

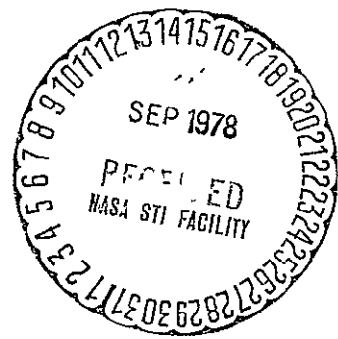
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 and Distortion Methodologies Studies

Volume II - Time Variant Data  
 Quality Analysis Plots

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# F-15 Inlet/Engine Test Techniques and Distortion Methodologies Studies

Volume II - Time Variant Data Quality Analysis Plots

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## FOREWORD

This report was prepared by the McDonnell Aircraft Company (MCAIR), a division of the McDonnell Douglas Corporation, St. Louis, Missouri for the National Aeronautics and Space Administration, Dryden Flight Research Center, Edwards, California. The study was performed under NASA Contract NAS4-2364, "F-15 Inlet/Engine Test Techniques and Distortion Methodologies Study." The work was performed from March 1977 through February 1978 with Mr. Jack Nugent (NASA/Dryden) as Program Monitor and Mr. Harvey Neumann (NASA/Lewis) as Technical Monitor. Special acknowledgement is due Mr. T. Putnam (NASA/Dryden) for his constructive criticisms and suggestions.

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This report consists of nine volumes. Technical discussions of the program, results and Appendices A and B are presented in Volume I (NASA CR 144866). Appendices C through J are presented in Volume II through IX (NASA CR 144867-144874) which present the distortion analysis plots and the associated statistical functions used for the analyses.

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16. Abstract <p>The Time Variant Data Quality Analysis plots contained in this volume of the F-15 Inlet/Engine Test Techniques and Distortion Methodologies Study were used in accomplishing the primary study goal of determining if peak distortion data taken from a subscale inlet model can be used to predict peak distortion levels for a full scale flight test vehicle. The results of this study are contained in the Technical Discussion, Volume I (NASA CR 144866).</p>					
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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
SUMMARY . . . . .	1
APPENDIX C - TIME VARIANT DATA QUALITY ANALYSIS PLOTS . . . . .	3
SUMMARY OF HIGH RESPONSE PROBES INVESTIGATED FOR TIME VARIANT DATA QUALITY . . . . .	4
DATA MATRIX TABLE . . . . .	5
TIME VARIANT DATA QUALITY ANALYSIS PLOTS . . . . .	8

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
C-1	Time Variant Data Quality Analysis for $M_0=.6$ , $\alpha=-10$ , $\beta=10$ , WAT2=97.2%. . . . .	8
C-2	Time Variant Data Quality Analysis for $M_0=.6$ , $\alpha=-10$ , $\beta=10$ , WAT2=90.2%. . . . .	9
C-3	Time Variant Data Quality Analysis for $M_0=.69$ , $\alpha=-8.4$ , $\beta=10.6$ , WAT2=101.2% . . . . .	10
C-4	Time Variant Data Quality Analysis for $M_0=.69$ , $\alpha=-8.4$ , $\beta=10.6$ , WAT2=101.2% . . . . .	11
C-5	Time Variant Data Quality Analysis for $M_0=.69$ , $\alpha=-8.4$ , $\beta=10.6$ , WAT2=101.2% . . . . .	12
C-6	Time Variant Data Quality Analysis for $M_0=.9$ , $\alpha=-10$ , $\beta=10$ , WAT2=70.2%. . . . .	13
C-7	Time Variant Data Quality Analysis for $M_0=.94$ , $\alpha=-8.9$ , $\beta=10.2$ , WAT2=107.1% . . . . .	14
C-8	Time Variant Data Quality Analysis for $M_0=.94$ , $\alpha=-8.9$ , $\beta=10.2$ , WAT2=107.1% . . . . .	15
C-9	Time Variant Data Quality Analysis for $M_0=.94$ , $\alpha=-8.9$ , $\beta=10.2$ , WAT2=107.1% . . . . .	16
C-10	Time Variant Data Quality Analysis for $M_0=.9$ , $\alpha=-10.0$ , $\beta=10.0$ , WAT2=106.3% . . . . .	17
C-11	Time Variant Data Quality Analysis for $M_0=1.6$ , $\alpha=-4.0$ , $\beta=0.0$ , WAT2=87.3%. . . . .	18
C-12	Time Variant Data Quality Analysis for $M_0=1.6$ , $\alpha=-4.0$ , $\beta=0.0$ , WAT2=96.9%. . . . .	19
C-13	Time Variant Data Quality Analysis for $M_0=1.57$ , $\alpha=-3.6$ , $\beta=.7$ , WAT2=89.3%. . . . .	20
C-14	Time Variant Data Quality Analysis for $M_0=1.57$ , $\alpha=-3.6$ , $\beta=.7$ , WAT2=89.3%. . . . .	21
C-15	Time Variant Data Quality Analysis for $M_0=1.57$ , $\alpha=-3.6$ , $\beta=.7$ , WAT2=89.3%. . . . .	22
C-16	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=80.5%. . . . .	23

LIST OF ILLUSTRATIONS  
(Continued)

<u>Figure</u>		<u>Page</u>
C-17	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=91.0%. . . . .	24
C-18	Time Variant Data Quality Analysis for $M_0=1.75$ , $\alpha=-2.6$ , $\beta=.4$ , WAT2=80.7%. . . . .	25
C-19	Time Variant Data Quality Analysis for $M_0=1.75$ , $\alpha=-2.6$ , $\beta=.4$ , WAT2=80.7%. . . . .	26
C-20	Time Variant Data Quality Analysis for $M_0=1.75$ , $\alpha=-2.6$ , $\beta=.4$ , WAT2=80.7%. . . . .	27
C-21	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=75.1%. . . . .	28
C-22	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=82.2%. . . . .	29
C-23	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=85.4%. . . . .	30
C-24	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=80.6%. . . . .	31
C-25	Time Variant Data Quality Analysis for $M_0=1.8$ , $\alpha=-2$ , $\beta=0$ , WAT2=79.8%. . . . .	32
C-26	Time Variant Data Quality Analysis for $M_0=1.81$ , $\alpha=-2.3$ , $\beta=.2$ , WAT2=78.9%. . . . .	33
C-27	Time Variant Data Quality Analysis for $M_0=1.81$ , $\alpha=-2.3$ , $\beta=.2$ , WAT2=78.9%. . . . .	34
C-28	Time Variant Data Quality Analysis for $M_0=1.81$ , $\alpha=-2.3$ , $\beta=.2$ , WAT2=78.9%. . . . .	35
C-29	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=-2$ , $\beta=0$ , WAT2=65.0%. . . . .	36
C-30	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=-2$ , $\beta=0$ , WAT2=52.9%. . . . .	37
C-31	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=-2$ , $\beta=0$ , WAT2=61.7%. . . . .	38
C-32	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=-2$ , $\beta=0$ , WAT2=62.3%. . . . .	39

LIST OF ILLUSTRATIONS  
(Concluded)

<u>Figure</u>		<u>Page</u>
C-33	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=-2$ , $\beta=0$ , WAT2=60.2% . . . . .	40
C-34	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=-2$ , $\beta=0$ , WAT2=60.5% . . . . .	41
C-35	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=0$ , $\beta=0$ , WAT2=69.3% . . . . .	42
C-36	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=0$ , $\beta=0$ , WAT2=75.4% . . . . .	43
C-37	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=0$ , $\beta=0$ , WAT2=73.6% . . . . .	44
C-38	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=0$ , $\beta=0$ , WAT2=68.3% . . . . .	45
C-39	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=.1$ , $\beta=.2$ , WAT2=73.0% . . . . .	46
C-40	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=.1$ , $\beta=.2$ , WAT2=73.0% . . . . .	47
C-41	Time Variant Data Quality Analysis for $M_0=2.2$ , $\alpha=.1$ , $\beta=.2$ , WAT2=73.0% . . . . .	48
C-42	Time Variant Data Quality Analysis for $M_0=2.5$ , $\alpha=0$ , $\beta=0$ , WAT2=63.1% . . . . .	49
C-43	Time Variant Data Quality Analysis for $M_0=2.5$ , $\alpha=0$ , $\beta=0$ , WAT2=68.2% . . . . .	50
C-44	Time Variant Data Quality Analysis for $M_0=2.5$ , $\alpha=0$ , $\beta=0$ , WAT2=62.8% . . . . .	51
C-45	Time Variant Data Quality Analysis for $M_0=2.5$ , $\alpha=0$ , $\beta=0$ , WAT2=68.9% . . . . .	52



SYMBOLS

	<u>Description</u>	<u>Units</u>
ALPHA	Aircraft angle of attack . . . . .	degrees
ALT	Altitude . . . . .	meters (feet)
AVG	Average. . . . .	
b, B	Radial Distortion Weighting factor . . . . .	
BYPASS	Inlet bypass area. . . . .	sq. meters (sq. inches)
Beta	Aircraft angle of sideslip . . . . .	degrees
CIVV	Compressor Inlet (Fan) Variable Vanes . . . . .	degrees
Deg	Degree . . . . .	degree
$\Delta P_{t_2}$	Fluctuating component of individual probe pressure at the engine face . . . . .	
$(\Delta P_{t_2})_{rms}$	Root mean square of fluctuating pressure . . . . .	kPa (PSIA)
DELTA3	Inlet third ramp angle relative to the Inlet Reference Line . . . . .	degrees
$\Delta P_{t_{2.5H}}$	Fluctuating component of fan exit total pressure/engine stream . . . . .	kPa (PSIA)
$\Delta P_{t_{2.5C}}$	Fluctuating component of fan exit total pressure/fan stream . . . . .	kPa (PSIA)
$\frac{\Delta P}{P}$ , $D_2$	Spatial Distortion = $[(P_{t_2})_{max} - (P_{t_2})_{min}] / \bar{P}_{t_2}$ . . . . .	
FLT, FLIGHT	Flight test data notation . . . . .	
FSCP	Full Scale Cold Pipe (without engine) wind tunnel test data notation . . . . .	
FSE	Full Scale with Engine wind tunnel test data notation . . . . .	
HZ	Hertz. . . . .	hertz
I.D., IDENT	Identification . . . . .	
$K_{a_2}$ , KA2	Fan distortion descriptor = $K_\theta + b K_{ra_2}$ . . . . .	
$K_\theta$ , KTHETA	Circumferential distortion . . . . .	
$K_{ra_2}$ , KRA2	Radial distortion. . . . .	

SYMBOLS (Continued)

	<u>Description</u>	<u>Units</u>
BKRA2	Radial distortion multiplied by radial distortion weighting factor. . . . .	
KC2	High compressor distortion descriptor. . . . .	
KØSP	Circumferential distortion descriptor used to calculate the high compressor distortion descriptor. . . . .	
kPa	Pressure, Killopascals . . . . .	Killopascals
$M_o$	Freestream Mach number . . . . .	
MACH	Freestream Mach number . . . . .	
MAX	Maximum. . . . .	
MIN	Minimum. . . . .	
No.	Number . . . . .	
$P_{t2}$	Individual probe engine face steady state pressure . . . . .	kPa (PSIA)
$\overline{P}_{t2}$	48 probe averaged engine face steady state pressure . . . . .	kPa (PSIA)
$\overline{P}_{t25H}$	Average high compressor face steady state pressure . . . . .	kPa (PSIA)
$P_{t_o}$	Freestream total pressure. . . . .	kPa (PSIA)
PT2I	Individual probe time variant engine face pressure . . . . .	kPa (PSIA)
$\overline{PT2I}, \overline{PI}$	48 probe averaged time variant engine face pressure . . . . .	kPa (PSIA)
PI/PS	Ratio of time variant to steady state 48 probe averaged engine face pressure . . . . .	
PSIA	Pressure (Pounds per Square Inch Absolute) . . . . .	PSIA
Q, q	Dynamic pressure . . . . .	kPa (PSIA)
Re. No.	Reynolds number . . . . .	
RHO	Inlet first ramp angle relative to the Inlet Reference Line . . . . .	degrees
RMS, rms	Root mean square . . . . .	
Sec	Second . . . . .	second

SYMBOLS (Continued)

	<u>Description</u>	<u>Units</u>
Series VII	1/6th scale inlet wind tunnel test series data notation . . . . .	
Series VIII	1/6th scale inlet wind tunnel test series data notation . . . . .	
$T_{t2}$	Engine face total temperature . . . . .	°K
$T_{t25H}$	High compressor inlet (or fan exit) total temperature . . . . .	°K
Tu	Turbulence . . . . .	
W2	Engine/Fan airflow . . . . .	kg/sec (LB/sec)
WAT2	Corrected fan airflow = $W2\sqrt{\theta_{t2}}/\delta_{t2}$ . . . . .	kg/sec (LB/sec)
WAT2 Design	Design corrected fan airflow . . . . .	98.43 kg/sec (217 LB/sec)
WAT2 Percent	WAT2 divided by WAT2 Design x 100 . . . . .	
W25H	High compressor airflow . . . . .	kg/sec (LB/sec)
WAT25H	Corrected high compressor airflow $W25H \sqrt{\theta_{t25H}}/\delta_{t25H}$ . . . . .	kg/sec (LB/sec)
WAT25H Design	Design corrected high compressor airflow . . . . .	24.69 kg/sec (54.44 LB/sec)
WAT25H Percent	WAT25H divided by WAT25H Design x 100. . . . .	
$\alpha$	Aircraft angle of attack . . . . .	degrees
$\beta$	Aircraft angle of sideslip . . . . .	degrees
$\Delta_3$	Inlet third ramp angle relative to the Inlet Reference Line . . . . .	degrees
$\delta_{t2}$	Corrected average engine face total pressure $P_{t2}/101$ . . . . .	
$\delta_{t25H}$	Corrected average engine face total pressure $P_{t25H}/101$ . . . . .	
$\rho$	Inlet first ramp angle relative to the Inlet Reference Line . . . . .	degrees
$\sigma$	Standard deviation of the instantaneous pressure . . . . .	kPa (PSIA)

SYMBOLS (Concluded)

	<u>Description</u>	<u>Units</u>
$\sigma_{xy}(\tau)$	Covariance of pressure data from probes x and y at lag time $\tau$ . . . . .	kPa (PSIA)
$\sigma_{xy}(\tau=0)$	Covariance of pressure data from probes x and y at lag time $\tau=0$ . . . . .	kPa (PSIA)
$\theta_{t_2}$	Corrected average engine face total temperature $T_{t_2}/288.15$ . . . . .	
$\theta_{t_{25H}}$	Corrected average high compressor face total temperature $T_{t_{25H}}/288.15$ . . . . .	

## SUMMARY

Recent emphasis on increased maneuverability requirements for fighter aircraft has necessitated an extensive engineering development effort be directed towards inlet/engine compatibility. Inlet/engine compatibility must be assessed early in the aircraft development program to allow necessary inlet and engine design modifications to be defined and implemented at minimum cost impact. This early assessment of inlet/engine compatibility is determined by engine stability audits computed using inlet distortion levels from subscale inlet model data and engine sensitivities to inlet distortion. Therefore, the accuracy with which subscale inlet model distortion levels predict flight test vehicle distortion levels is a crucial element in assessing inlet/engine compatibility.

The primary goal of this distortion methodologies study was to determine if time variant distortion data taken from a subscale inlet model can predict peak distortion levels for a full scale flight test vehicle. The data base used to accomplish this goal was collected in separate programs by MCAIR and NASA/Dryden. Subscale and full scale wind tunnel data were collected by MCAIR during the F-15 development program, and flight test data were collected by NASA/Dryden during the NASA F-15 inlet/engine compatibility flight test program. This data base has a Mach number range of 0.4 to 2.5 and an angle of attack range from -10 degrees to +12 degrees.

The primary objectives accomplished in meeting the overall program goal were to determine the effects on peak distortion of: (1) Reynolds Number/scale, (2) engine presence and (3) frequency content. In addition, the capability of the P&WA stability audit system to predict engine stalls was evaluated, and the capability of Melick's procedure, Reference (1), to predict peak time variant distortion levels was evaluated. Using the Pratt and Whitney Aircraft distortion descriptor,  $K_{a2}$ , the data indicate the following significant results for the F-15/F100 inlet/engine propulsion system.

- o Peak time variant distortion from subscale inlet model wind tunnel tests are representative of full scale flight test distortion.
- o The time variant pressure data of this study are random stationary data, thereby allowing valid statistical analyses to be conducted.
- o The effect of the engine presence on total pressure recovery, peak time variant distortion and turbulence level is small but favorable.
- o The Reynolds number/scale evaluation indicates a general trend of increasing total pressure recovery, decreasing peak time variant fan distortion and decreasing turbulence with increasing Reynolds number/scale.
- o The frequency content evaluation indicates that peak time variant fan distortion and turbulence increase with increasing filter cutoff frequency for all of the data evaluated in this study.
- o The capability of the Pratt & Whitney Aircraft stability audit system to predict engine stalls has been verified for both stall and non-stall flight test conditions.

- o Predictions of peak distortion values using Melick's procedure are accurate to 11.3 percent average error for fourteen data points having nominal turbulence levels and are accurate to 20 percent average error (the maximum error approaches 40 percent) for eight data points having high turbulence levels.

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APPENDIX C

TIME VARIANT DATA QUALITY ANALYSIS PLOTS

Presented herein are the data used to establish the time variant data quality for this study. Time history plots are presented in Figure C-1 through Figure C-45 for the instantaneous (time variant) pressure, mean of the instantaneous pressure, variance of the instantaneous pressure, and the standard deviation of the instantaneous pressure.

SUMMARY OF HIGH RESPONSE PROBES INVESTIGATED  
FOR TIME VARIANT DATA QUALITY

FIGURE NUMBER	DATA POINT IDENTIFICATION NUMBER	*PART-POINT	MODEL SCALE	PROBE ANALYZED
1	5	164-1	1/6th	L3R3
2	6	164-3	1/6th	L5R3
3	7	421-10	FLT	L2R2
4	7	421-10	FLT	L2R3
5	7	421-10	FLT	L2R6
6	17	157-7	1/6th	L4R3
7	19	421-14	FLT	L3R2
8	19	421-4	FLT	L3R4
9	19	421-14	FLT	L3R6
10	18	157-5	1/6th	L3R3
11	42	206-9	1/6th	L6R3
12	43	206-5	1/6th	L6R3
13	44	414-2	FLT	L6R2
14	44	414-2	FLT	L6R3
15	44	414-2	FLT	L6R6
16	45	15-9	1/6th	L6R3
17	46	15-5	1/6th	L6R3
18	47	415-1	FLT	L4R6
19	47	415-1	FLT	L5R1
20	47	415-1	FLT	L8R3
21	48	353-15	FSCP	L2R3
22	49	353-5	FSCP	L8R3
23	50	353-12	FSCP	L8R3
24	51	523-12	FSE	L8R3
25	52	525-4	FSE	L8R3
26	53	416-1	FLT	L4R2
27	53	416-1	FLT	L6R2
28	53	416-1	FLT	L8R2
29	60	249-5	1/6th	L8R3
30	61	249-9	1/6th	L7R3
31	62	385-5	FSCP	L1R3
32	63	385-2	FSCP	L1R3
33	64	542-2	FSE	L8R3
34	65	543-4	FSE	L8R3
35	66	184-7	1/6th	L8R3
36	67	184-5	1/6th	L8R3
37	68	413-9	FSCP	L8R3
38	69	413-12	FSCP	L8R3
39	70	425-1	FLT	L1R2
40	70	425-1	FLT	L1R3
41	70	425-1	FLT	L1R5
42	79	227-7	1/6th	L5R3
43	80	227-5	1/6th	L7R3
44	81	465-8	FSCP	L8R3
45	82	465-5	FSCP	L8R3

\* FOR FLIGHT DATA, THESE ARE FLIGHT-RUN NUMBERS



DATA POINT I.D. NO.	MODEL SCALE	M <sub>0</sub>	α (DEG)	β (DEG)	ρ (DEG)	Δ3 (DEG)	BYPASS*	% WAT2	RE NO x 10 <sup>-6</sup>	ANALYSIS TIME (SEC)	PART-POINT **
1	FLT	0.4	16.4	-0.8	6.9	27.6	C	104.1	1.44	0.6	422-4
2	FLT	0.59	13.9	0.9	7.0	26.6	C	102.7	2.04	0.6	417-5
3	↓	0.52	10.0	0.7	↓	27.6	↓	107.1	1.33	0.6	417-4
4	↓	0.69	11.5	1.0	↓	26.5	↓	104.2	0.84	0.6	417-2
5	1/6th	0.60	-10.0	10.0	-3.0	10.6	C	97.2	0.43	0.144	164-1
6	1/6th	0.60	-10.0	10.0	-3.0	10.6	C	90.2	0.43	0.144	164-3
7	FLT	0.69	-8.4	10.6	0.6	10.5	C	101.2	1.40	0.88	421-10
8	1/6th	0.60	4.0	0	7.0	10.6	C	76.6	0.43	0.181	112-7
9	1/6th	0.60	4.0	0	7.0	10.6	C	108.6	0.43	0.181	112-5
10	FSE	0.60	4.0	0	5.2	10.0	C	97.7	3.41	1.110	116-2
11	FLT	0.67	4.3	0.7	6.9	11.1	C	94.4	3.58	0.72	424-2
12	↓	0.69	3.4	0.7	6.9	11.1	↓	74.1	3.68	0.76	425-6
13	↓	0.59	4.6	1.2	7.0	11.1	↓	107.9	1.74	0.62	412-2
14	↓	0.60	4.6	0.6	6.9	11.0	↓	76.2	1.66	1.11	424-11
15	FLT	0.85	8.8	-0.5	7.0	27.6	C	104.2	2.21	0.60	417-3
16	FLT	0.92	5.6	0.6	7.0	26.6	C	104.5	1.04	0.60	417-1
17	1/6th	0.90	-10.0	10.0	-3.0	10.6	C	70.2	0.34	0.113	157-7
18	1/6th	0.90	-10.0	10.0	-3.0	10.6	C	106.3	0.34	0.113	157-5
19	FLT	0.94	-8.9	10.2	1.0	10.5	C	107.1	1.6	0.69	421-14
20	FSE	0.90	-4.0	0	-1.0	8.2	C	97.8	3.64	1.990	102-2
21	FLT	0.90	-2.8	-0.2	-1.2	8.7	C	97.5	3.25	1.23	424-10
22	FLT	0.93	-3.3	0	-1.2	8.6	C	104.8	1.17	1.99	425-3
23	1/6th	0.90	4.0	0	7.0	10.6	C	76.8	0.34	0.369	67-9
24	1/6th	0.90	4.0	0	7.0	10.6	C	104.3	0.34	0.369	67-7
25	FSE	0.90	4.0	0	7.3	10.4	C	97.7	3.62	2.260	126-2
26	FLT	0.92	4.6	0.7	6.0	11.0	C	96.2	3.47	0.89	420-9
27	↓	0.91	5.2	0.5	6.9	11.1	↓	99.1	3.28	1.18	422-2
28	↓	0.92	4.2	0.1	7.0	11.0	↓	76.1	2.47	1.34	421-5
29	↓	0.90	4.1	0.5	6.9	11.1	↓	98.6	2.43	1.46	424-9
30	↓	0.90	5.1	0.1	7.0	11.0	↓	105.7	2.42	0.69	421-4
31	↓	0.90	3.5	0.2	7.0	11.0	↓	77.5	1.78	2.26	421-6
32	↓	0.90	5.2	-0.1	7.0	11.0	↓	100.1	1.79	0.70	421-7
33	↓	0.94	4.3	0.2	7.0	11.1	↓	105.6	1.89	1.06	421-8

\*C = Closed

GP76 0323 8

\*\* For flight test, these data are flight-run numbers

TABLE C-1  
DATA MATRIX

DATA POINT I.D. NO.	MODEL SCALE	M <sub>0</sub>	α (DEG)	β (DEG)	ρ (DEG)	Δ3 (DEG)	BYPASS*	% WAT2	RE NO x 10 <sup>-6</sup>	ANALYSIS TIME (SEC)	PART-POINT **
34	FLT	1.21	1.5	0	6.0	27.6	C	98.3	2.97	0.60	423-4
35	FLT	1.24	3.0	0.8	6.7	27.6	C	96.4	1.52	0.60	423-3
36	1/6th	1.2	10.0	0	7.0	10.6	C	76.6	0.45	0.198	131-7
37	1/6th	1.2	10.0	0	7.0	10.6	C	107.9	0.45	0.198	131-5
38	FLT	1.18	7.7	0.3	7.0	11.0	C	74.0	3.22	1.21	424-12
39	↓	1.2	7.4	-0.1	7.1	11.1	↓	94.4	3.35	1.19	424-13
40	↓	1.17	10.6	0.0	7.0	11.0	↓	103.4	1.40	0.60	421-17
41	FLT	1.54	1.5	0	-1.4	27.0	Auto	95.4	2.17	0.60	424-6
42	1/6th	1.6	-4.0	0	-2.0	13.5	C	87.3	0.21	0.106	206-9
43	1/6th	1.6	-4.0	0	-2.0	13.5	C	96.9	0.21	0.106	206-5
44	FLT	1.57	-3.6	0.7	-2.3	13.7	C	89.3	1.46	0.65	414-2
45	1/6th	1.8	-2.0	0	-3.0	17.4	C	80.5	0.22	0.210	15-9
46	1/6th	1.8	-2.0	0	-3.0	17.4	C	91.0	0.22	0.201	15-5
47	FLT	1.75	-2.6	0.4	-2.2	16.7	C	80.7	1.41	1.23	415-1
48	FSCP	1.8	-2.0	0	-3.0	18.7	C	75.1	1.45	0.680	353-15
49	↓	↓	-2.0	↓	-3.0	↓	↓	82.2	1.45	0.680	353-5
50	↓	↓	-2.0	↓	-3.0	↓	↓	85.4	1.44	0.680	353-12
51	FSE	1.8	-2.0	0	-2.9	18.6	C	80.6	1.46	0.680	523-2
52	FSE	1.8	-2.0	0	-2.9	18.6	C	79.8	1.46	0.680	525-4
53	FLT	1.81	-2.3	0.2	-2.9	18.2	C	78.9	1.53	0.680	416-1
54	FSCP	1.8	4.0	0	2.5	18.7	C	79.9	1.45	2.800	355-8
55	FSE	1.8	4.0	0	2.5	18.7	C	80.8	1.46	2.800	528-2
56	FSE	1.8	4.0	0	2.5	18.7	C	79.7	1.46	2.800	529-4
57	FLT	2.0	2.5	0.2	2.3	20.9	Auto	77.0	1.72	2.800	425-2

\*C = Closed

\*\* For flight test, these data are flight-run numbers

GP78-0323 9

TABLE C-1 (Continued)  
DATA MATRIX

DATA POINT I.D NO.	MODEL SCALE	M <sub>0</sub>	α (DEG)	β (DEG)	ρ (DEG)	Δ3 (DEG)	BYPASS*	% WAT2	RE NO. x 10 <sup>-6</sup>	ANALYSIS TIME (SEC)	PART-POINT**
58	1/6th	2.2	-2.0	0	-4.0	22.5	C	68.6	0.22	0.100	250-7
59	FSCP	2.2	-2.0	0	-4.0	22.5	C	69.2	1.48	0.600	411-6
60	1/6th	2.2	-2.0	0	-4.0	25.0	O	65.0	0.22	0.100	249-5
61	1/6th	2.2	-2.0	0	-4.0	25.0	O	52.9	0.22	0.100	249-9
62	FSCP	2.2	-2.0	0	-4.0	25.0	O	61.7	1.48	0.600	385-5
63	FSCP	2.2	-2.0	0	-4.0	25.0	O	62.3	1.48	0.600	385-2
64	FSE	2.2	-2.0	0	-4.0	24.8	P	60.2	1.27	0.600	542-2
65	FSE	2.2	-2.0	0	-4.0	24.8	P	60.5	1.27	0.600	543-4
66	1/6th	2.2	0	0	-2.0	22.5	C	69.3	0.22	0.106	184-7
67	1/6th	2.2	0	0	-2.0	22.5	C	75.4	0.22	0.106	184-5
68	FSCP	2.2	0	0	-2.0	22.5	C	73.6	1.47	0.650	413-9
69	FSCP	2.2	0	0	-2.0	22.5	C	68.3	1.47	0.650	413-12
70	FLT	2.2	0.1	0.2	-2.2	22.9	C	73.0	2.34	0.650	425-1
71	FSCP	2.2	4.0	0	0.0	25.0	O	60.7	1.48	0.600	382-3
72	FSE	2.2	4.0	0	1.0	25.0	O	59.2	1.28	0.600	545-2
73	FSE	2.2	4.0	0	1.0	25.0	O	58.2	1.27	0.600	546-4
74	1/6th	2.2	12.0	0	6.0	25.0	O	47.3	0.22	0.100	252-9
75	1/6th	2.2	12.0	0	6.0	25.0	O	65.0	0.22	0.100	252-5
76	FSCP	2.2	12.0	0	6.8	25.0	O	60.8	1.48	0.600	384-2
77	FSE	2.2	11.0	0	6.8	24.8	O	59.0	1.28	0.600	548-3
78	FSE	2.2	11.0	0	6.8	24.8	P	59.8	1.27	0.600	549-8
79	1/6th	2.5	0	0	-4.0	26.0	O	63.1	0.21	0.100	227-7
80	1/6th	2.5	0	0	-4.0	26.0	O	68.2	0.21	0.100	227-5
81	FSCP	2.5	0	0	-4.0	26.0	O	62.8	1.28	0.600	465-8
82	FSCP	2.5	0	0	-4.0	26.0	O	68.9	1.28	0.600	465-5

\*O = Open, C = Closed, P = Partial

GP76 0323 10

\*\*For flight test, these data are flight-run numbers

TABLE C-1 (Concluded)  
DATA MATRIX

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SERIES VII - NASA DATA STUDY

DATA PART/POINT 164 / 1 IDENT 5 e 1040 HZ. PROBE L3R3  
THE SECTION START TIME WAS AT 22-11 52 042

MACH 0.6      ALPHA -10      BETA 10      RHO -3.0      DELTA3 10.6      BYPASS 0.0      WAT2 97.2%      CIWV -11.7

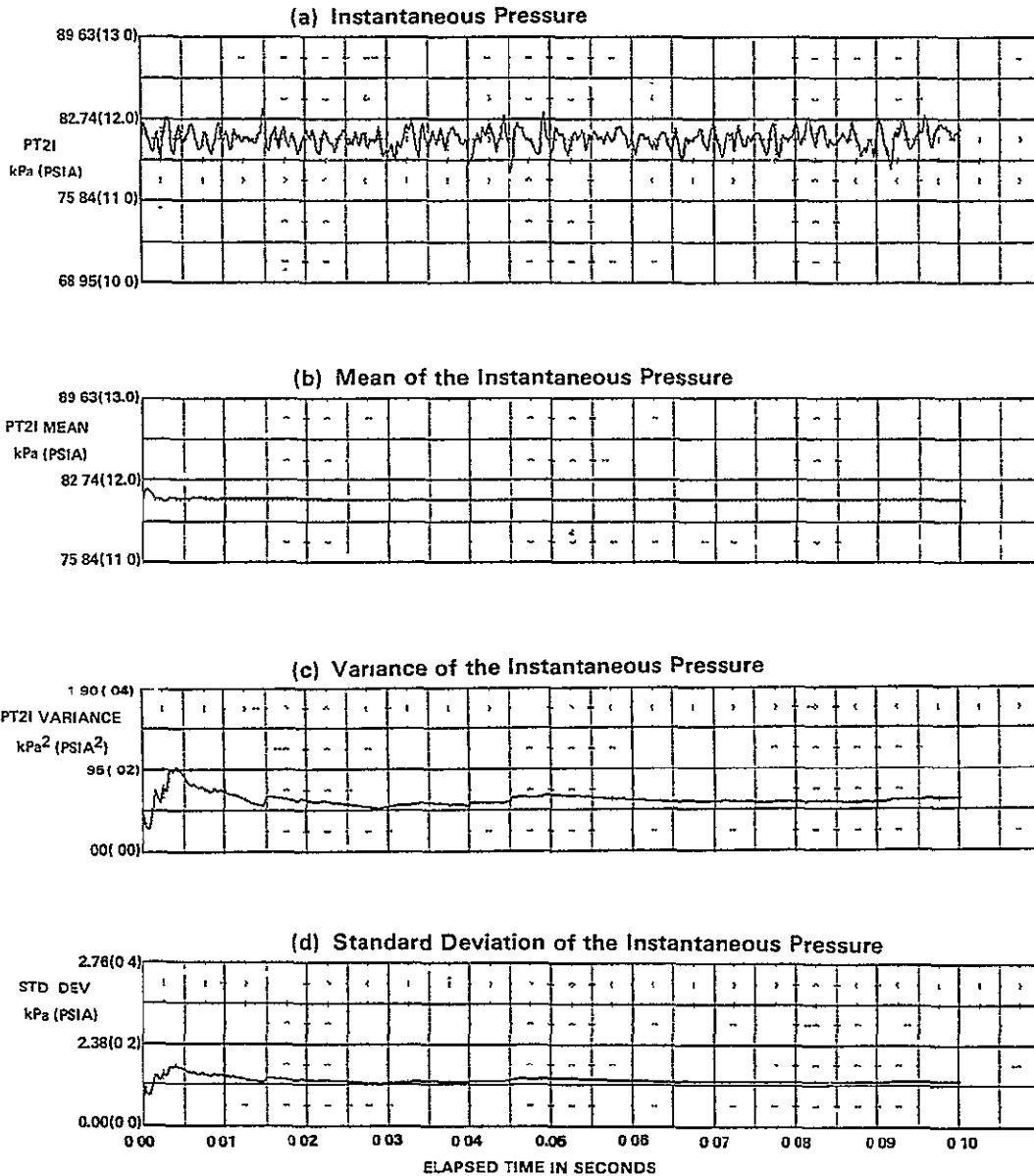


FIGURE C-1  
TIME VARIANT DATA QUALITY ANALYSIS  
Probe = L3R3     $M_0 = 0.6$      $\alpha = -10$      $\beta = 10.0$     WAT2 = 97.2%

DATA PART/PRINT 184 / 3 IDENT 6 e 1040 HZ PROBE L5R3  
THE SEGMENT START TIME WAS AT 22.13.53 098

MACH 0.5      ALPHA -10      BETA 10      RHO -3.0      DELTA3 10.6      BYPASS 0.0      WAT2 90.2%      CIVV -18.6

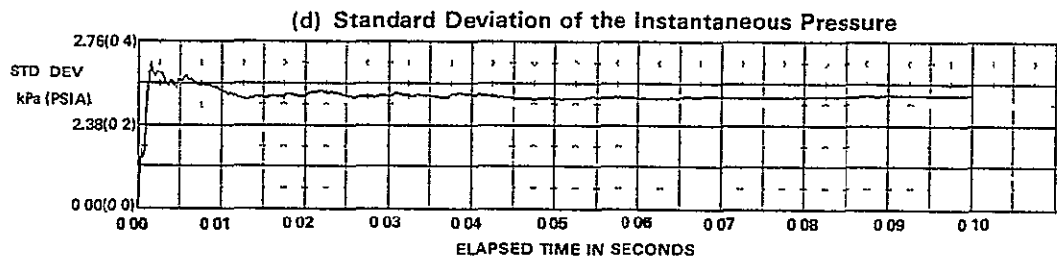
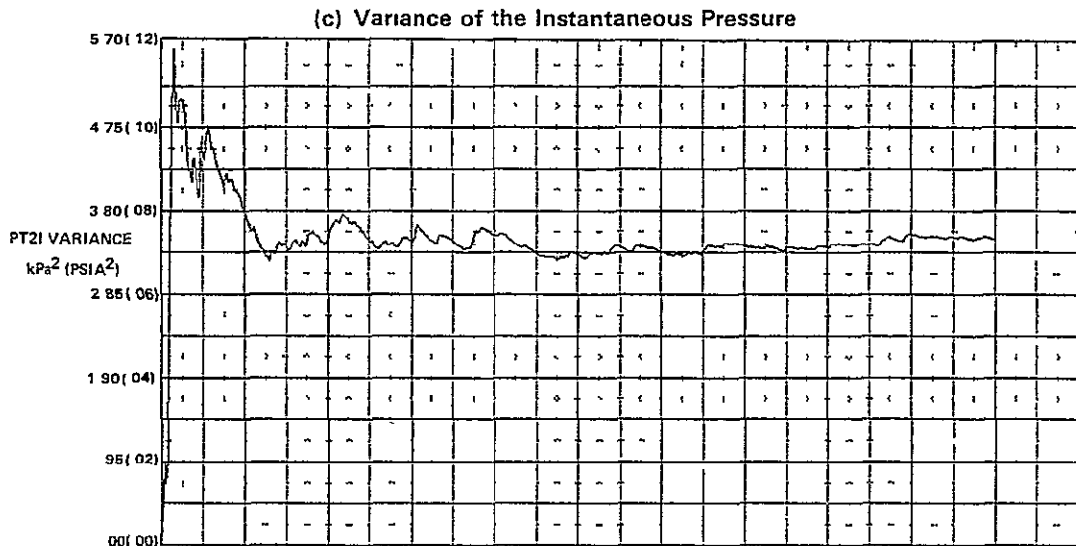
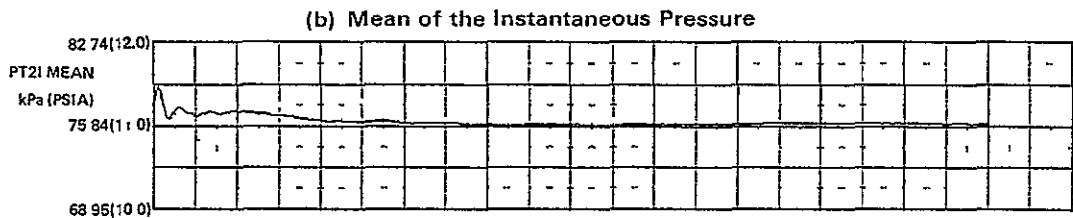
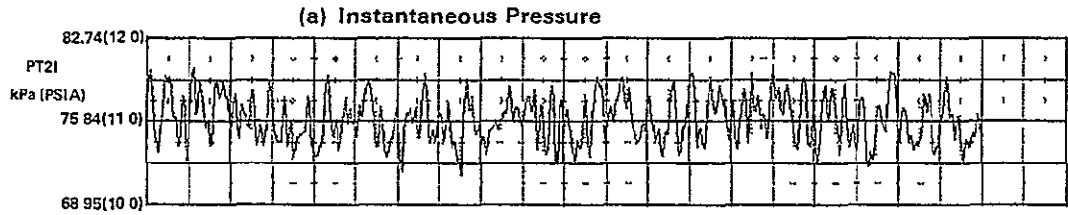


FIGURE C-2  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L5R3,  $M_0 = 0.6$ ,  $\alpha = -10.0$ ,  $\beta = 10.0$ , WAT2 = 90.2 %

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FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 421/10 IDENT 7 PROBE L2R2  
THE SEGMENT START TIME WAS AT 21 09 24 775

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
.69	-8.5	10.5	12142(39835)	60	10.5	0.0	101.2%	-8.513

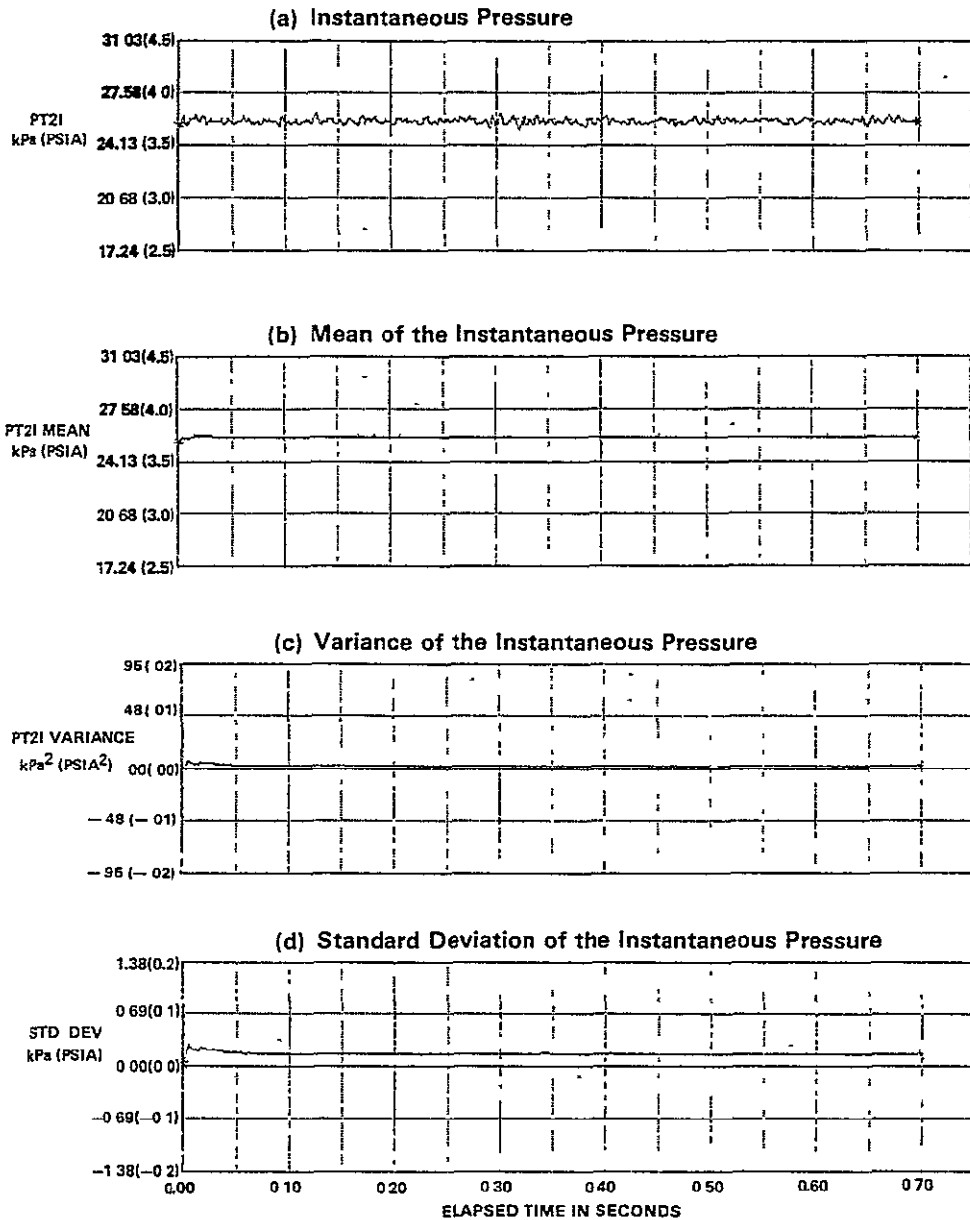


FIGURE C-3  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L2R2,  $M_0 = .69$ ,  $\alpha = -8.4$ ,  $\beta = 10.6$ ,  $WAT2 = 101.2\%$

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FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 421/10 IDENT 7 PROBE L2R3  
THE SEGMENT START TIME WAS AT 21 09 24 775

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
69	-8.5	10.5	12142(39835)	60	10.5	00	101.2%	-8.513

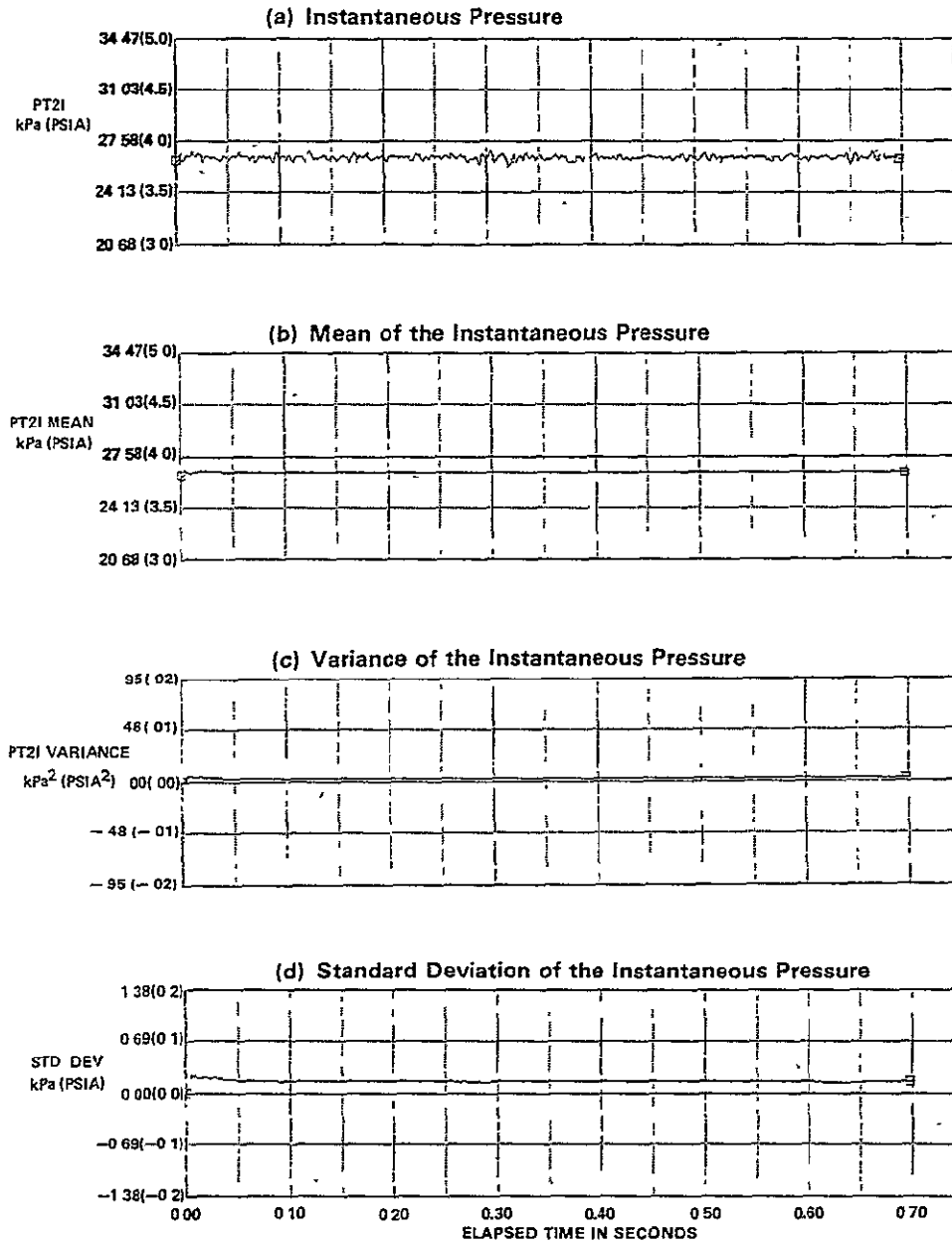
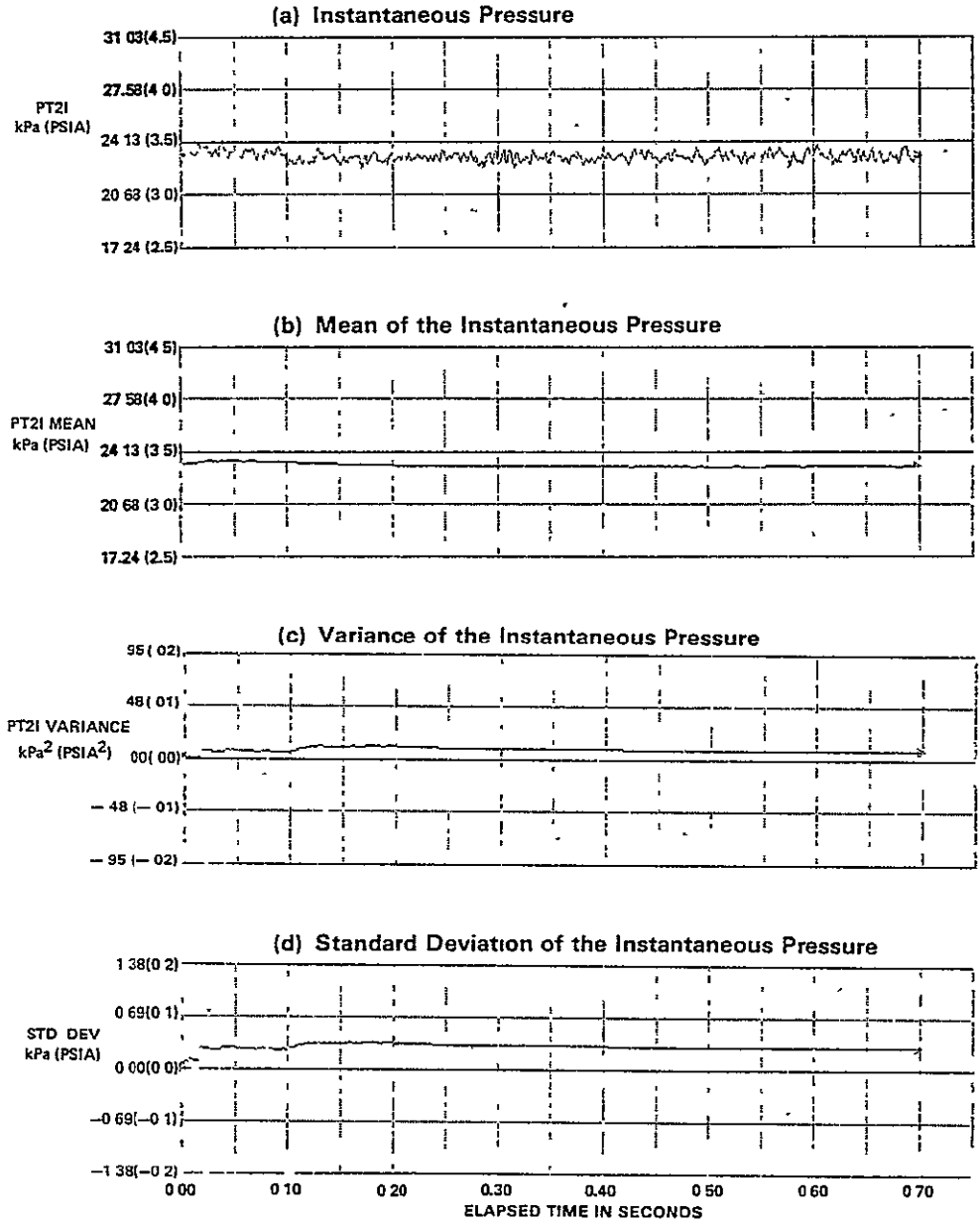


FIGURE C-4  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L2R3,  $M_0 = .69$ ,  $\alpha = -8.4$ ,  $\beta = 10.6$ ,  $WAT2 = 101.2\%$

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 421/10 IDENT 7 PROBE L2R6  
 THE SEGMENT START TIME WAS AT 21 09 24 775

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
69	-8.5	10.5	12142(39835)	60	10.5	0.0	101.2%	-8.513



**FIGURE C-5**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L2R6,  $M_0 = .69$ ,  $\alpha = -8.4$ ,  $\beta = 10.6$ , WAT2 = 101.2 %**



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SERIES VII - NASA DATA STUDY

DATA POINT 157.7 IDENT 17 @ 1040 HZ. PROBE L4R3  
THE ELEMENT START TIME WAS 9. 20 10 57 083

MACH 0.9      ALPHA -10      BETA 10      P40 -2.0      DELTA2 10.5      WAT2 70.2%      CIVV -25.9

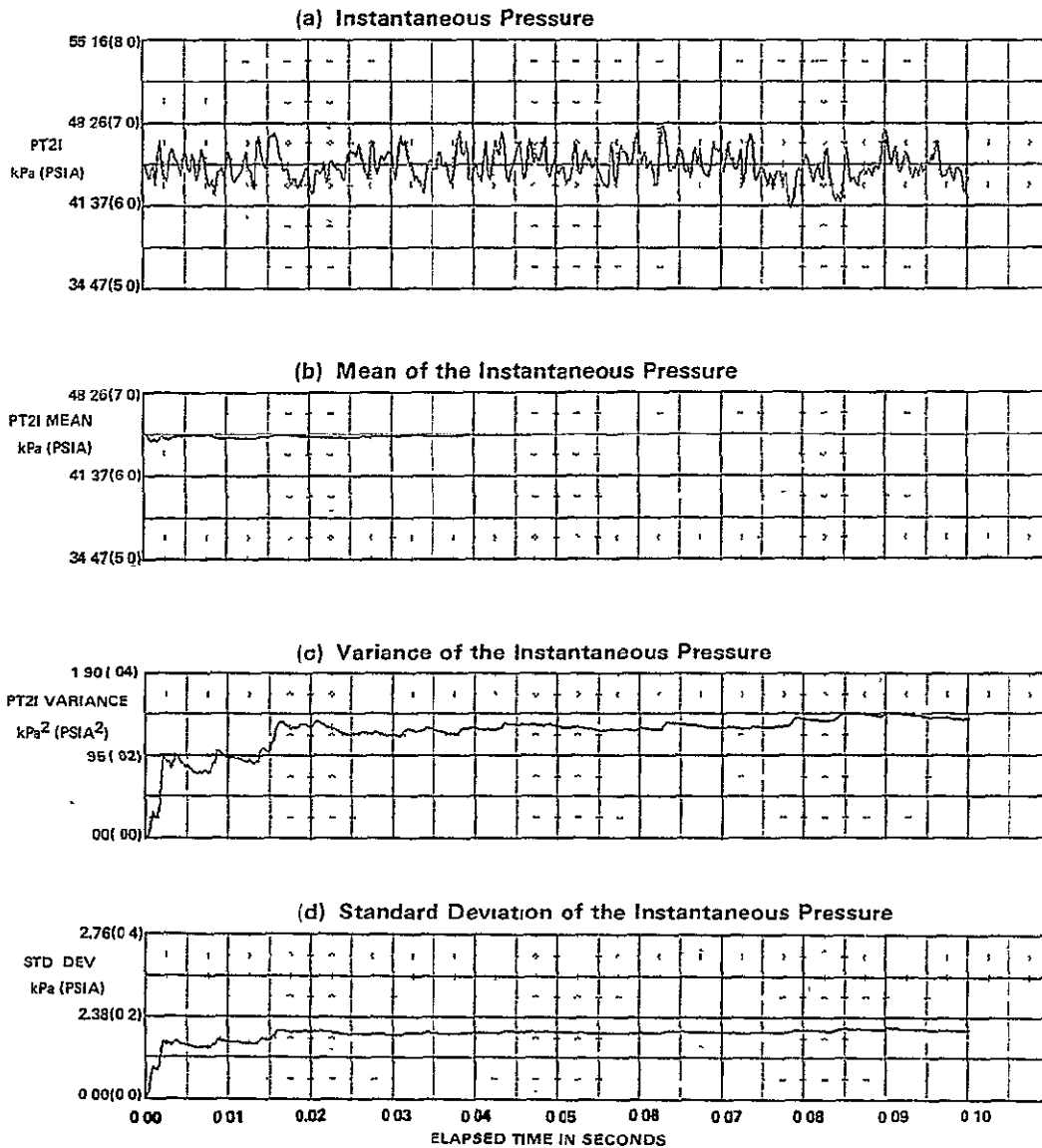
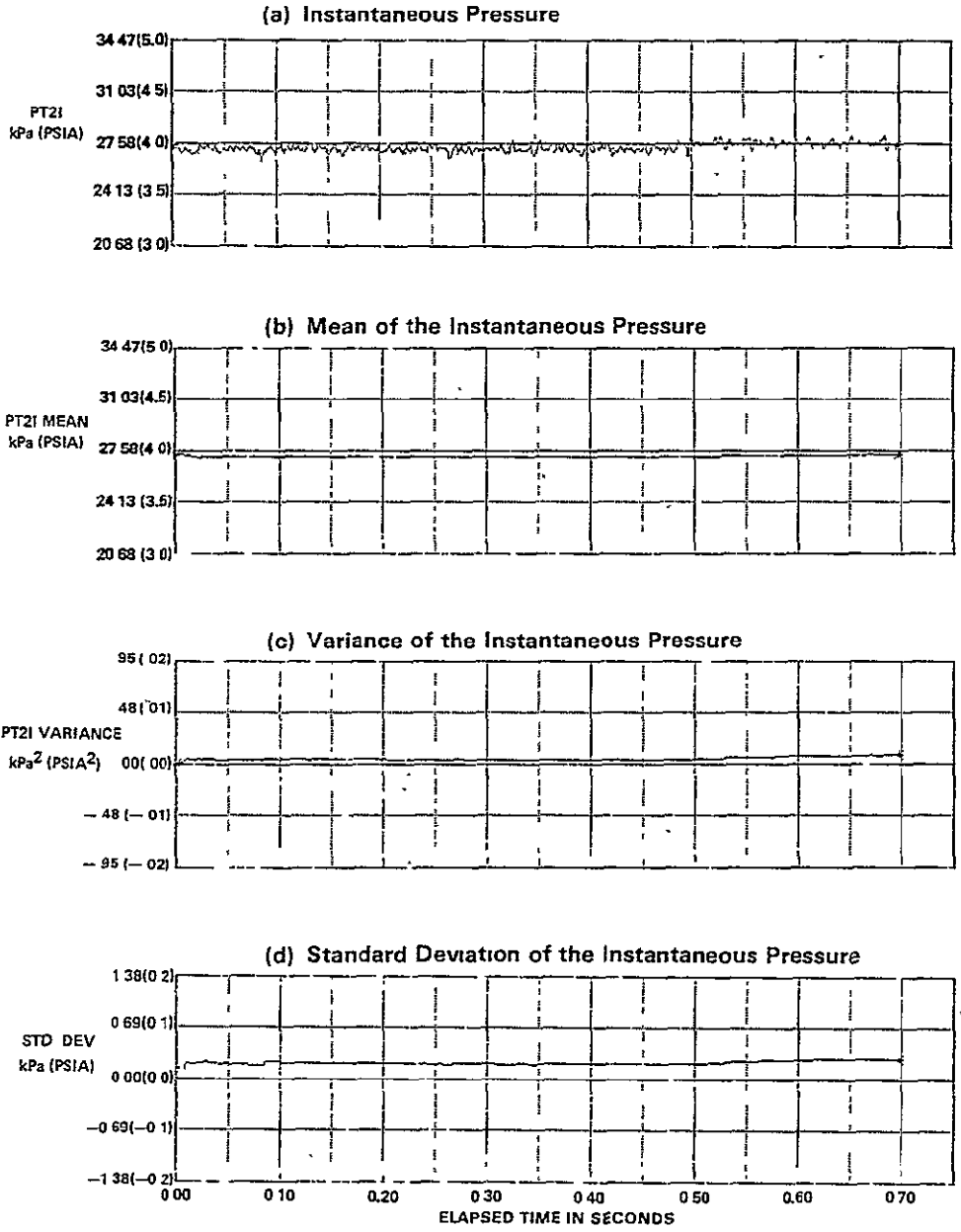


FIGURE C-6  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L4R3,  $M_0 = 0.9$ ,  $\alpha = -10.0$ ,  $\beta = 10.0$ ,  $WAT2 = 70.2\%$

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 421/14 IDENT 19 PROBE L3R2  
 THE SEGMENT START TIME WAS AT 21 16 07 335

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
94	-8.9	10.2	13402(43970)	1.0	10.5	0.0	107.1%	-5.000



**FIGURE C-7**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L3R2,  $M_0 = 1.94$ ,  $\alpha = -8.9$ ,  $\beta = 10.2$ , WAT2 = 107.1 %**

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FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 421/14 IDENT 19 PROBE L3R4  
THE SEGMENT START TIME WAS AT 21.16 07 335

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
94	-8.9	10.2	.13402(43970)	1.0	10.5	0.0	107.1%	-5.000

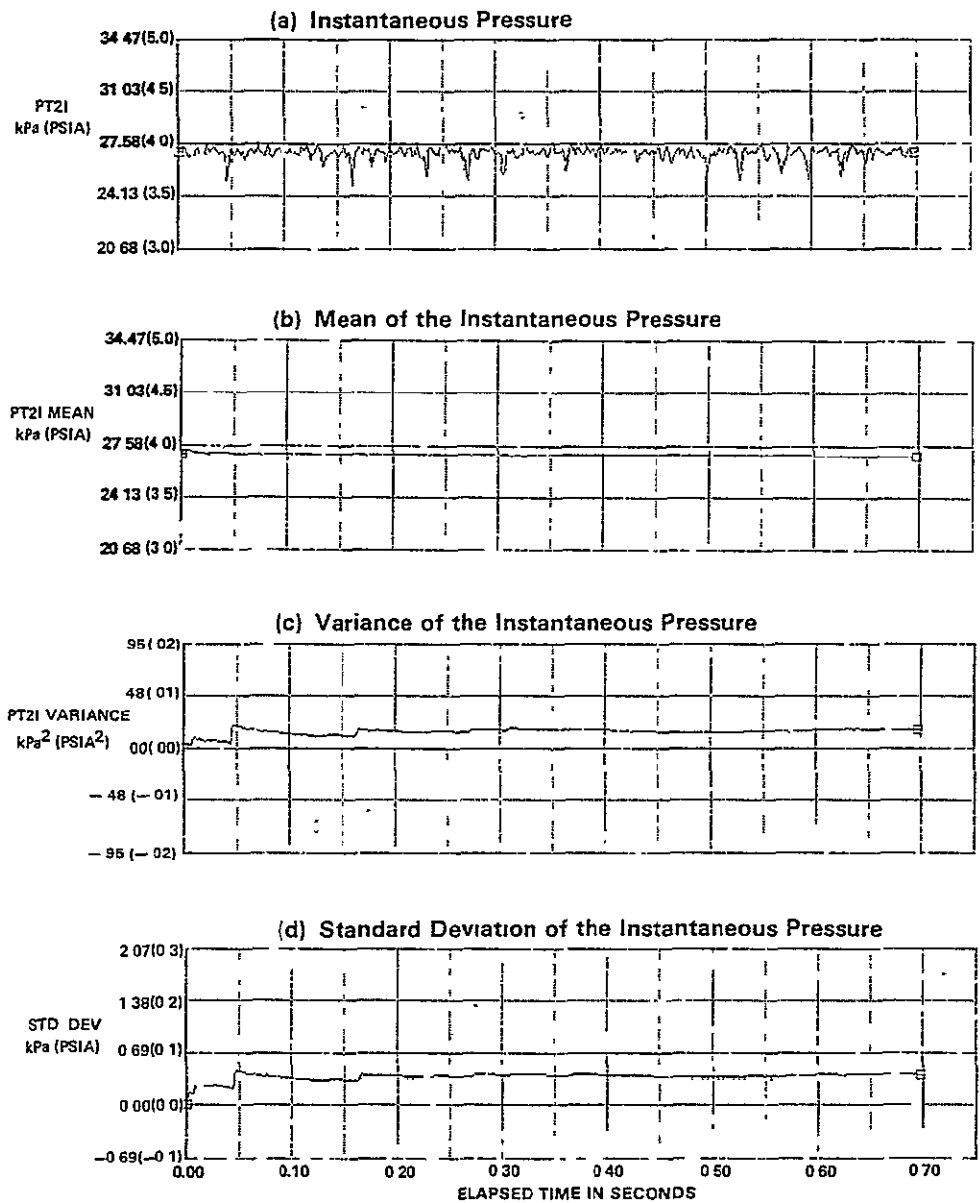
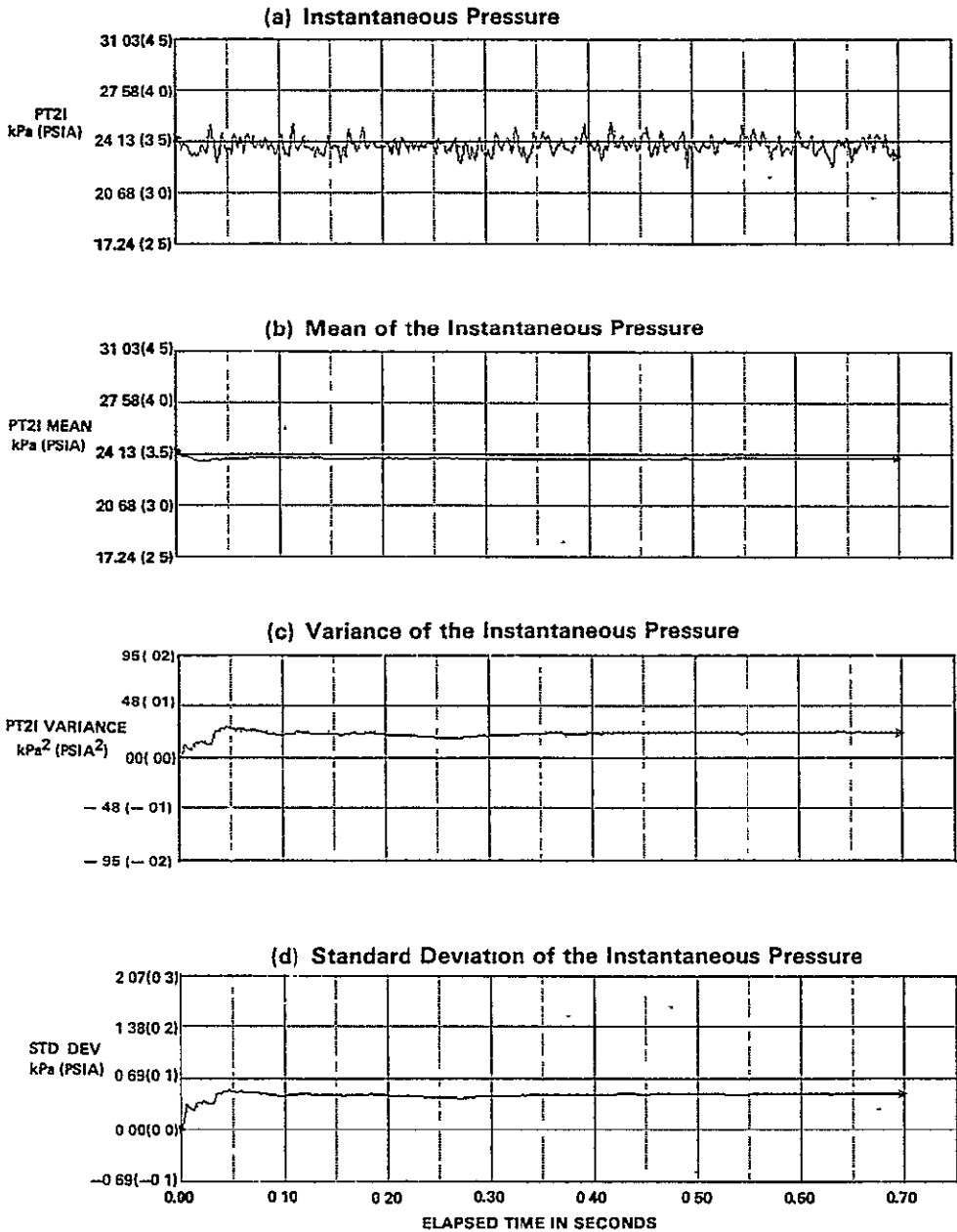


FIGURE C-8  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L3R4,  $M_0 = .94$ ,  $\alpha = -8.9$ ,  $\beta = 10.2$ ,  $WAT2 = 107.1\%$

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 421/14 IDENT 19 PROBE L3R6  
 THE SEGMENT START TIME WAS AT 21 16 07 335

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
94	-8.9	10.2	.13402(43970)	1.0	10.5	0.0	107.1%	-5.030



**FIGURE C-9**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L3R6,  $M_0 = 1.94$ ,  $\alpha = -8.9$ ,  $\beta = 10.2$ , WAT2 = 107.1%**

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SERIES VII - NASA DATA STUDY

DATA PART/JUNT 157 / 5 IDENT 18 @ 1040 HZ PROBE L3R3  
THE SEGMENT START TIME WAS AT 20 8 47 058

MACH 2.9 ALPHA -10 BETA 10 P-O 3.3 DELTAS 10.6 BYPASS 0.0 WAT2 106.3% CIVV -5.0

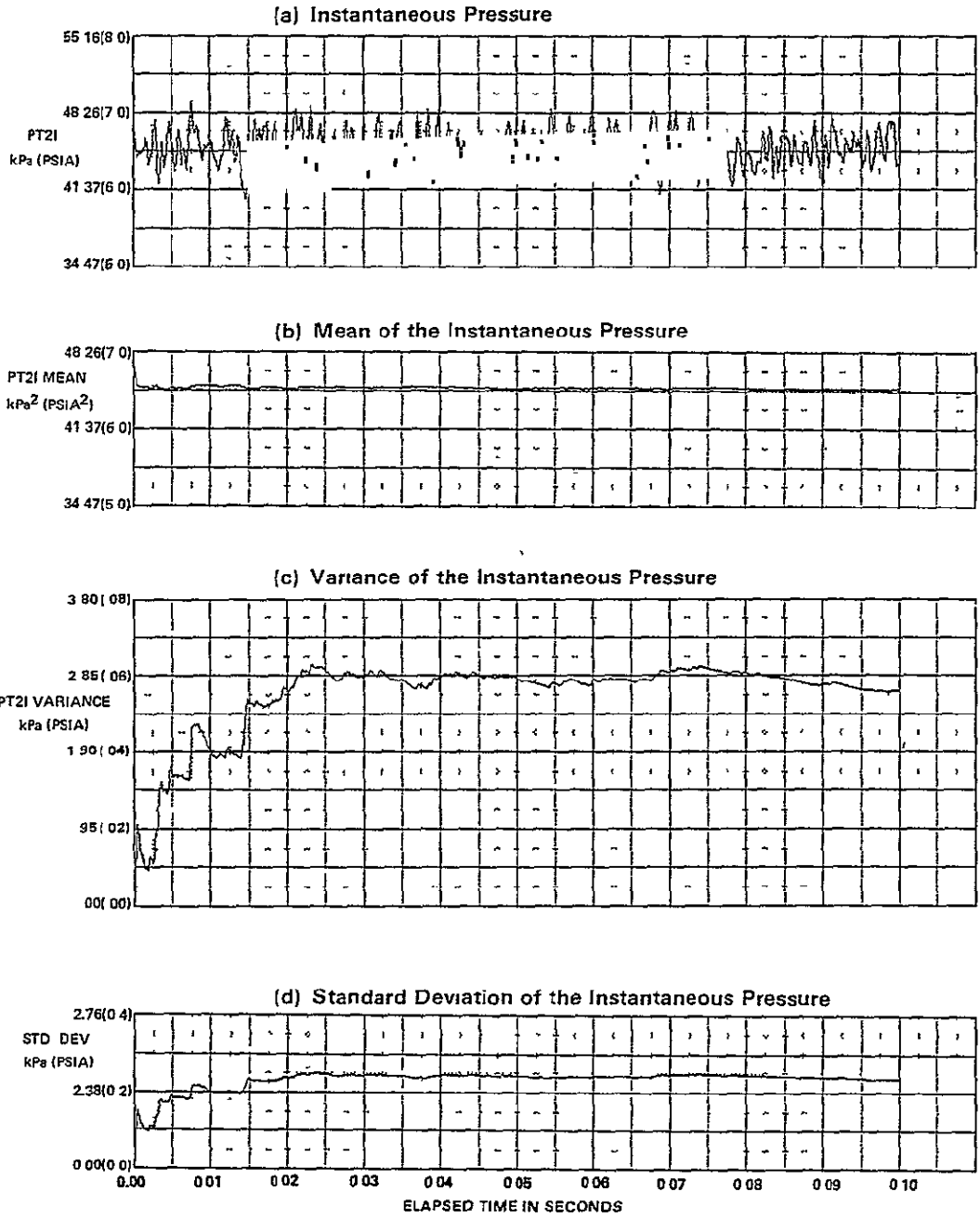


FIGURE C-10  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L3R3,  $M_0 = 0.9$ ,  $\alpha = -10.0$ ,  $\beta = 10.0$ , WAT2 = 106.3 %

SERIES VIII - WCP DATA STUDY

DATA POINT/POINT 303 / 0 IDENT. 42 @ 1040 HZ PROBE L6R3  
 THE OBSERVED START TIME WAS AT 0 12 5 031

WACH 1 2 ALPHA -1 BETA 0 GND -2 7 DELTAS 13 S EMPACS 0 C WAT2 87.3% CAV 2 S

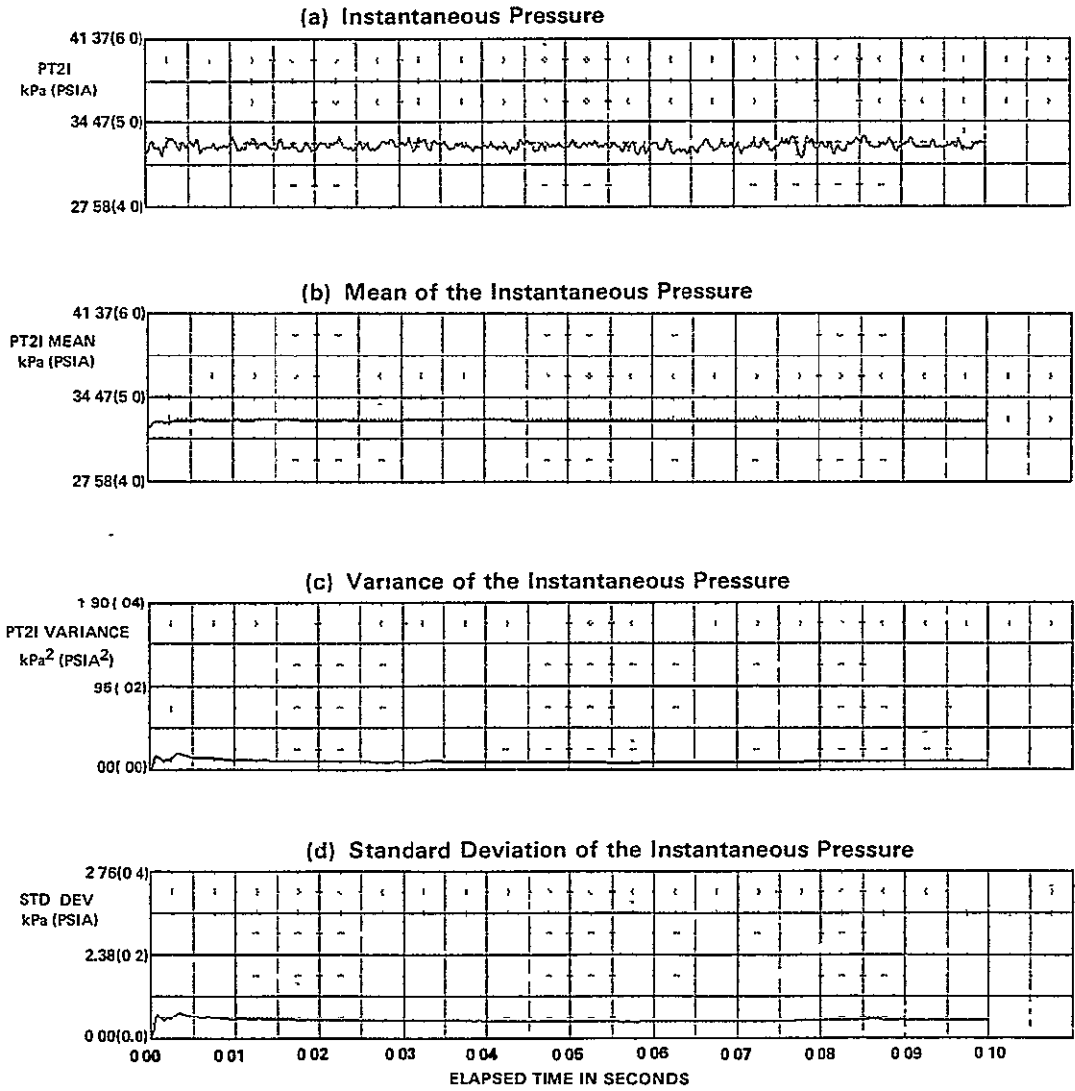


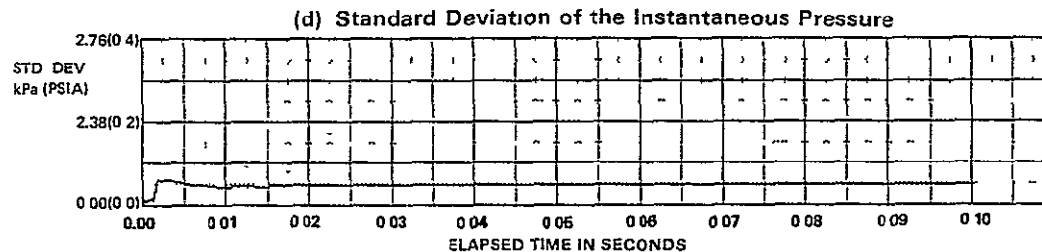
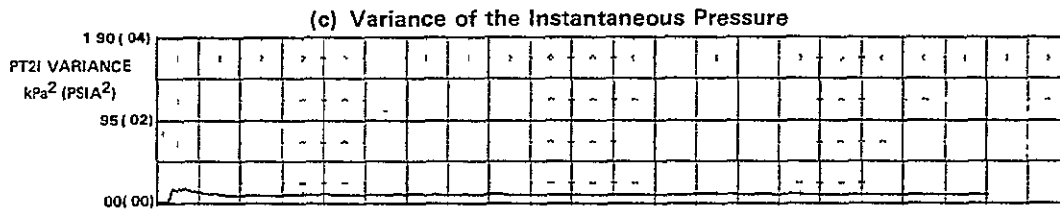
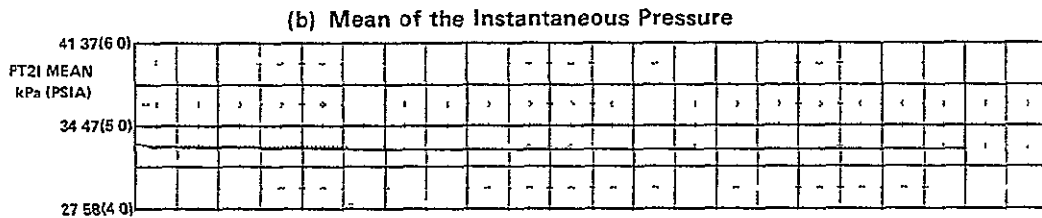
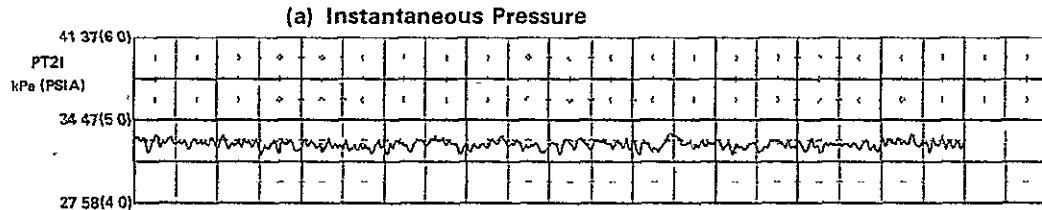
FIGURE C-11  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L6R3,  $M_0 = 1.6$ ,  $\alpha = -4.0$ ,  $\beta = 0.0$ , WAT2 = 87.3 %

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SERIES VIII - WSP DATA STUDY

DATA POINTS PER SEC IDENT 43 @ 1040 HZ. PROBE L6R3  
THE SECOND START TIME WAS AT 2:21:5.045

M<sub>0</sub> 1.6      α -4.0      β 0.0      DELTAS 13.5      BYPASS 0.0      WAT2 96.9%      CIVL

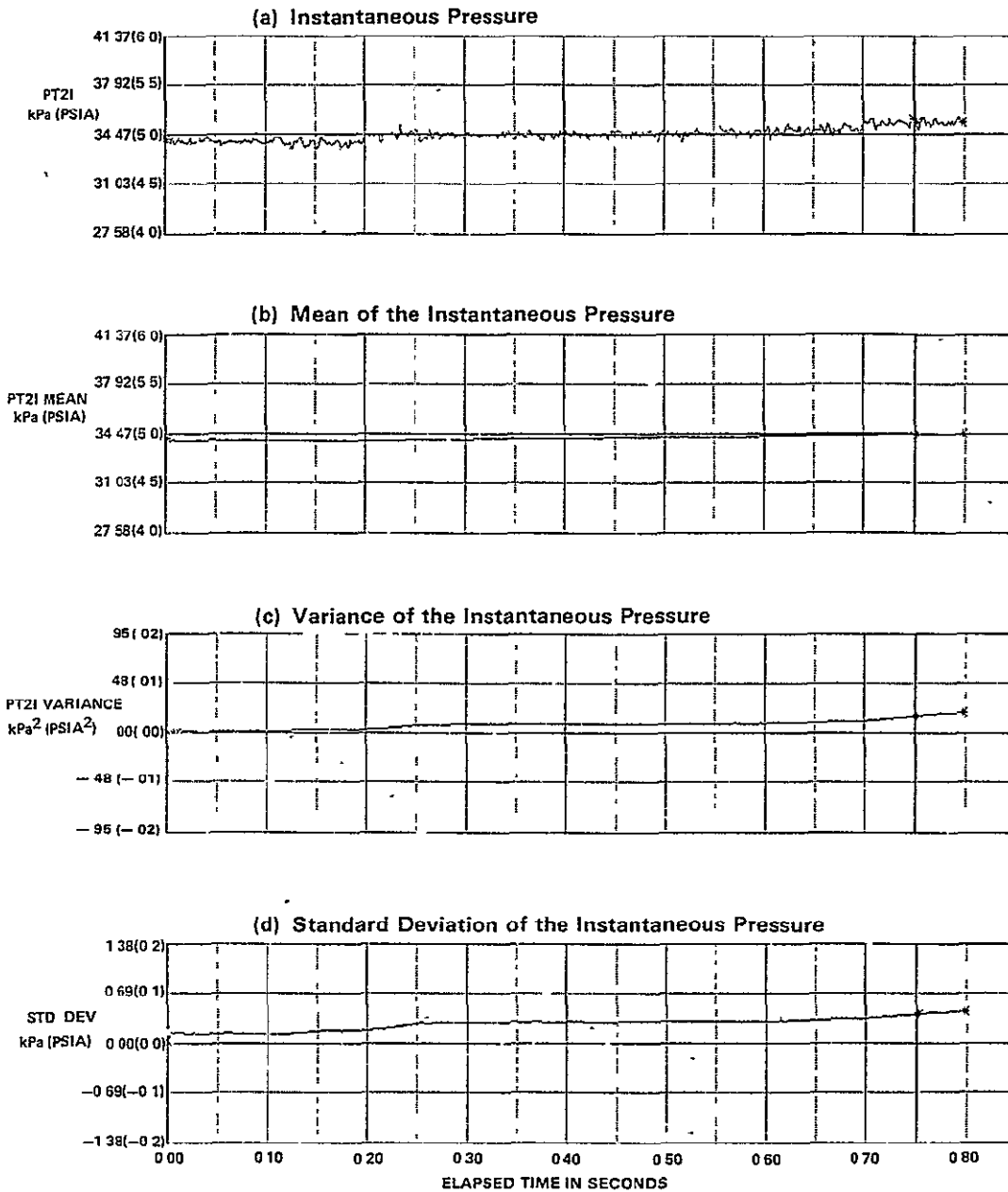


**FIGURE C-12**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L6R3, M<sub>0</sub> = 1.6, α = -4.0, β = 0.0, WAT2 = 96.9%**

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 414/2 IDENT 44 PROBE L6R2  
 THE SEGMENT START TIME WAS AT 20.16 48 905

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.57	-3.6	0.7	17156(56286)	-2.3	13.7	0.0	89.3%	-20.6C



**FIGURE C-13**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L6R2,  $M_0 = 1.57$ ,  $\alpha = -3.6$ ,  $\beta = 0.7$ , WAT2 = 89.3 %**



FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 414/2 IDENT 44 PROBE L6R3  
THE SEGMENT START TIME WAS AT 20 16 46 905

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.57	-3.6	0.7	17156(56286)	-2.3	13.7	0.0	89.3%	-20.60

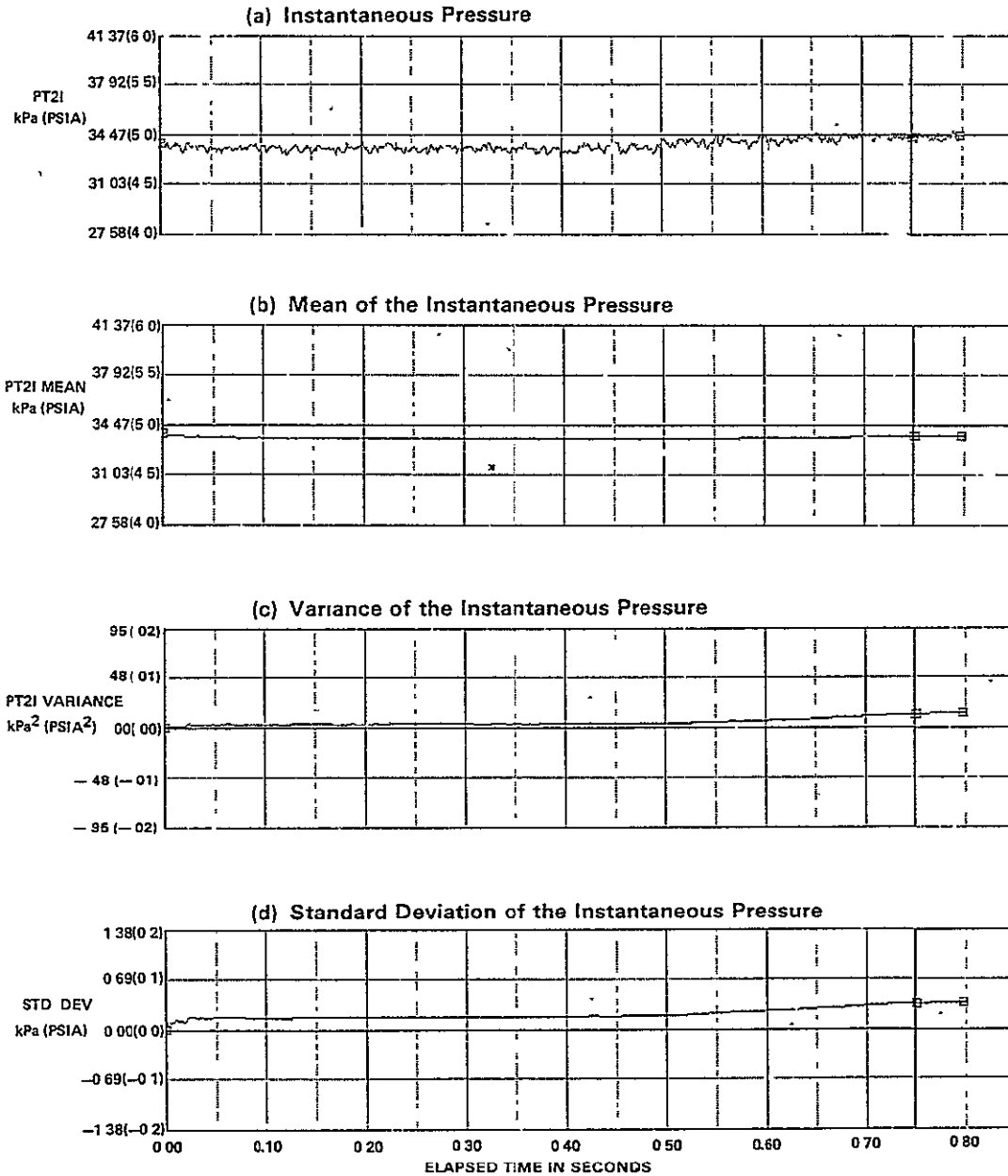
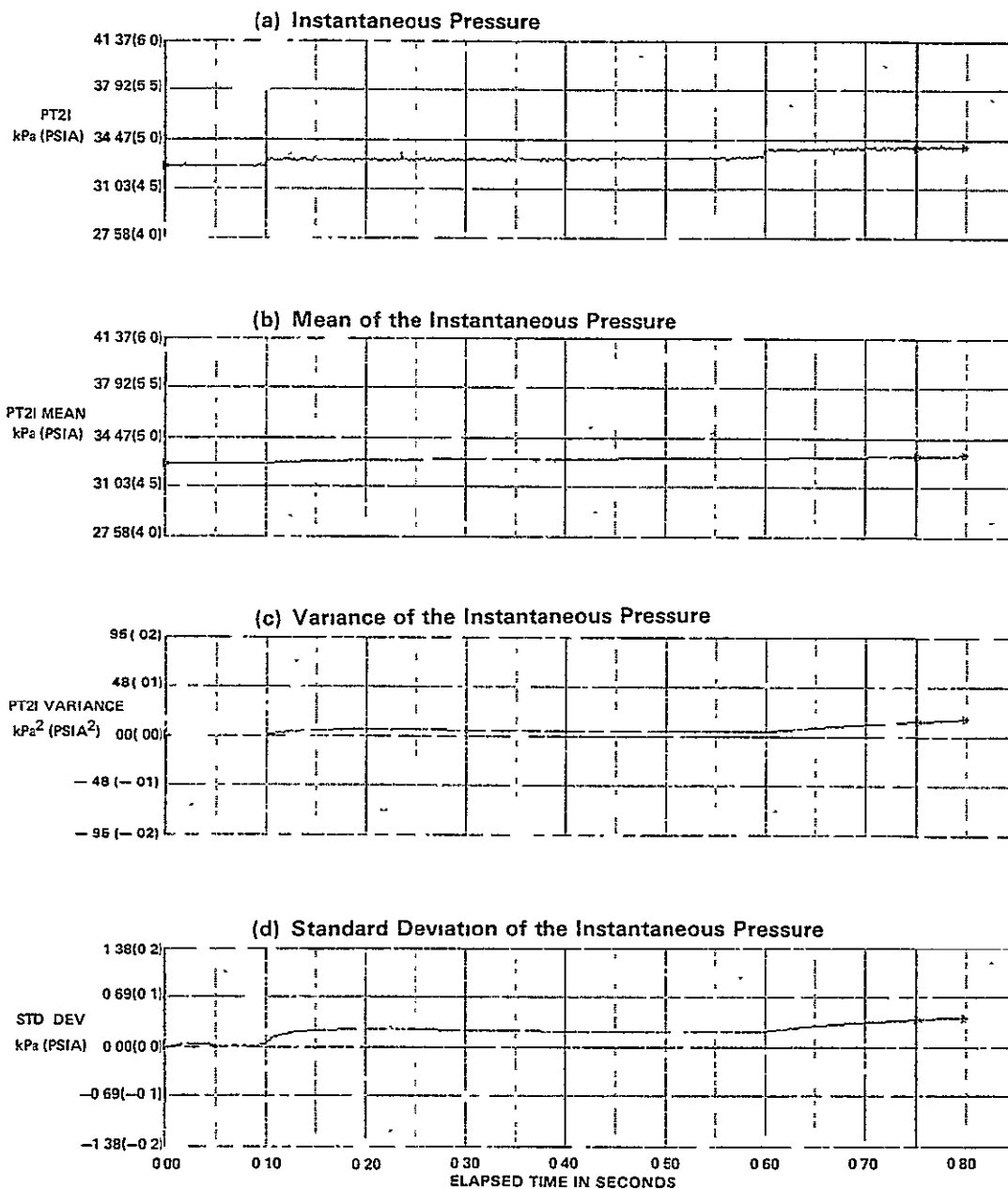


FIGURE C-14  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L6R3,  $M_0 = 1.57$ ,  $\alpha = -3.6$ ,  $\beta = 0.7$ , WAT2 = 89.3 %

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 414/2 IDENT 44 PROBE L6R6  
 THE SEGMENT START TIME WAS AT 20 16 46 905

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.57	-3.6	0.7	17156(56286)	-2.3	13.7	0.0	89.3%	-20.60



**FIGURE C-15**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L6R6,  $M_0 = 1.57$ ,  $\alpha = -3.6$ ,  $\beta = 0.7$ , WAT2 = 89.3 %**

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SERIES VII. - NASA DATA STUDY

DATA POINT/POINT 15 / 2 IDENT 45 @ 1040 HZ. PROBE L6R3  
1-5 DYNAMIC CORRECT TONE 13.47 0.15 0.45

ALPHA -2.0 BETA 0.0 DELTAS 0.0 BYPASS 0.0 WAT2 80.5% CIVV -1.0

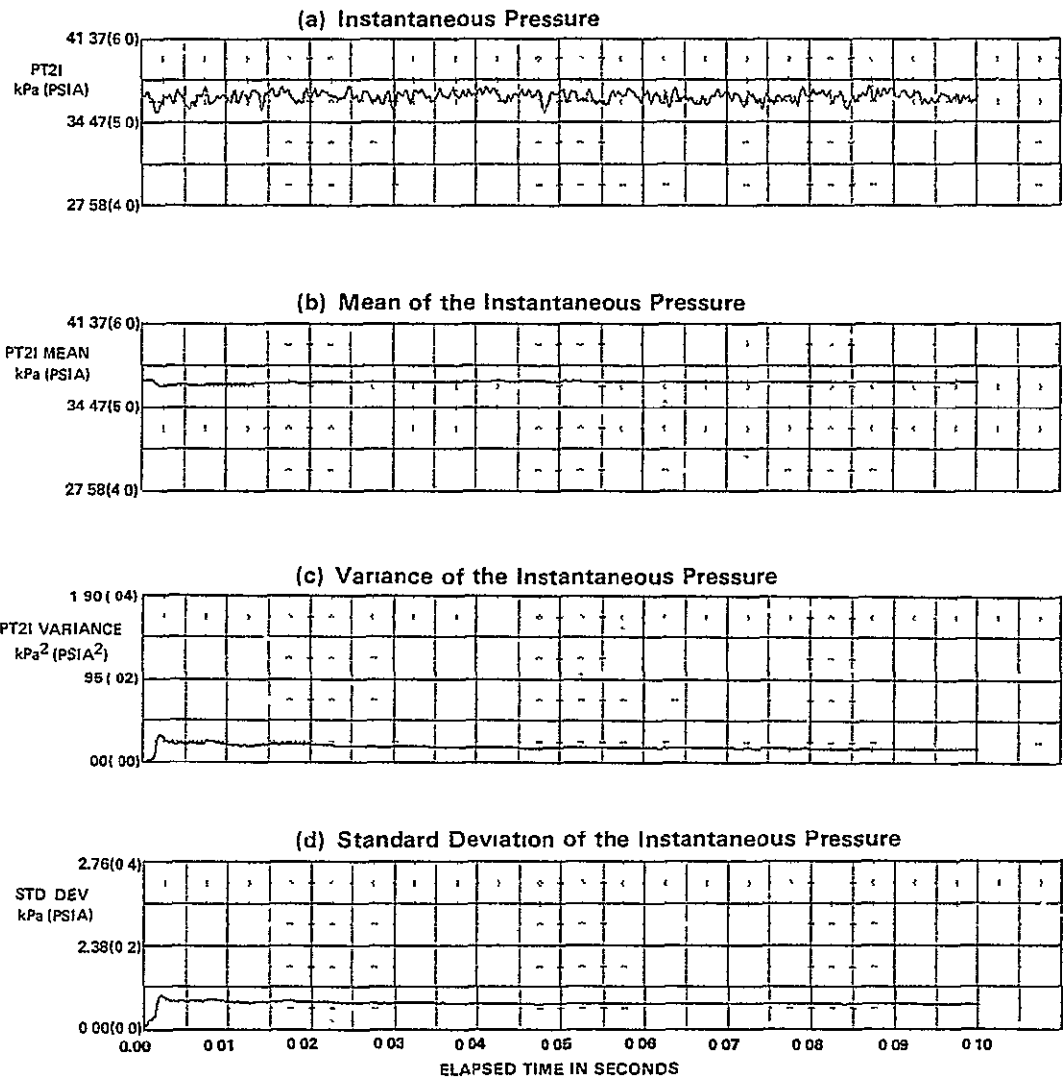


FIGURE C-16  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L6R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 80.5 %

SERIES VIII - NASA DATA STUDY

DATA PART/POINT 15 / 5 IDENT 46 @ 1040 HZ. PROBE L6R3  
 THE SEGMENT START TIME WAS AT 1 57 37 069

MACH 1.8 ALPHA -2.0 BETA 0.0 RHO -3.0 DELTA3 17.4 BYPASS 0.0 WAT2 91.0% CIVV -17.6

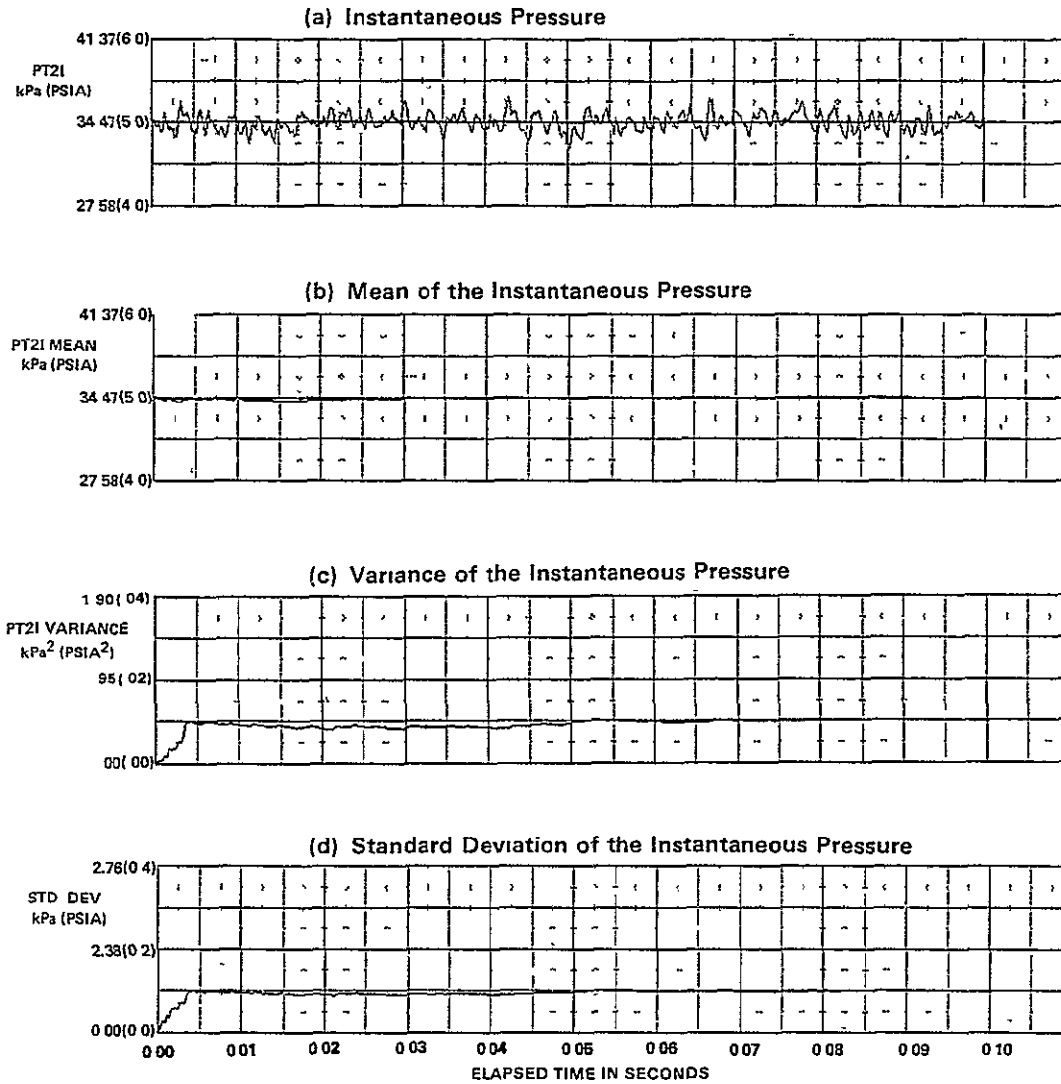
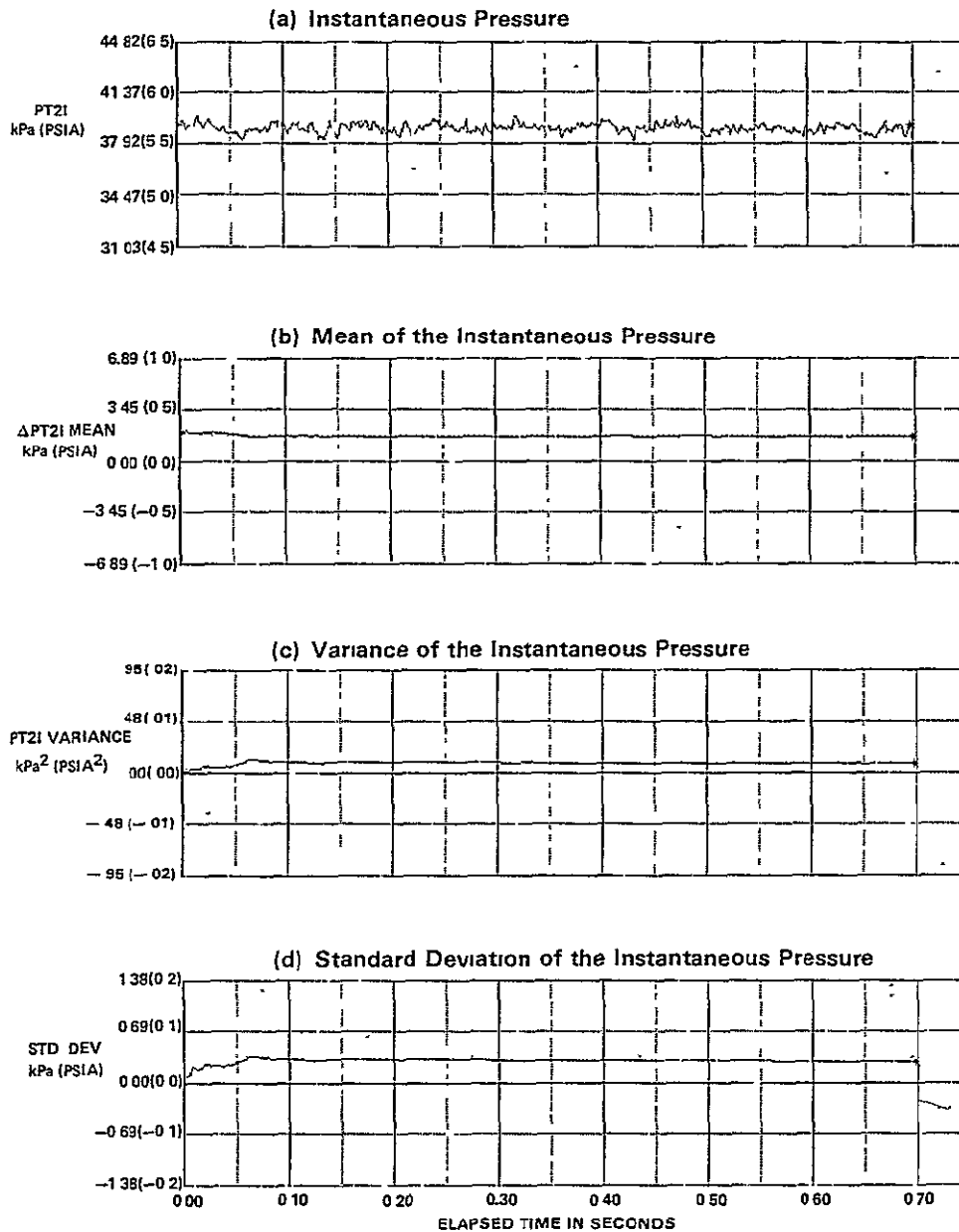


FIGURE C-17  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L6R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 91.0 %

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 415/1    IDENT 47    PROBE L4R6  
 THE SEGMENT START TIME WAS AT 20 21 47 004

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.75	-2.6	0.4	17847(58552)	-2.2	16.7	0.0	80.7%	-25.00



**FIGURE C-18**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L4R6,  $M_0 = 1.75$ ,  $\alpha = -2.6$ ,  $\beta = 0.4$ , WAT2 = 80.7 %**

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FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 415/1 IDENT 47 PROBE L5R1  
THE SEGMENT START TIME WAS AT 20 21 47 004

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.75	-2.6	0.4	17847(58552)	-2.2	16.7	0.0	80.7%	-25.00

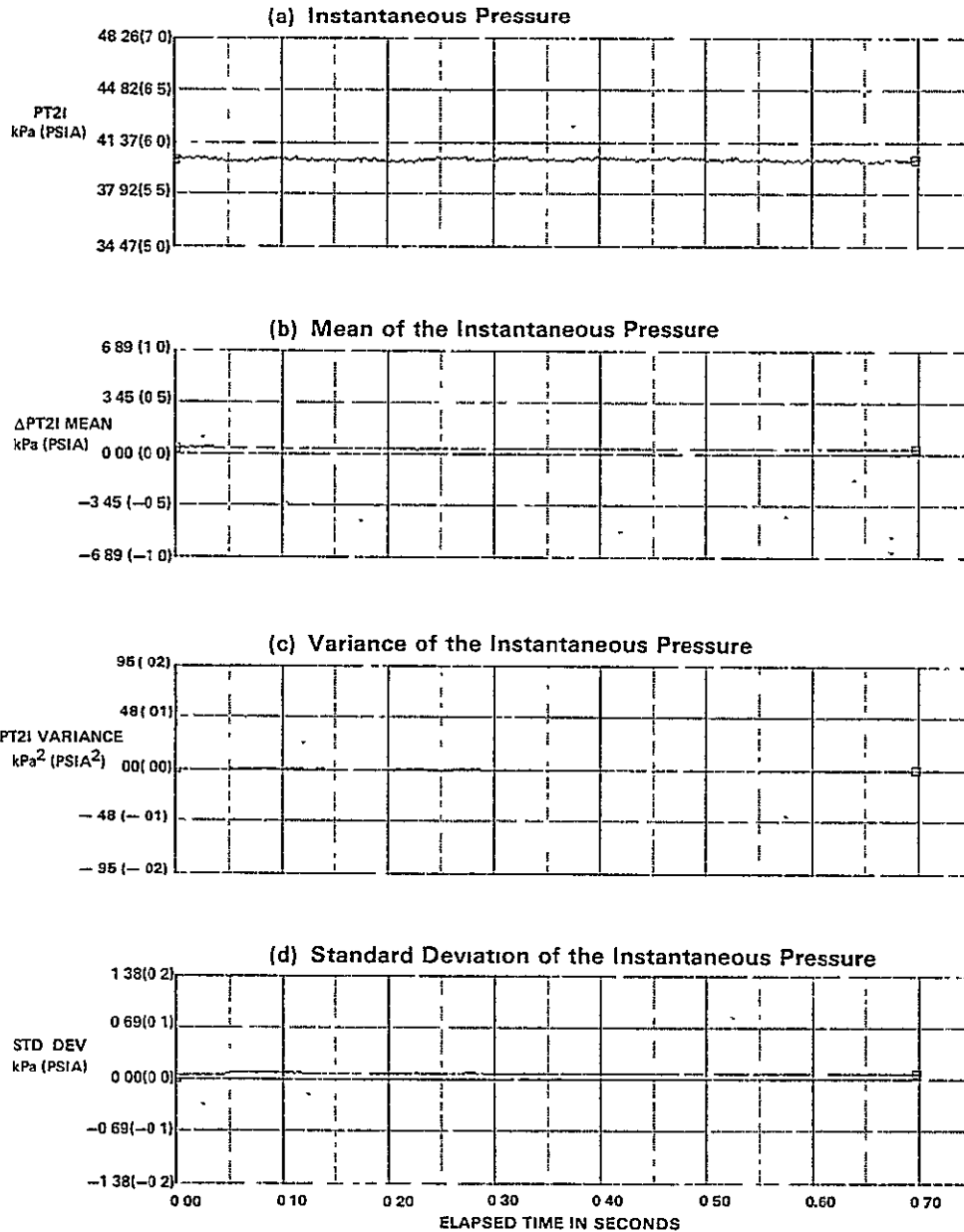
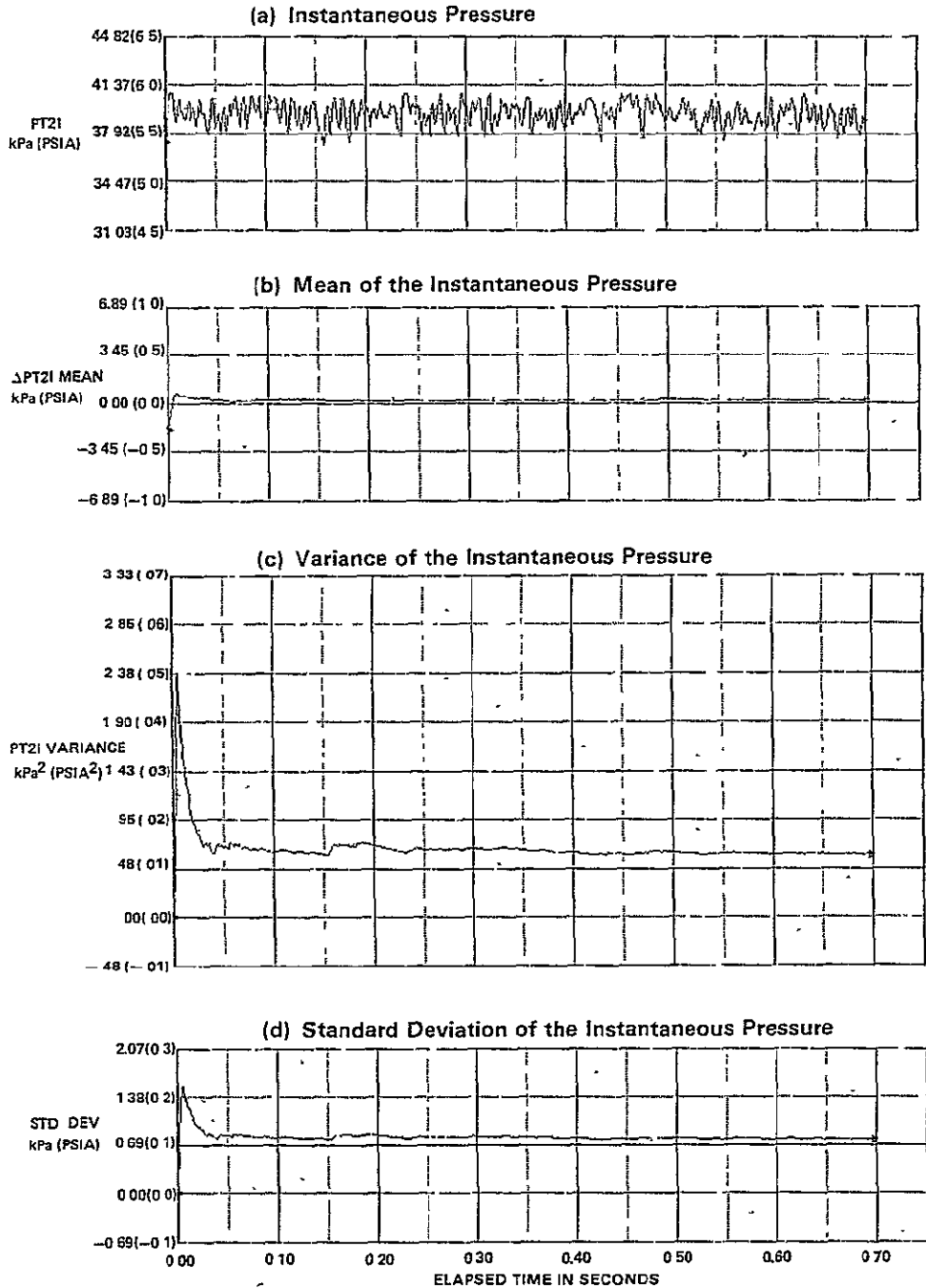


FIGURE C-19  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L5R1,  $M_0 = 1.75$ ,  $\alpha = -2.6$ ,  $\beta = 0.4$ ,  $WAT2 = 80.7\%$

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 415/1 IDENT 47 PROBE L8R3  
THE SEGMENT START TIME WAS AT 20 21 47 004

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.75	-2.6	0.4	17847(58652)	-2.2	16.7	0.0	80.7%	-25.00



**FIGURE C-20**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L8R3,  $M_0 = 1.75$ ,  $\alpha = -2.6$ ,  $\beta = 0.4$ , WAT2 = 80.7%**

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FSCP - NASA DATA STUDY

DATA PART/POINT 352 /15 IDENT 48 @ 170 HZ. PROBE L2R3  
THE SEGMENT START TIME WAS AT 0 42 2 172

MACH 1.8 ALPHA -2.0 BETA 0.0  $R_{40}$  -3.0 DELTAP 18.7 BYPASS 0.0 WAT2 75.1% CIVV -25.0

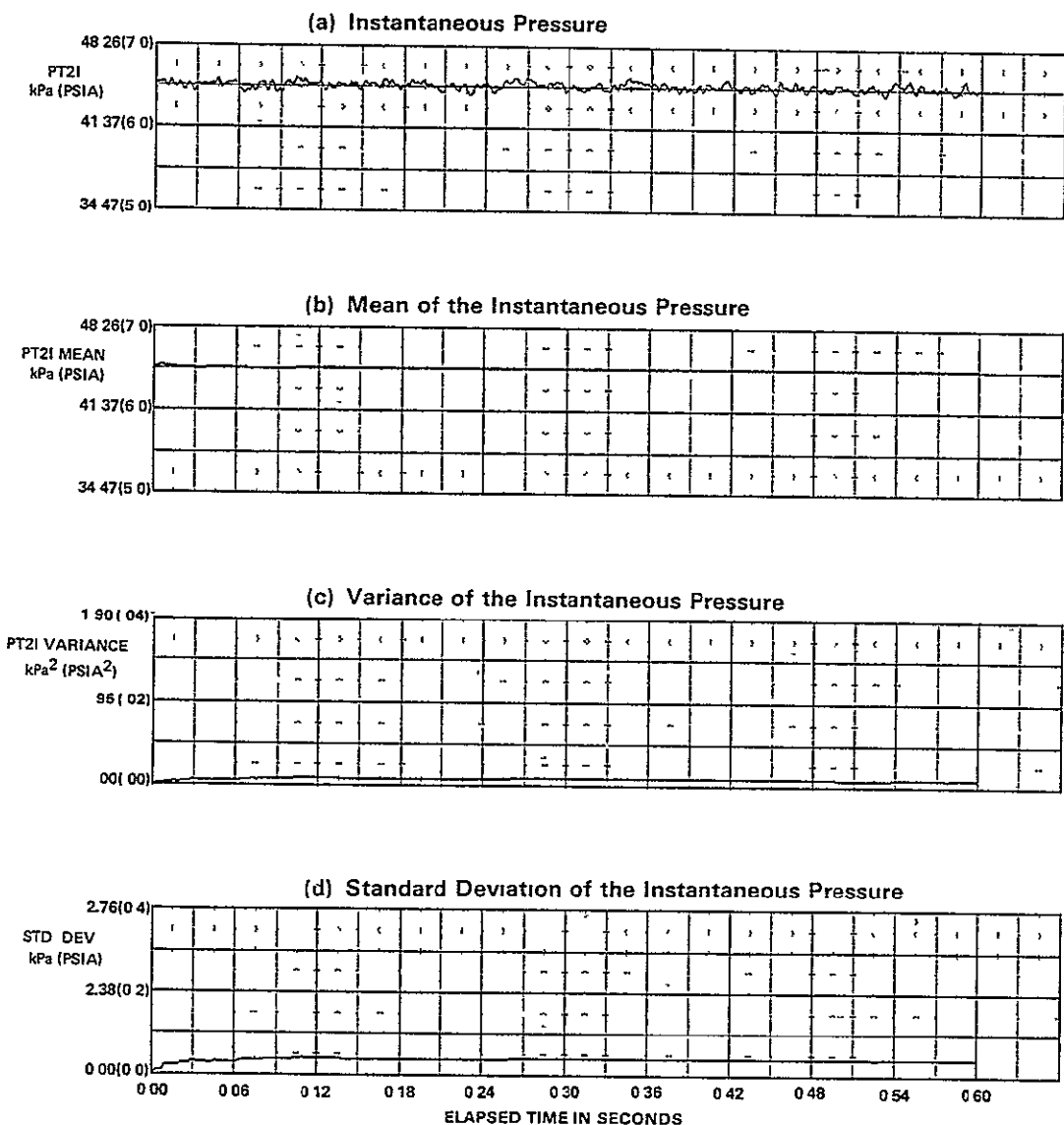


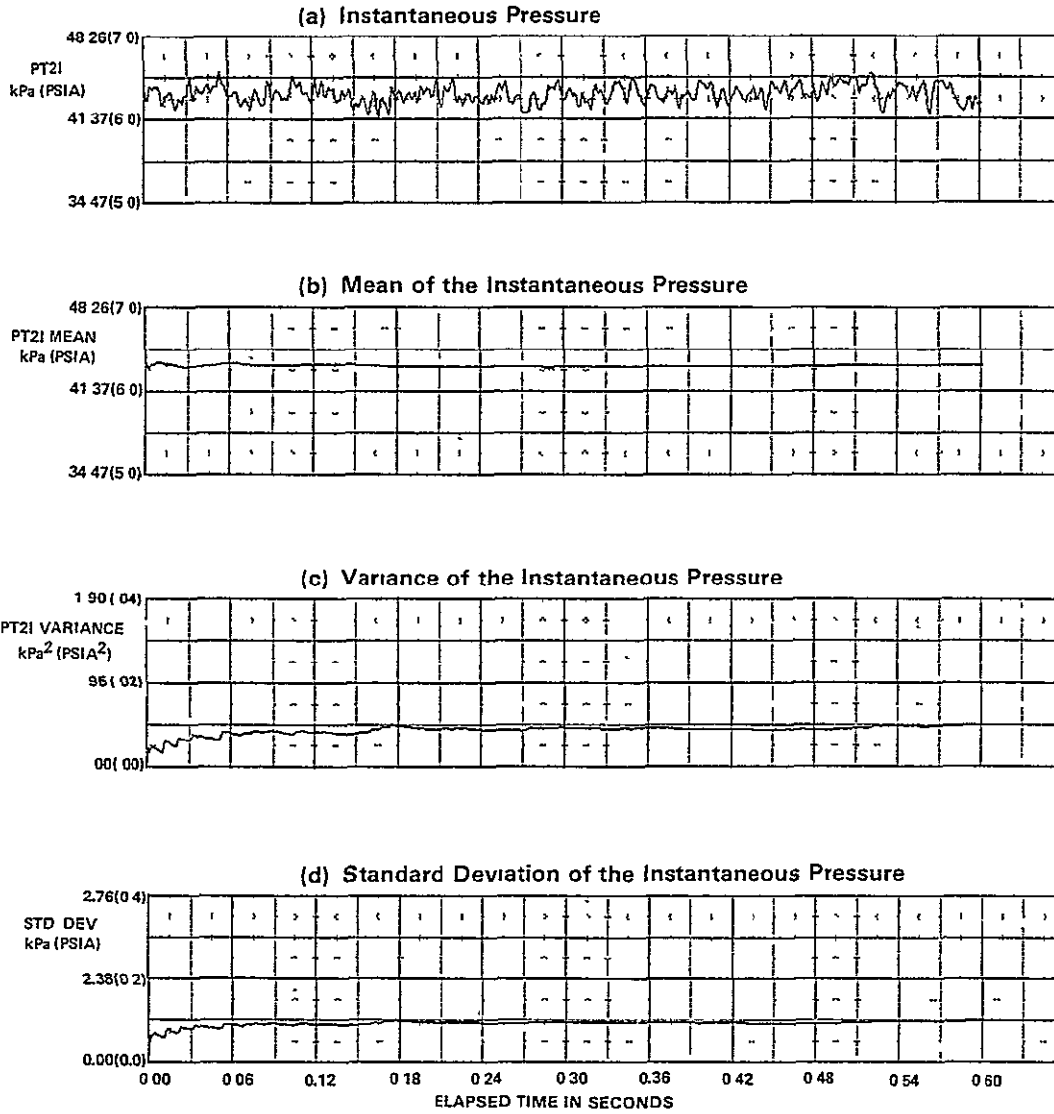
FIGURE C-21  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L2R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 75.1 %



# FSCP - NASA DATA STUDY

DATA POINT POINT 353 / 5 IDENT 49 e 170 HZ. PROBE L8R3  
 THE SEQUENCE START TIME WAS AT 0 27 21 031

MACH 1.8       $\alpha$  -2.0      BETA 0.0       $\beta$  -3.0      DEL T 12.7      BYPASS 2.0      WAT2 82.2%      CIVV -25.0

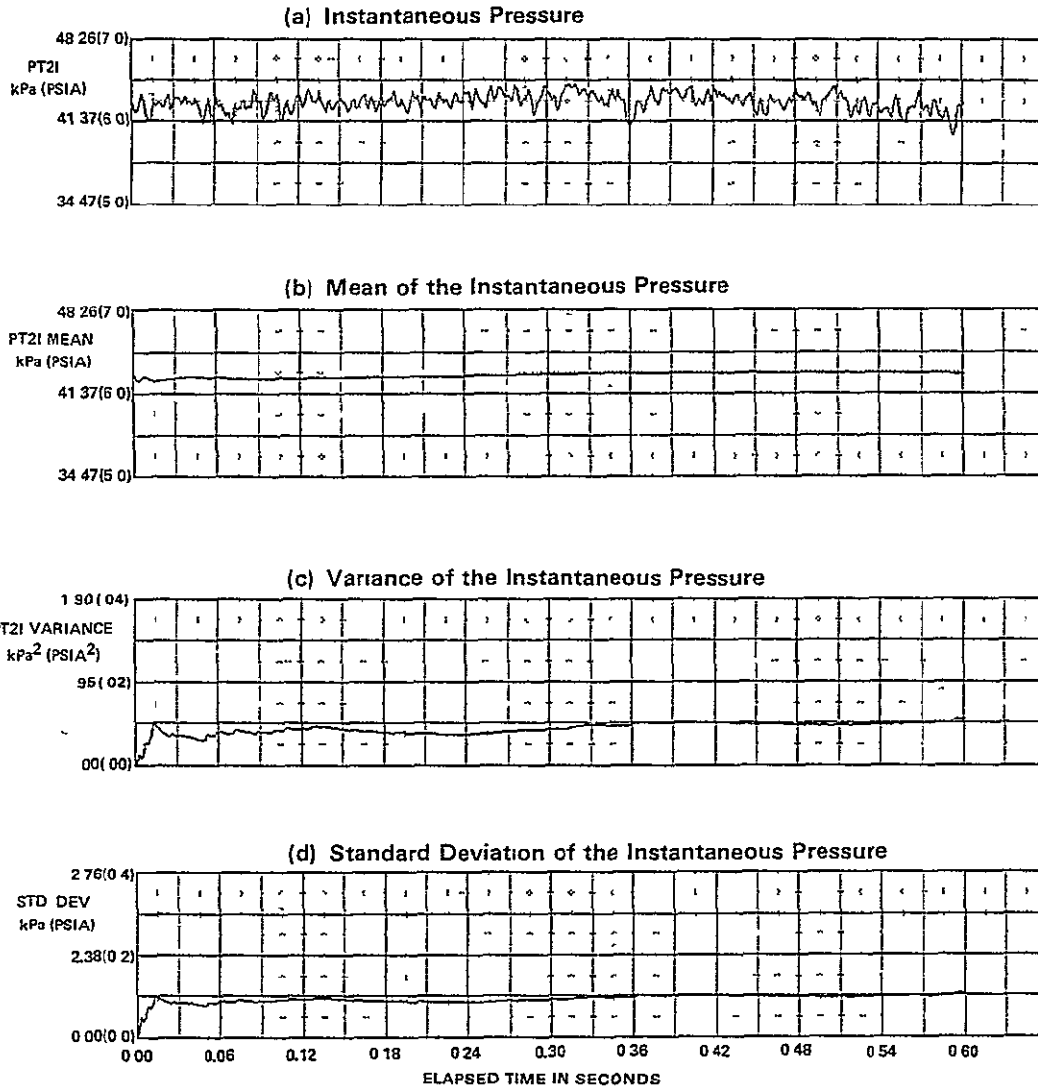


**FIGURE C-22**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L8R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 82.2%**

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FSCP - NASA DATA STUDY

DATA PART/POINT 352 /12 IDENT 50 @ 170 HZ PROBE L8R3  
THE SEGMENT START TIME WAS 07 P 33 10 09:

MACH 1.8      ALPHA -2      BETA 3      F<sub>10</sub> -2.0      DELTCS 18.7      BYPASS 0.0      WAT2 85.4%      CIVV -23.9



**FIGURE C-23**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L8R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 85.4 %**

FSE - NASA DATA STUDY

DATA PART/POINT 535 / 2 IDENT 51 @ 170 HZ. PROBE L8R3  
T-E SEGMENT START TIME WAS AT 2 45 27 091

MACH 1.8    ALPHA -2.0    BETA 0.0    P40 -2.3    DELTA3 18.6    BYPASS 0.0    WAT2 30.6%    CIVV -25.0

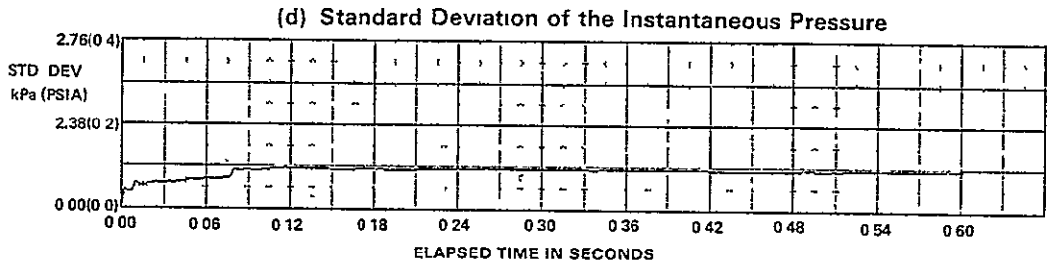
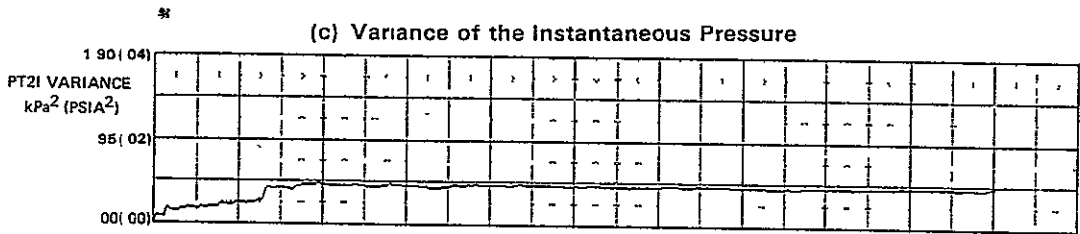
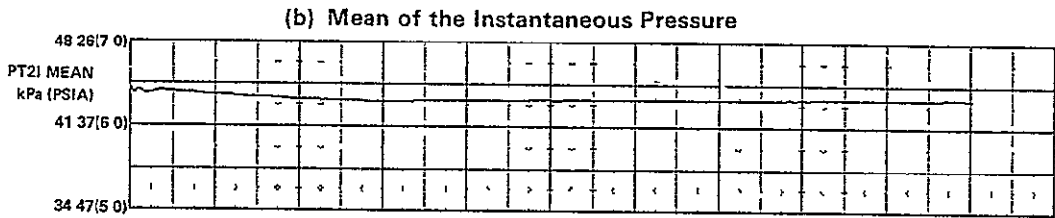
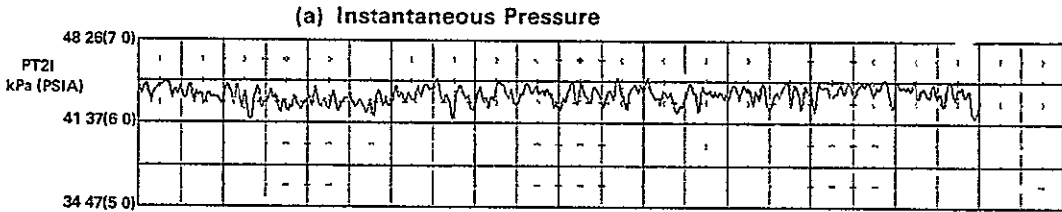


FIGURE C-24  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 30.6%

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FSE - NASA DATA STUDY

DATA PART/POINT 525 / 4 IDENT. 52 @ 170 HZ. PROBE L8R3  
THE SEGMENT START TIME WAS AT 3.18.26 170

MACH 1.8 ALPHA -2 BETA 0 RHO -2.9 DELTAS 18.6 BYPASS 0.0 WAT2 79.8% CIVV -25.0

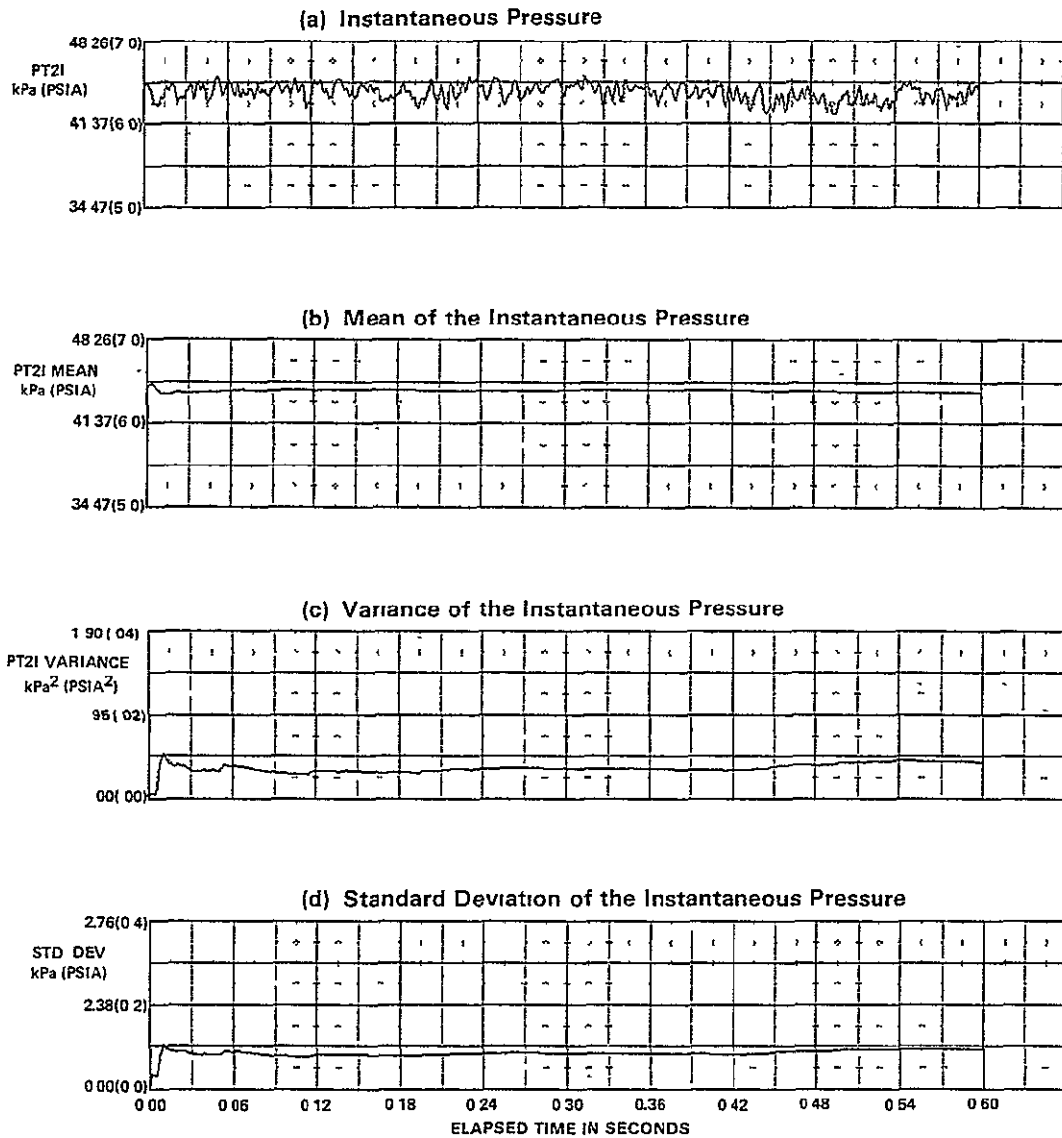
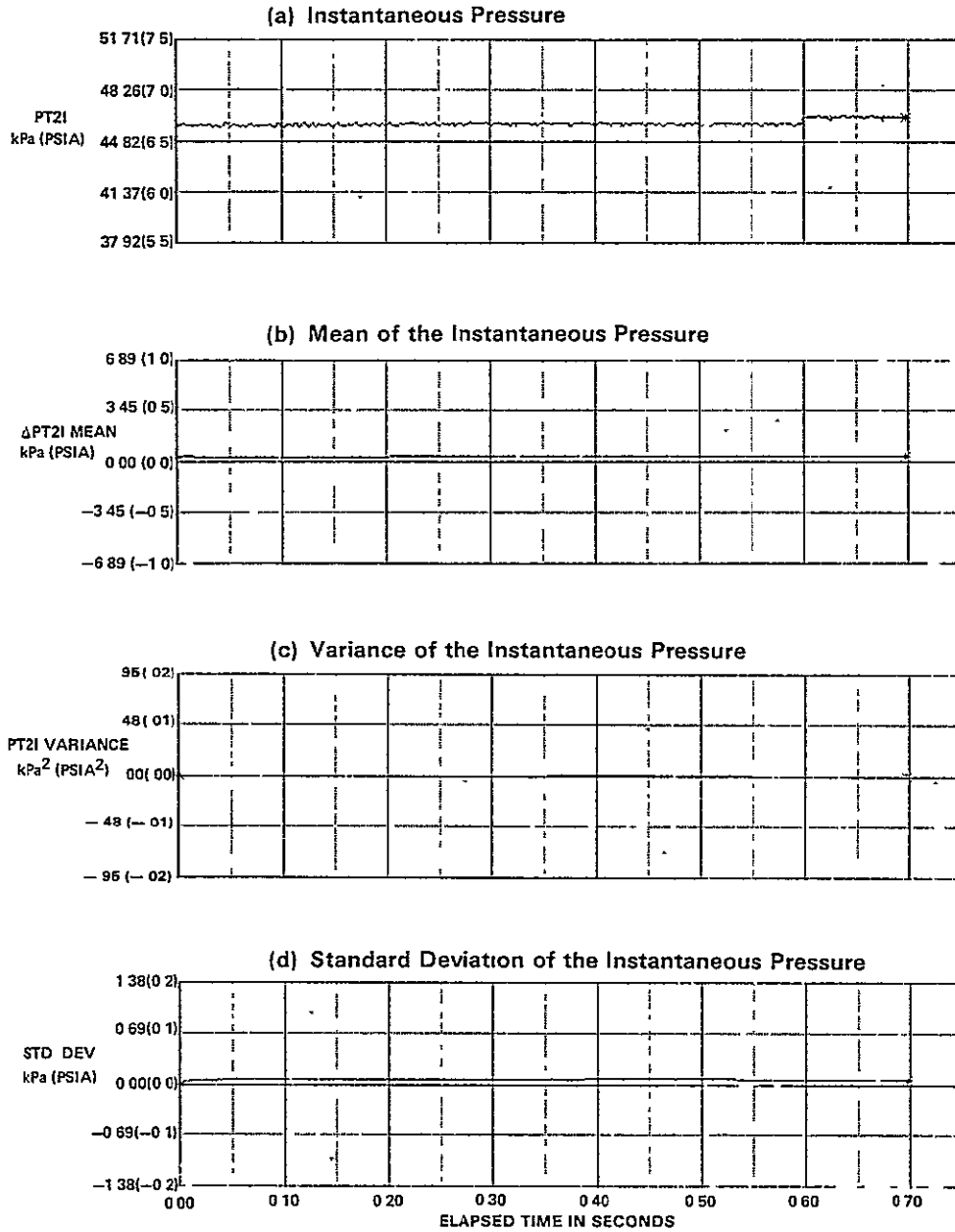


FIGURE C-25  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 1.8$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 79.8 %

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 416/1 IDENT 53 PROBE IL4R2  
 THE SEGMENT START TIME WAS AT 16 09 18 507

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.81	-2.3	0.20	17512(57453)	-2.8	18.2	0.0	78.9%	-25.00



**FIGURE C-26**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L4R2,  $M_0 = 1.81$ ,  $\alpha = -2.3$ ,  $\beta = 0.2$ , WAT2 = 78.9%**

FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 416/1 IDENT 53 PROBE L6R2  
THE SEGMENT START TIME WAS AT 16 09 18 507

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.81	-2.3	0.20	17512(57453)	-2.8	18.2	0.0	78.9%	-25.00

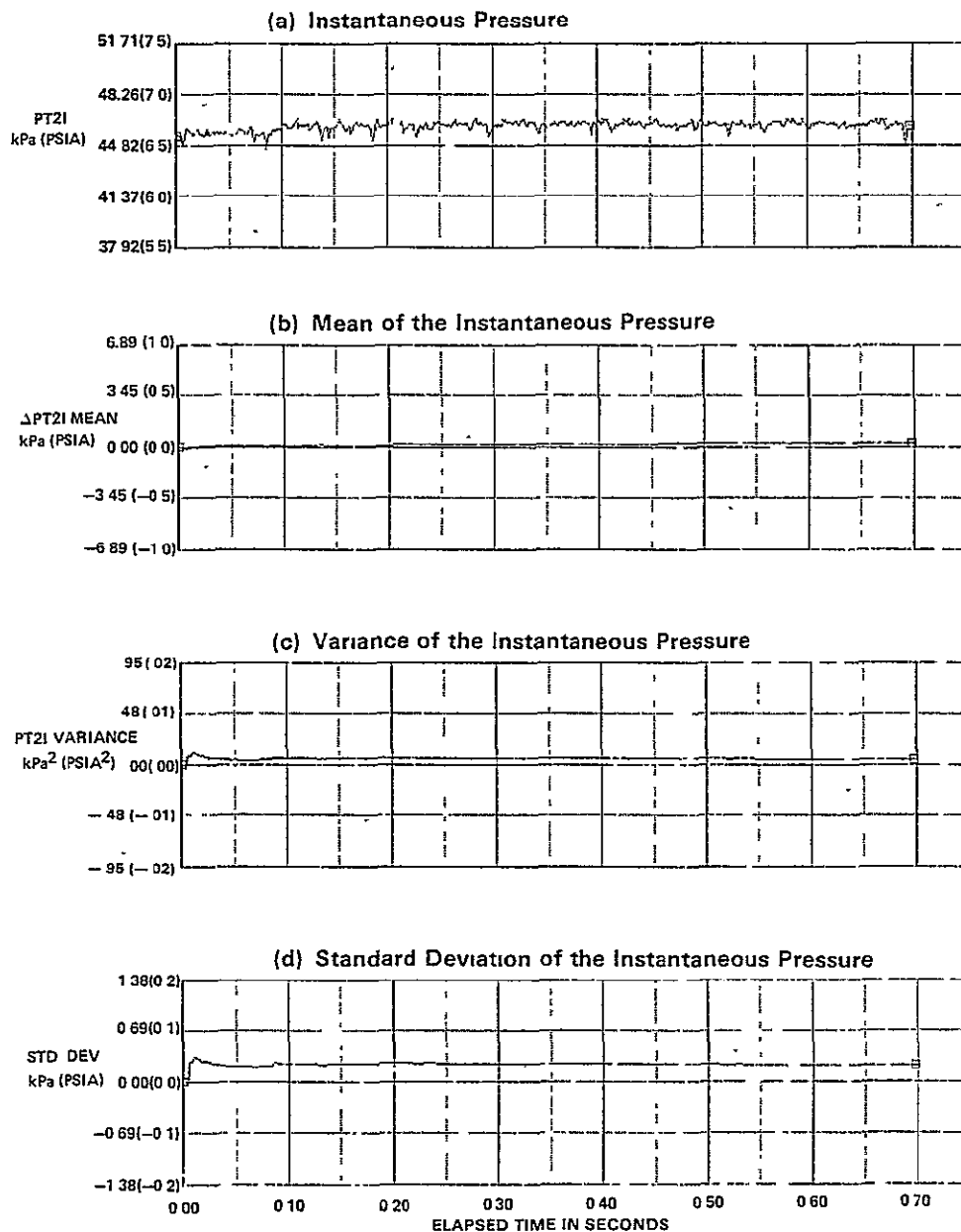
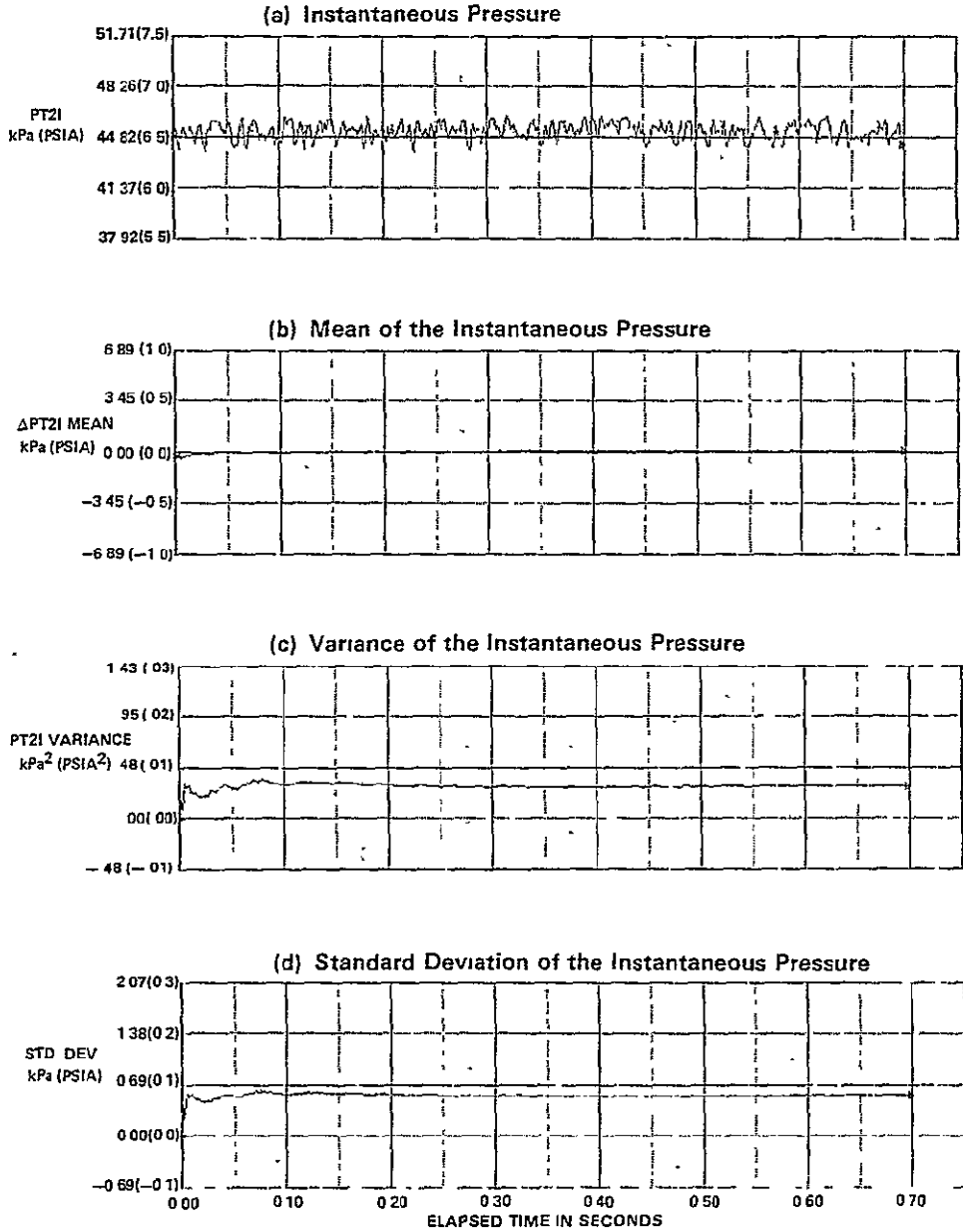


FIGURE C-27  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L6R2,  $M_0 = 1.81$ ,  $\alpha = -2.3$ ,  $\beta = 0.2$ ,  $WAT2 = 78.9\%$

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 416/1 IDENT 53 PROBE L8R2  
THE SEGMENT START TIME WAS AT 16 09 18 507

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
1.81	-2.3	0.20	17512(57453)	-2.8	18.2	0.0	78.9%	-25.00



**FIGURE C-28**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L8R2,  $M_0 = 1.81$ ,  $\alpha = -2.3$ ,  $\beta = 0.2$ , WAT2 = 78.9 %**

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SERIES VIII - NASA DATA STUDY

DATA POINT/POINT 2/3 / 5 IDENT 60 e 1040 HZ. PROBE L8R3  
THE SEGMENT START TIME WAS AT 3 15 59 045

M<sub>0</sub> 2.2 ALPHA -2.0 BETA 0.0 P<sub>0</sub> -4.0 DELTA<sub>3</sub> 25.0 BYPASS 0.07742 (120.0) WAT<sup>2</sup> 65.0% CIVV -25.0

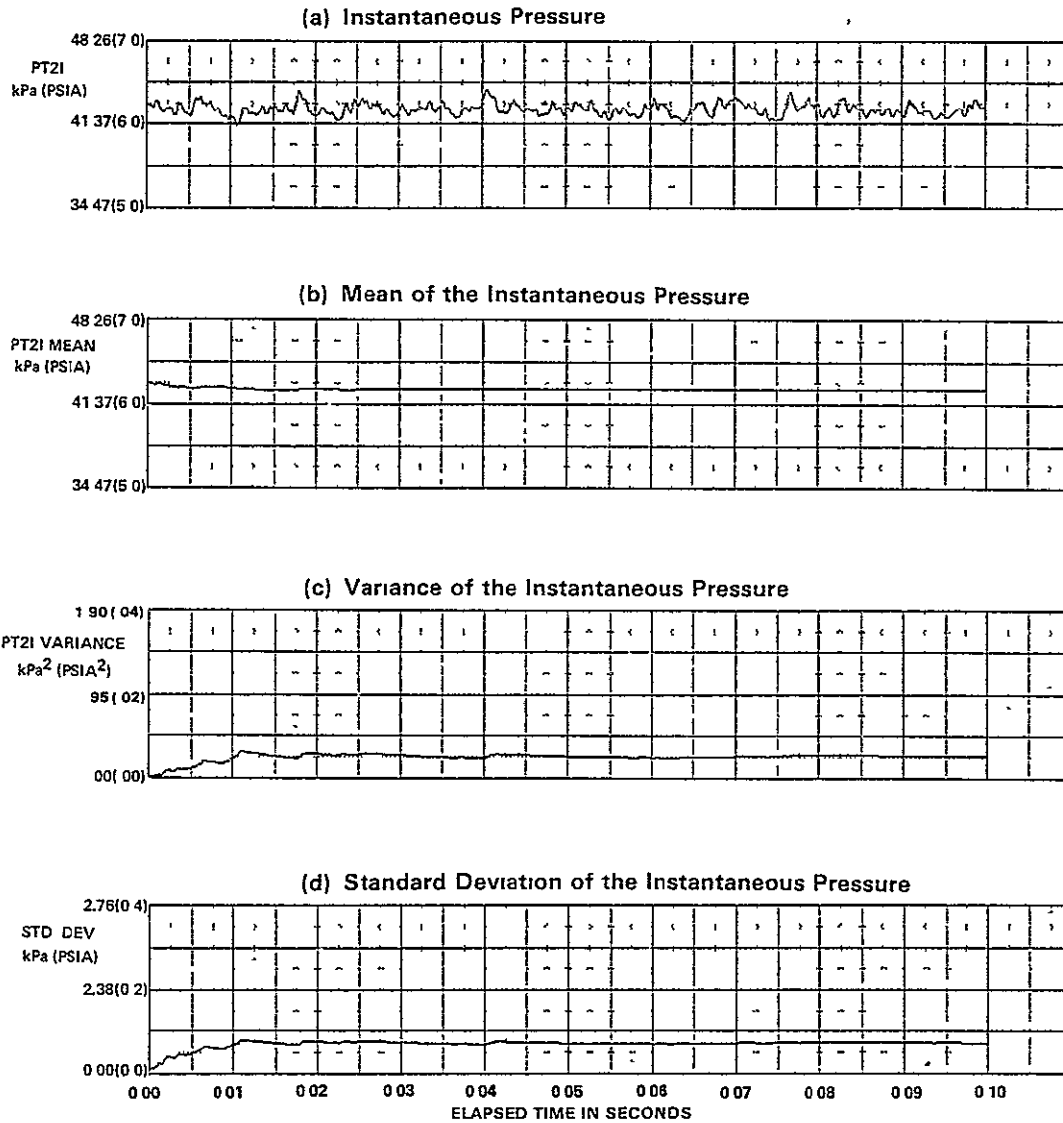


FIGURE C-29  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 2.2$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT<sup>2</sup> = 65.0%



SERIES VIII - NASA DATA STUDY

DATA PART/POINT 249 / 9 IDENT 61 @ 1040 HZ PROBE L7R3  
 THE SEGMENT START TIME WAS AT 6 21 10 045

MACH 2.2 ALPHA -2.0 BETA 0.0 PHO -4.0 DELTAS 25.0 BYPASS 0.07742 (120.0) WAT2 52.9% CIVV -25.0

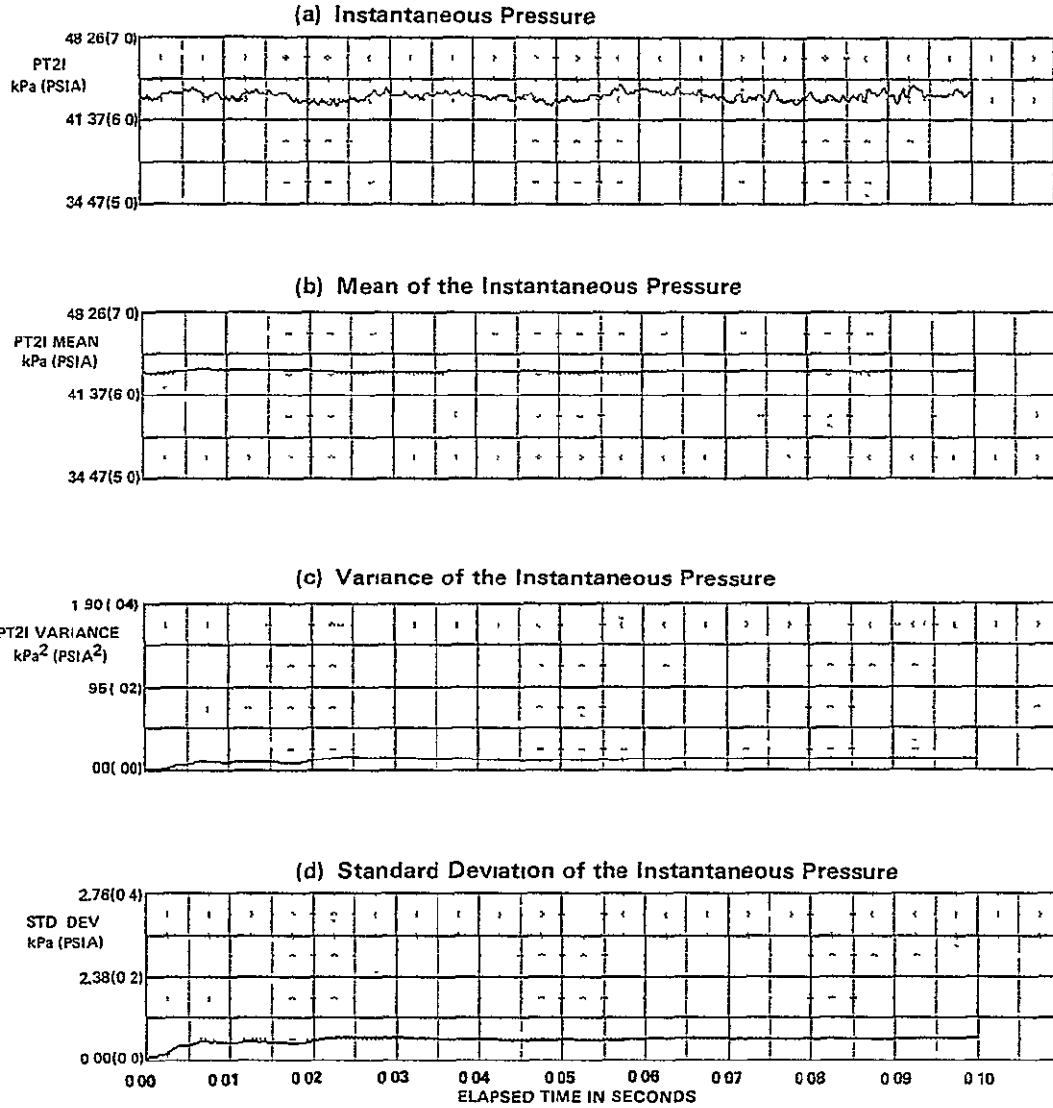


FIGURE C-30  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L7R3,  $M_\infty = 2.2$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 52.9%

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FSCP - NASA DATA STUDY

DATA PART/POINT 385 / 5 IDENT. 62 @ 170 HZ. PROBE L1R3  
THE SEGMENT START TIME WAS AT 1:32:36 092

MACH 2.2    ALPHA -2    BETA 0    PHO -4 0    DELTA 25.0    BYPASS 0.07742 (120 0)    WAT2 61.7%    CIVV -25.0

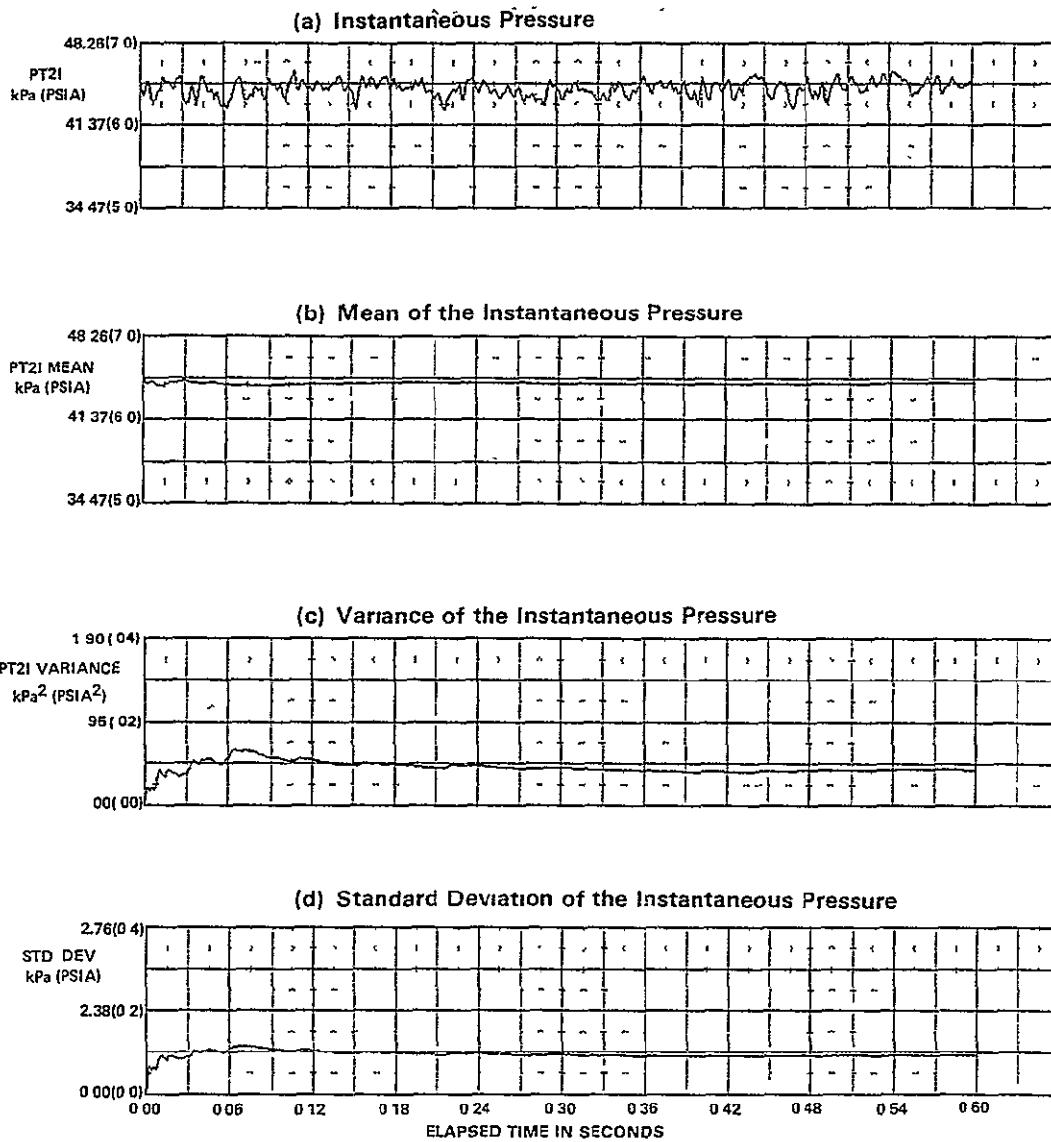


FIGURE C-31  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L1R3,  $M_0 = 2.2$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ ,  $WAT2 = 61.7\%$

# FSCP - NASA DATA STUDY

DATA PART/POINT 385 / 2 IDENT 63 @ 170 HZ PROBE L1R3  
 THE SEGMENT START TIME WAS AT 1 29 15 091

MACH 2.2 ALPHA -2.0 BETA 0.0 RHO -4.0 DELTAS 25.0 BYPASS 0.07748 (120 1) WAT2 62.3% CIVV -25.0

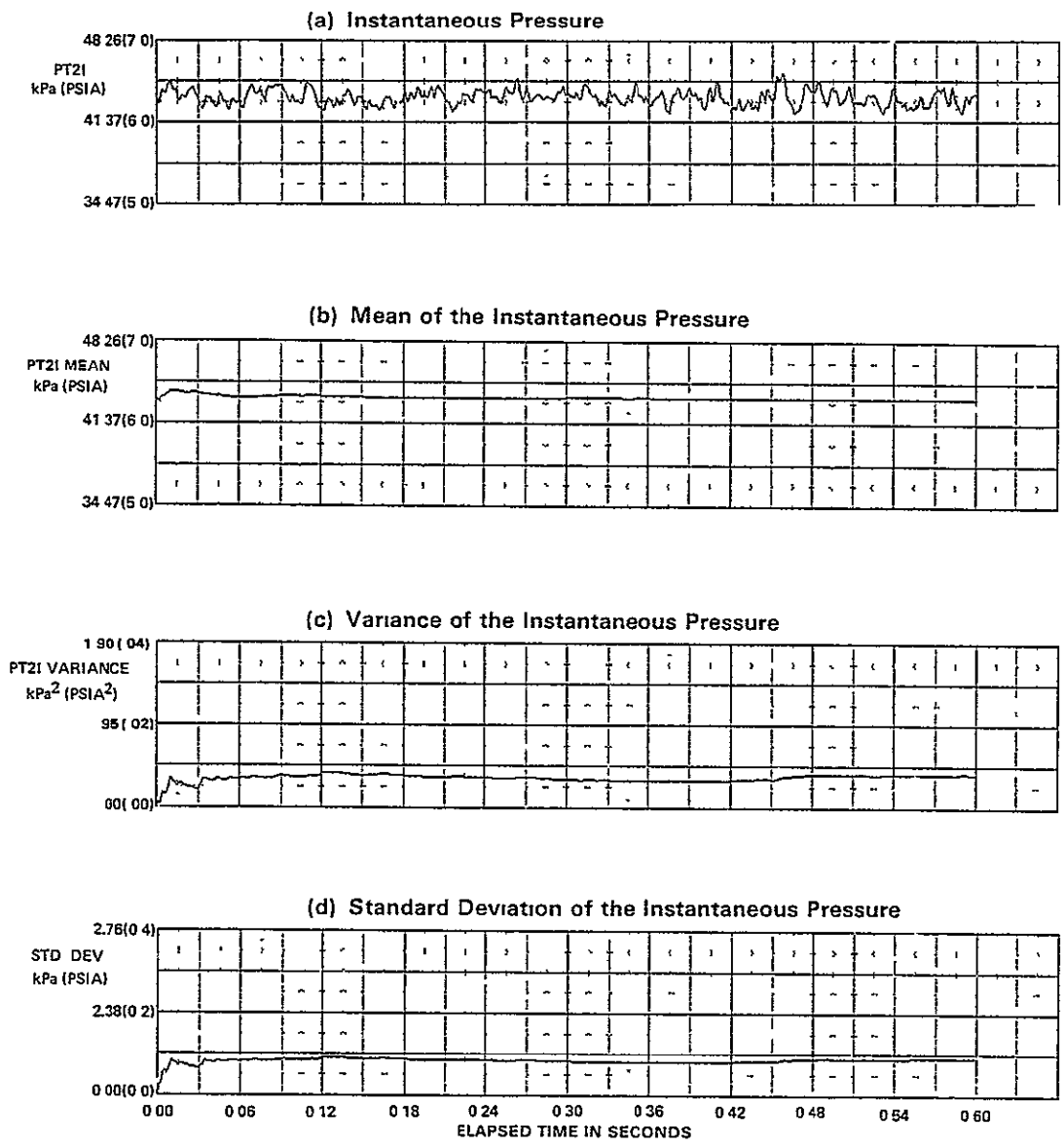


FIGURE C-32  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L1R3,  $M_0 = 2.2$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ ,  $WAT2 = 62.3\%$

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FSE - NASA DATA STUDY

DATA PART/POINT 542 / 2 IDENT 64 e 170 HZ. PROBE L8R3  
THE SEGMENT START TIME WAS AT 22:51:48 091

MACH 2.2 ALPHA -2.0 BETA 0.0 RHO -4.0 DELTAR3 24.8 BYPASS 0.02781 (43.1) WAT2 60.2% CIVV -25.0

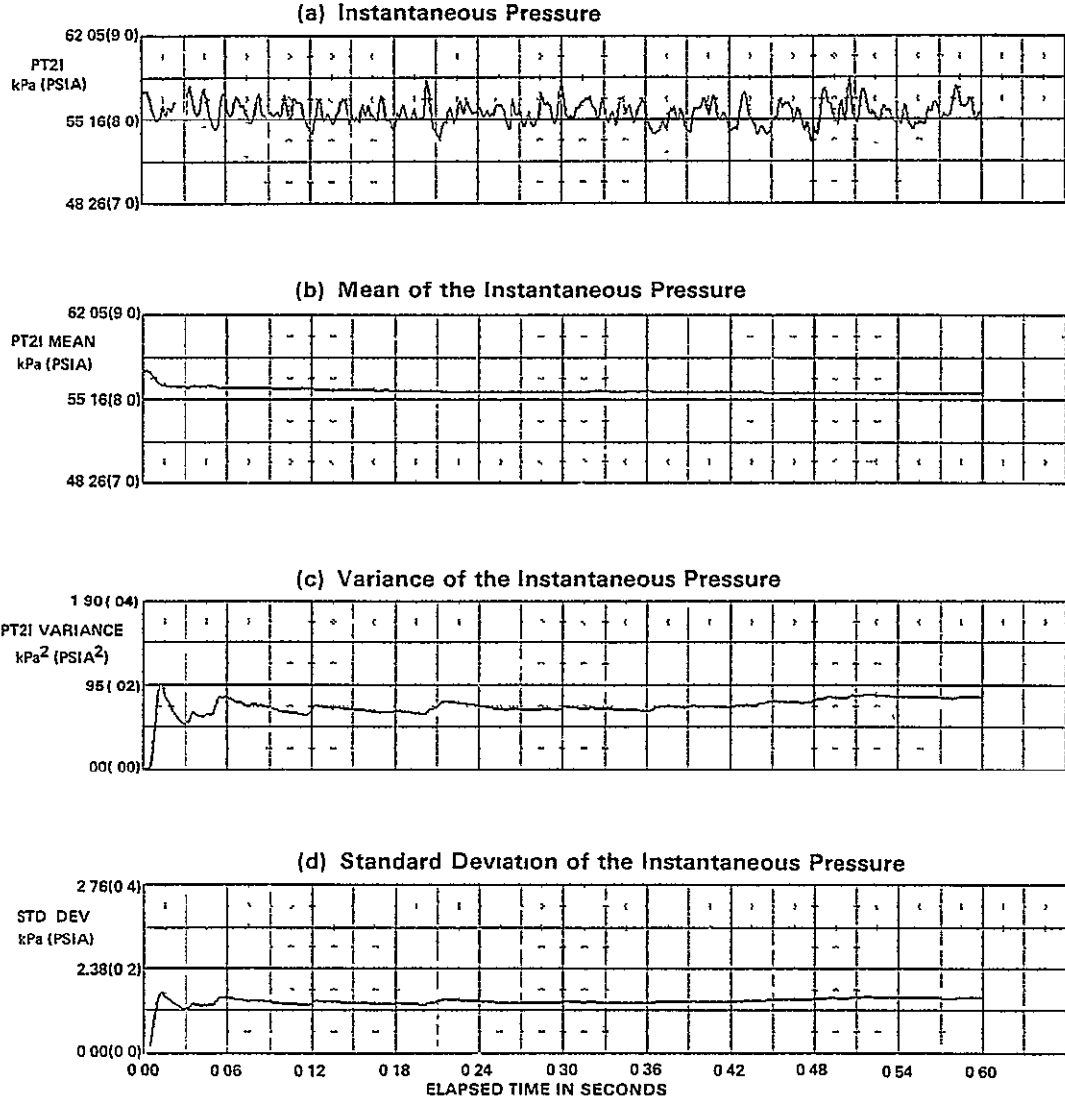


FIGURE C-33  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 2.2$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ ,  $WAT2 = 60.2\%$

# FSE - NASA DATA STUDY

DATA PART/POINT 543 / 4 IDENT. 65 e 170 HZ PROBE L8R3  
 THE SEGMENT START TIME WAS AT 23.12: 7.092

MACH 2.2      ALPHA -2      BETA 0      RHO -4.0      DELTA3 24.8      BYPASS 0.02226 (34.5)      WAT2 60.5%      CIVV -25.0

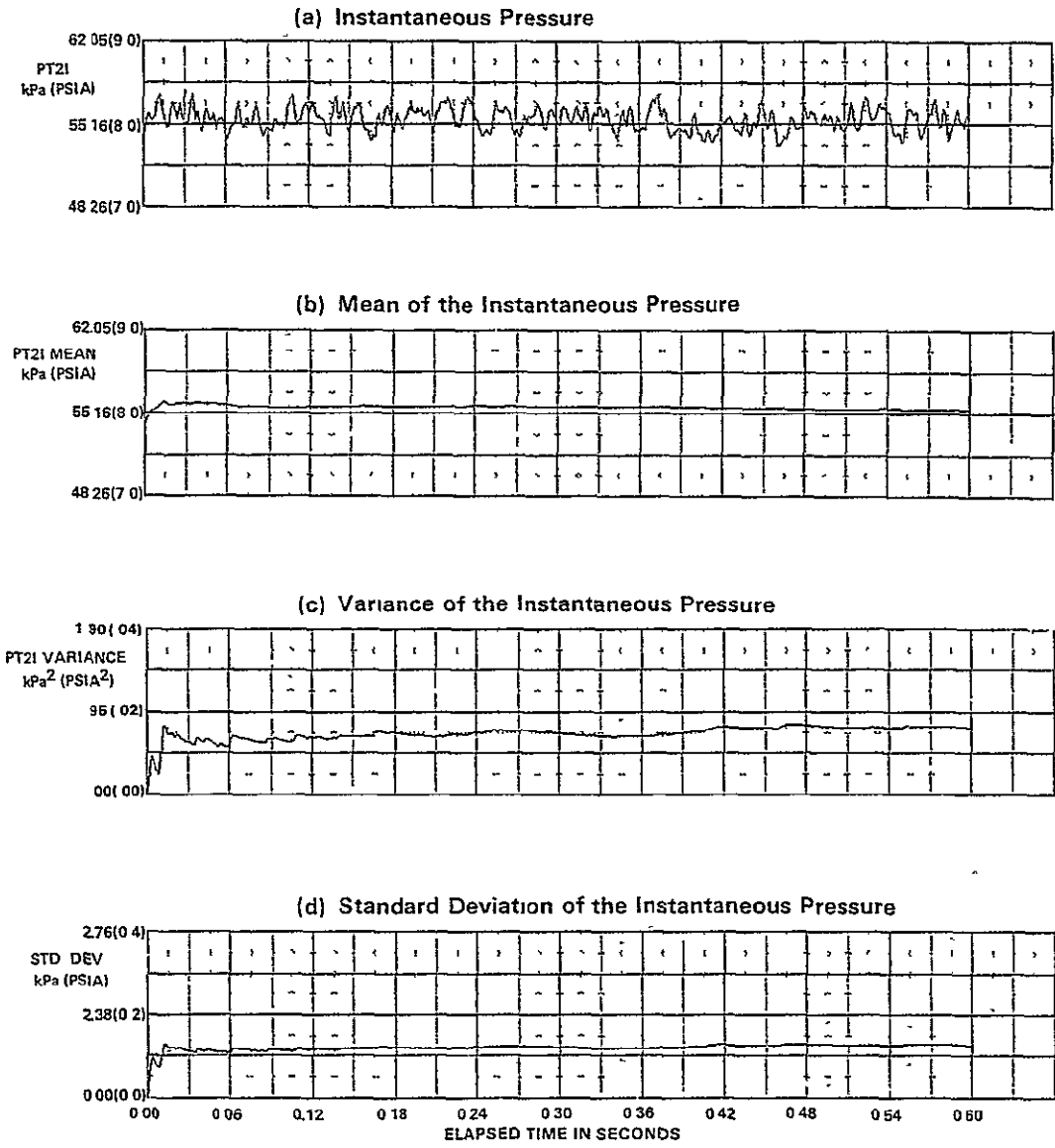


FIGURE C-34  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L8R3,  $M_o = 2.2$ ,  $\alpha = -2.0$ ,  $\beta = 0.0$ , WAT2 = 60.5 %

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SERIES VIII - NASA DATA STUDY

DATA PART/POINT 184 / 7 IDENT 66 @ 1040 HZ. PROBE L8R3  
THE SEGMENT START TIME WAS AT 20 22 12 051

MACH 2.2 ALPHA 0.0 BETA 0.0 RHO -2.0 DELTAS 22.5 BYPASS 0.0 WAT2 69.3% CIVV -25.0

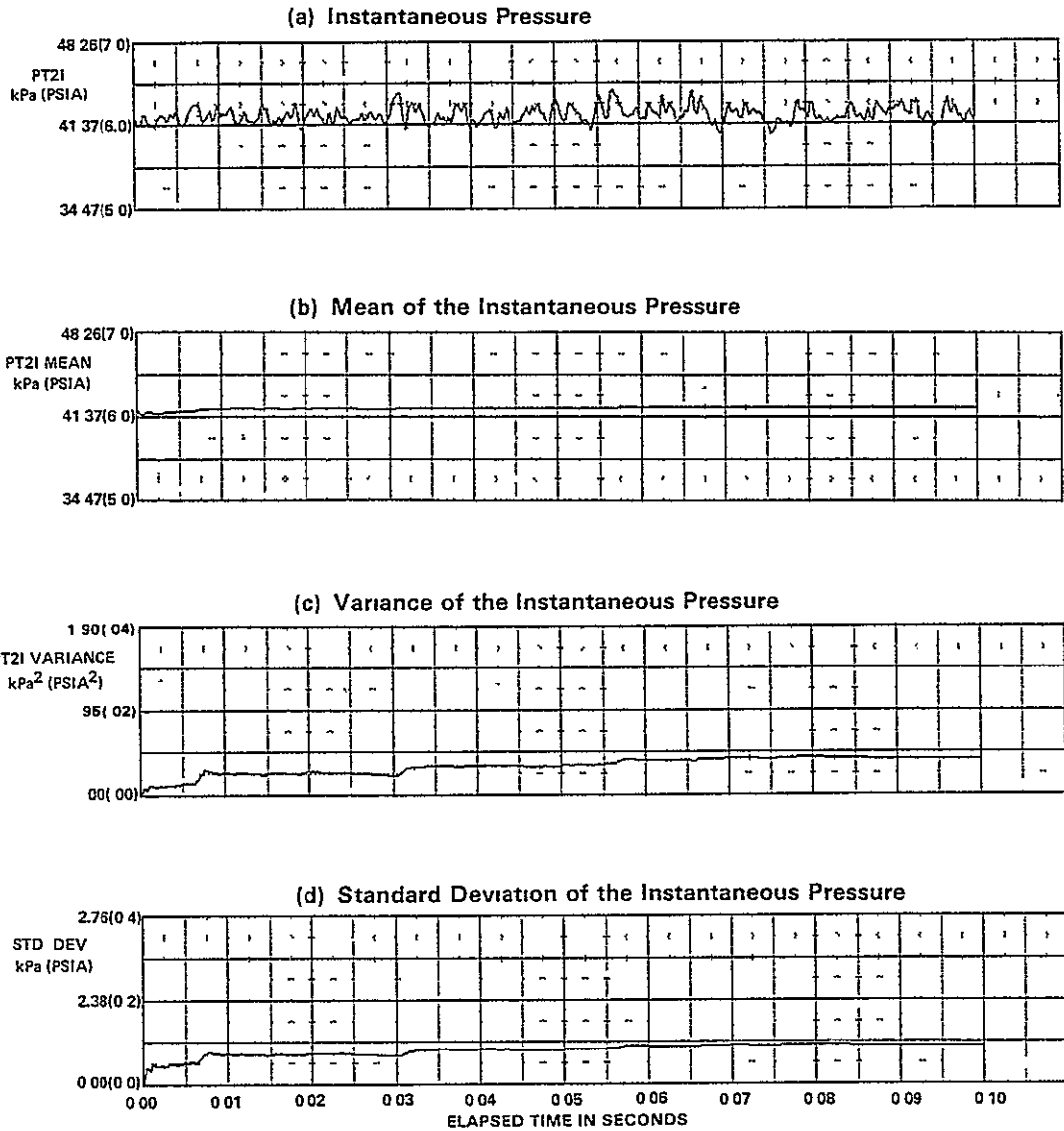


FIGURE C-35  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 2.2$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 69.3 %

SERIES VIII - NASA DATA STUDY

DATA PART/POINT 184/5 IDENT 67 @ 1040 HZ. PROBE L8R3  
 THE SEGMENT START TIME WAS AT 20 19 58 044

MACH 2.2 ALPHA 0.0 BETA 0.0 PHO -2.0 DELTA3 22.5 BYPASS 0.0 WAT2 75.4% CIVV -25.0

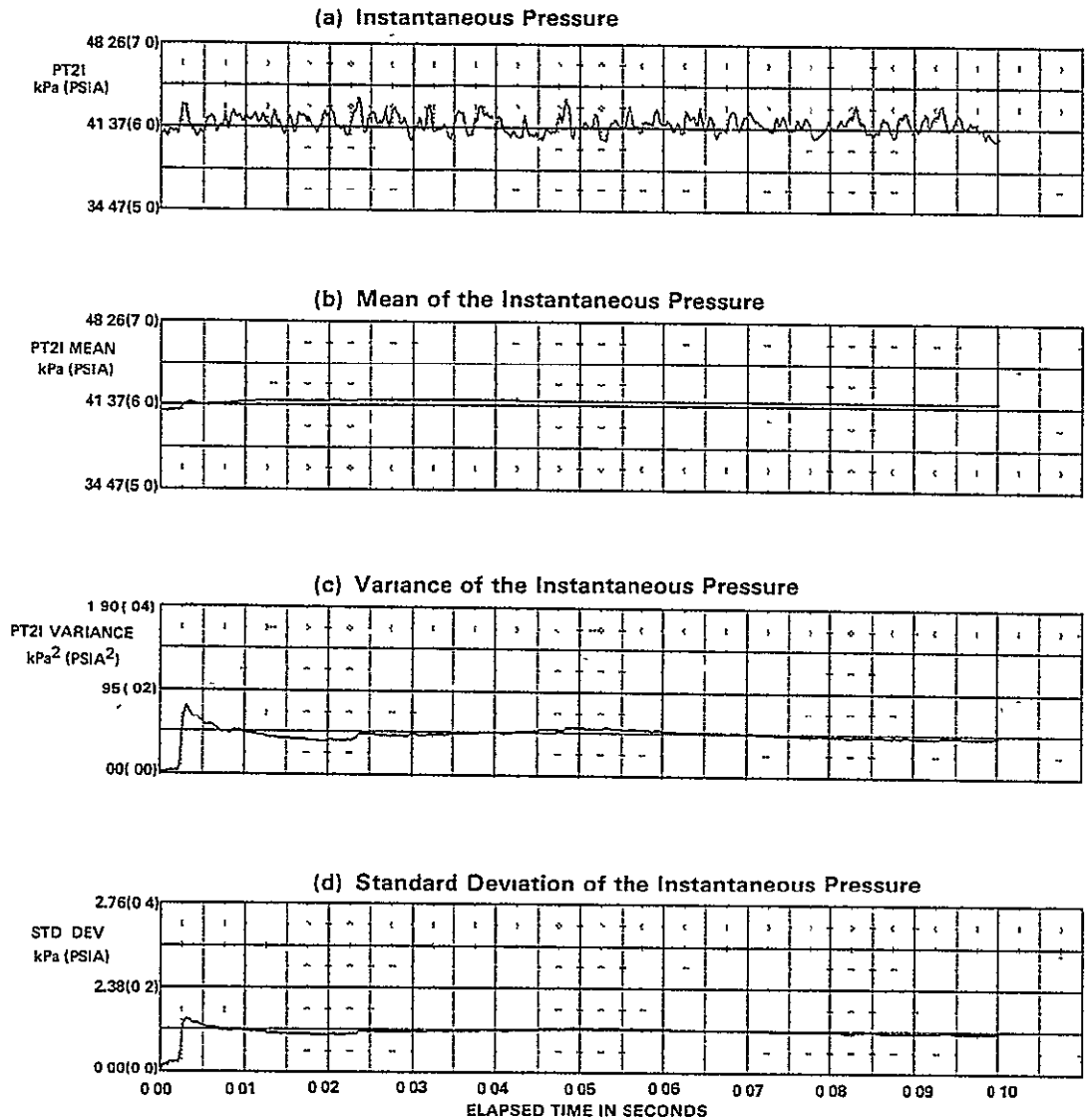


FIGURE C-36  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L8R3,  $M_0 = 2.2$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 75.4 %

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FSCP - NASA DATA STUDY

DATA PART/POINT 413 / 9 IDENT 68 @ 170 HZ PROBE L8R3  
THE SEGMENT START TIME WAS AT 22-30-15.140

MACH 2.2 ALPHA 0 BETA 0 RHO -2.0 DELTA3 22.5 BYPASS 0.0 WAT2 73.6% CIVV -25.0

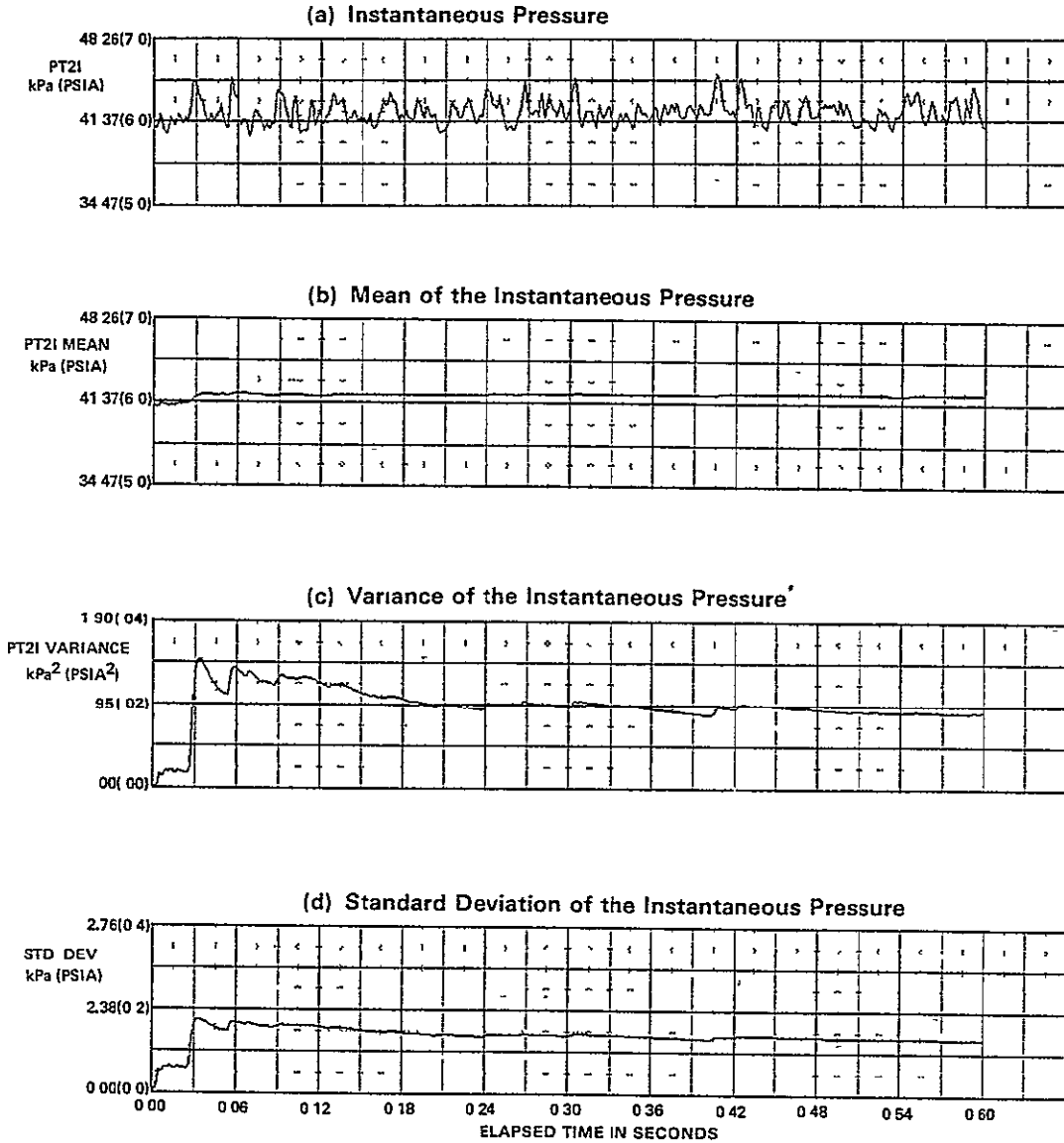


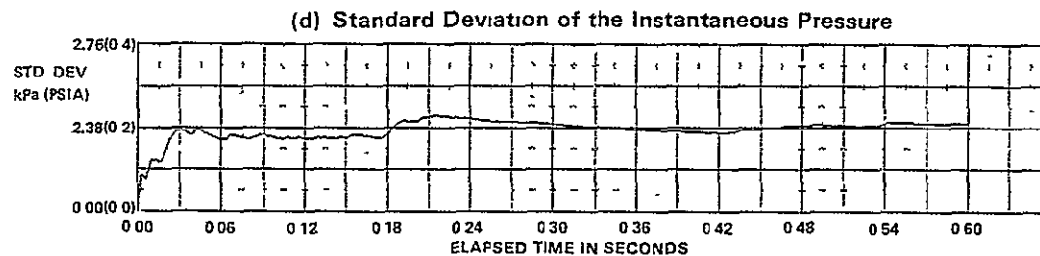
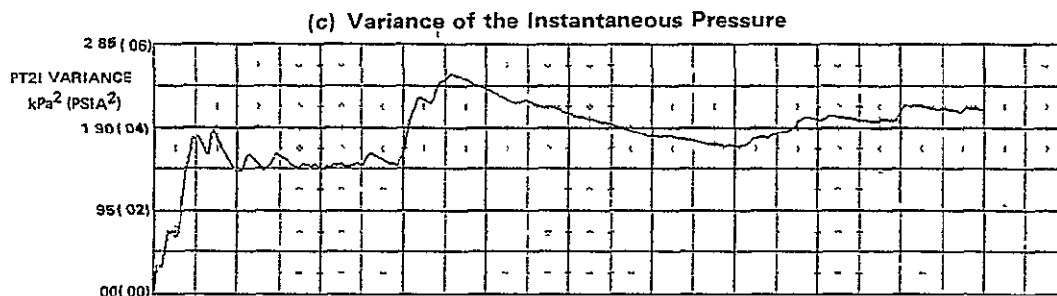
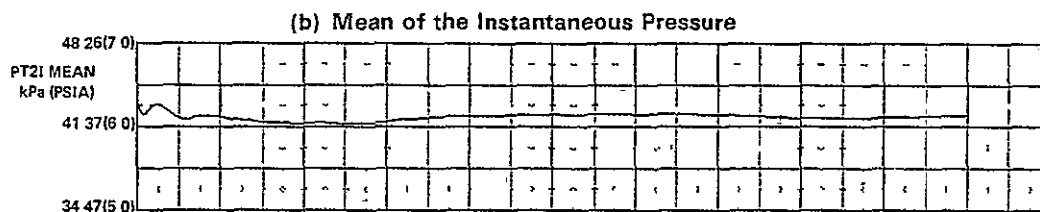
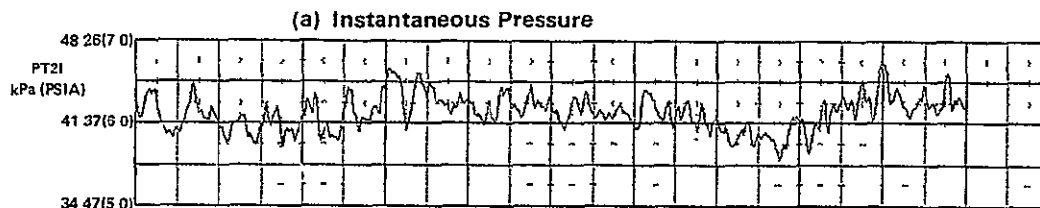
FIGURE C-37  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 2.2$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 73.6 %



# FSCP - NASA DATA STUDY

DATA PART/POINT 413 /12 IDENT 69 e 170 HZ PROBE L8R3  
 THE SEGMENT START TIME WAS AT 22 34.20.140

MACH 2.2      ALPHA 0      BETA 0      RHO -2.0      DELTAS 22.5      BYPASS 0 0      WAT2 68.3%      CIVV -25.0



**FIGURE C-38**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L8R3,  $M_0 = 2.2$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 68.3 %**

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FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 425/1 IDENT:70 PROBE L1R2  
THE SEGMENT START TIME WAS AT 05 09 58 941

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
2.2	0.1	0.2	16522(54207)	-2.2	22.9	0.0	73.0%	-25.00

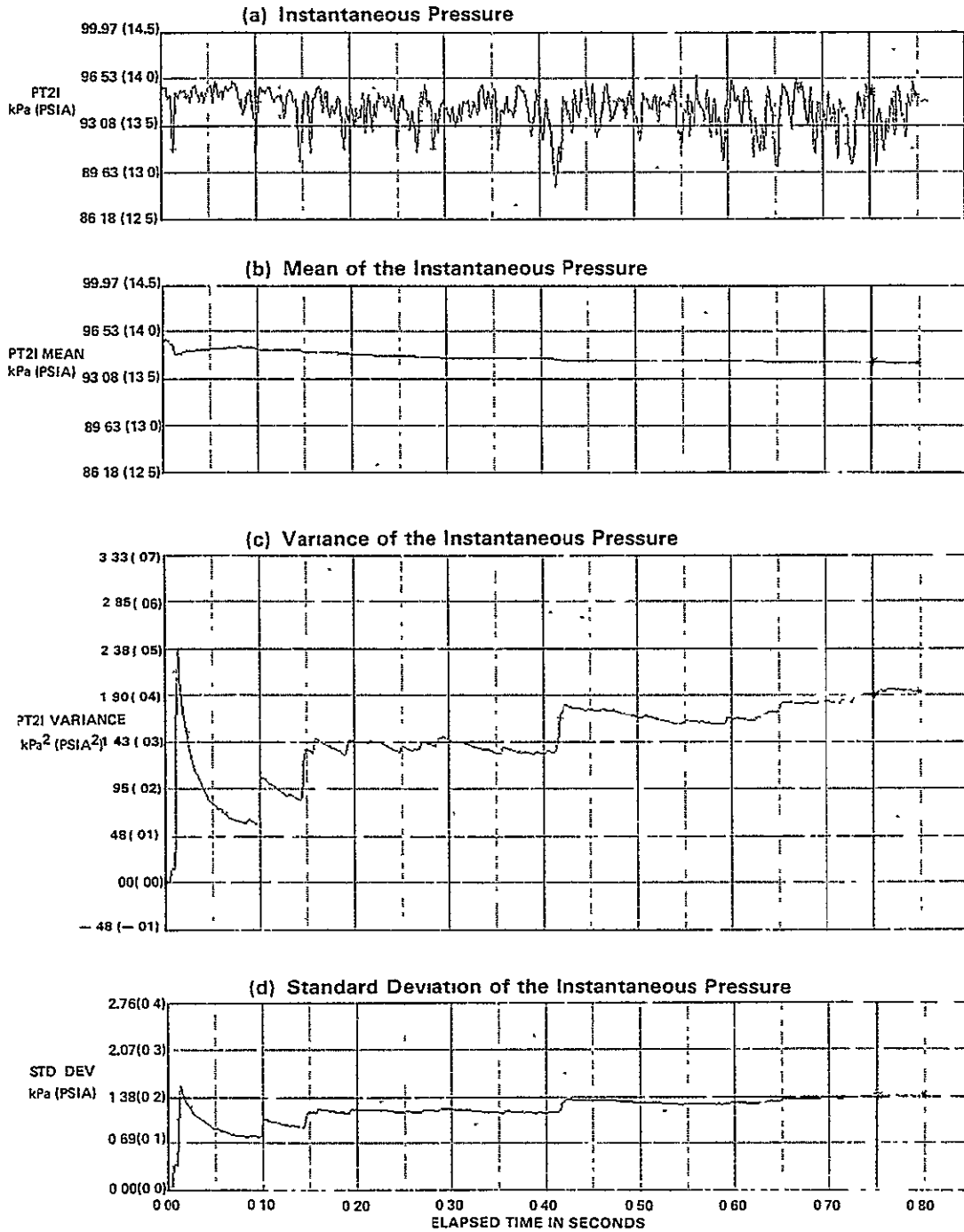
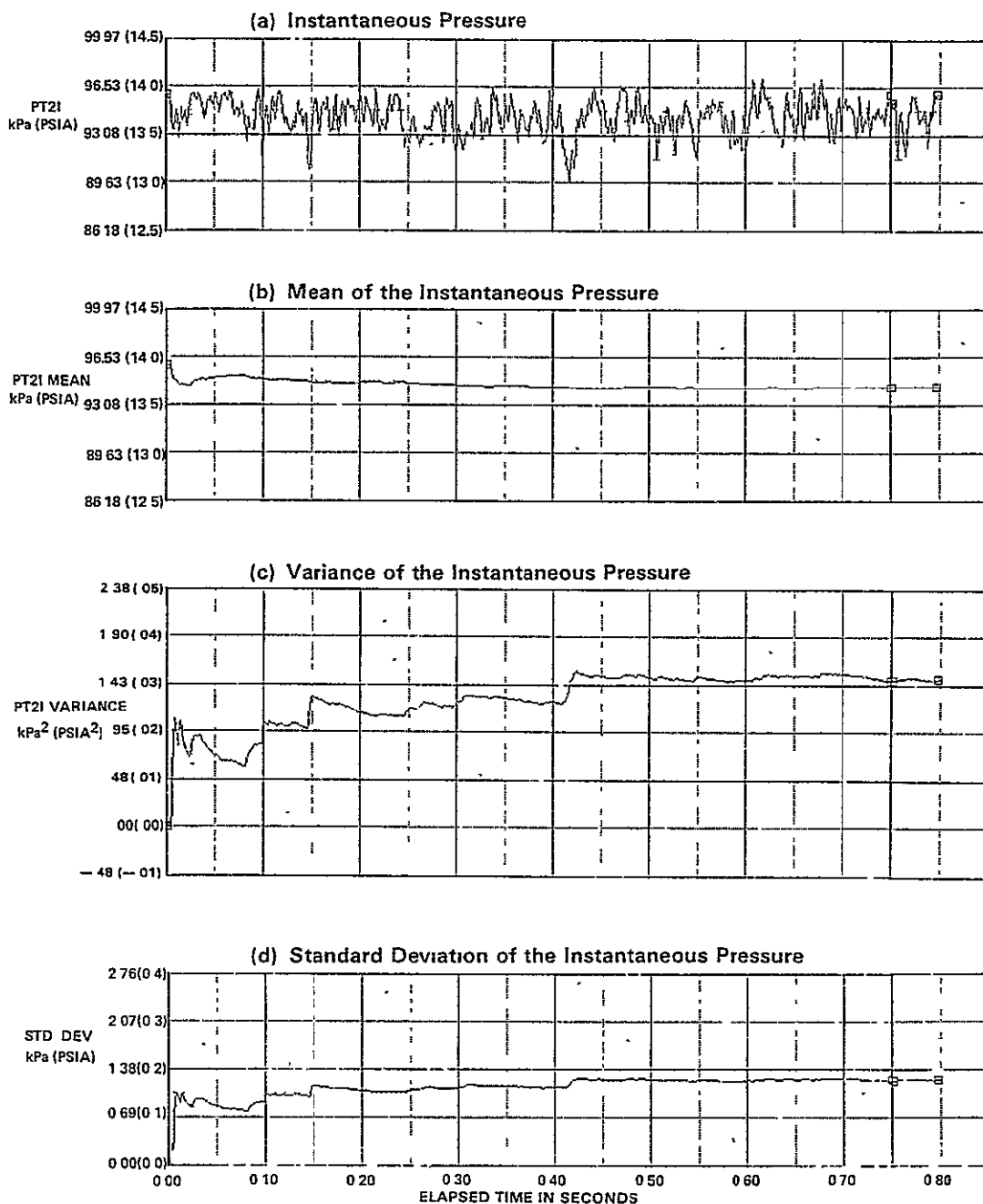


FIGURE C-39  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L1R2,  $M_0 = 2.2$ ,  $\alpha = 0.1$ ,  $\beta = 0.2$ , WAT2 = 73.0 %

# FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 425/1 IDENT:70 PROBE L1R3  
THE SEGMENT START TIME WAS AT 05 09 58 941

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
2.2	0.1	0.2	16522(54207)	-2.2	22.9	0.0	73.0%	-25.00



**FIGURE C-40**  
**TIME VARIANT DATA QUALITY ANALYSIS FOR**  
**PROBE = L1R3,  $M_0 = 2.2$ ,  $\alpha = 0.1$ ,  $\beta = 0.2$ , WAT2 = 73.0%**

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FLIGHT - NASA DATA STUDY

DATA FLIGHT/RUN 425/1 IDENT:70 PROBE L1R5  
THE SEGMENT START TIME WAS AT 05 09 58 941

MACH	ALPHA	BETA	ALT	RHO	DELTA3	BYPASS	WAT2	CIVV
2.2	0.1	0.2	16522(54207)	-2.2	22.9	0.0	73.0%	-25.00

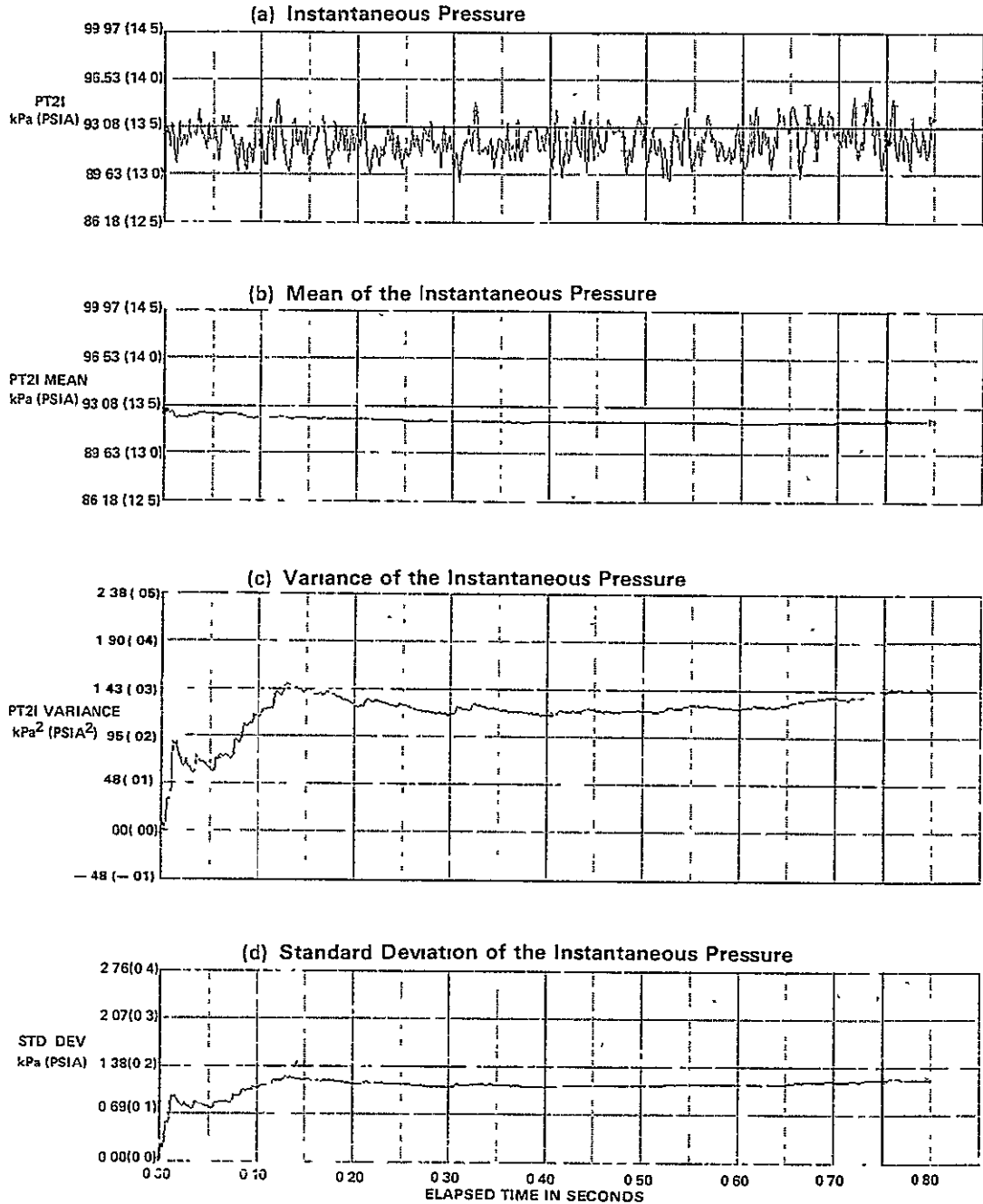


FIGURE C-41  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L1R5,  $M_0 = 2.2$ ,  $\alpha = 0.1$ ,  $\beta = 0.2$ ,  $WAT2 = 73.0\%$

SERIES VIII - NASA DATA STUDY

DATA PART/POINT 227 / 7 IDENT. 79 @ 1040 HZ. PROBE L5R3  
 THE SEGMENT START TIME WAS AT 30 27 47 245

MACH 2.5 ALPH0 BETA 0 PHO -4 0 DELTA3 26 0 BYPASS 0 07742 (120 0) WAT2 63.1% CIVV /-25 0

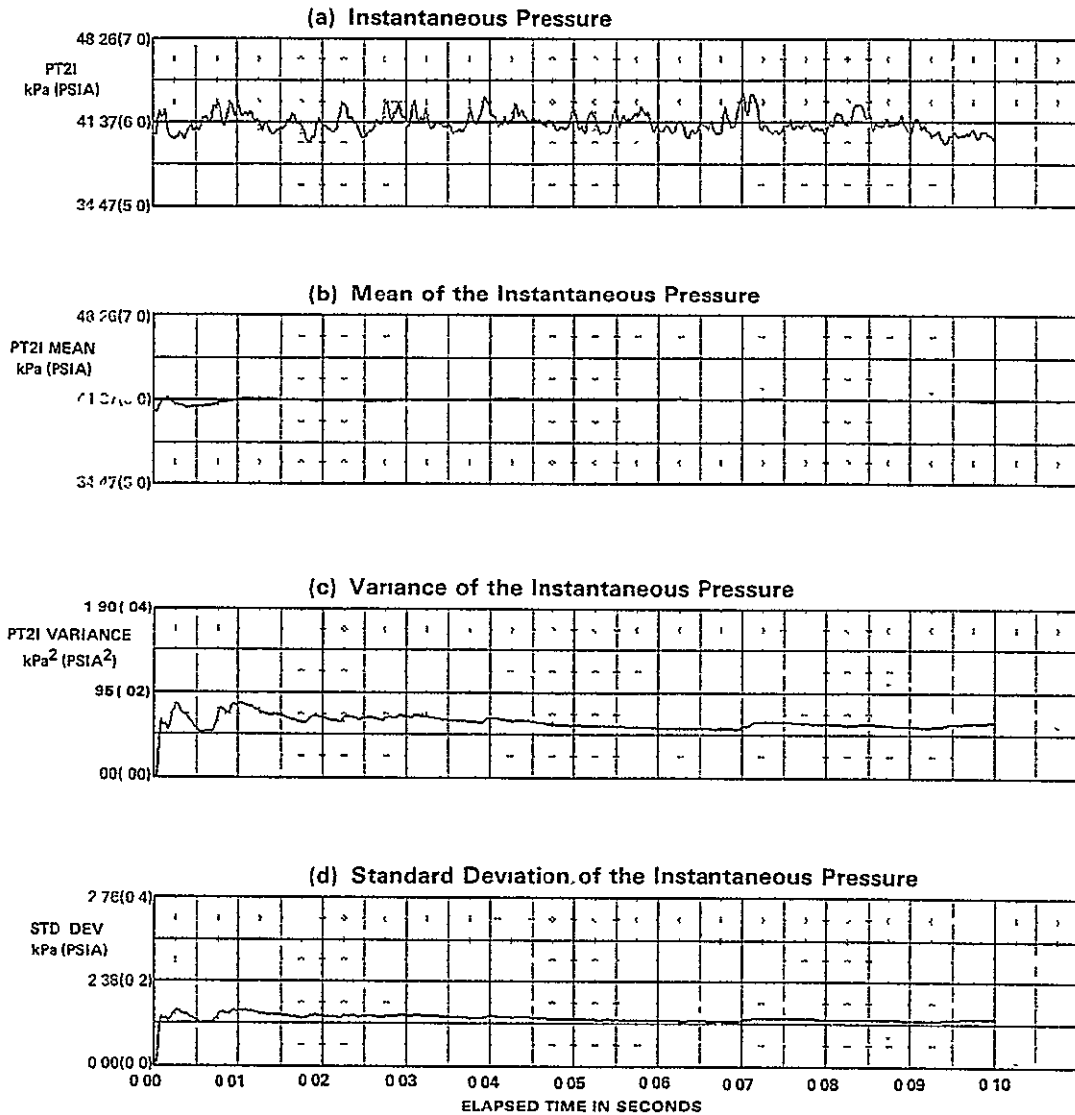


FIGURE C-42  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L5R3,  $M_0 = 2.5$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ ,  $WAT2 = 63.1\%$

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SERIES VIII - NASA DATA STUDY

DATA PART/POINT 227 / 5 IDENT 80 e 1040 HZ PROBE L7R3  
THE SEGMENT START TIME WAS AT 20 25 49 045

MACH 2.5 ALPHA 0 BETA 0 RPO -4 0 DELTA3 26 0 BYPASS 0 07742 (120 0) WAT2 68.2% CIVV -25 0

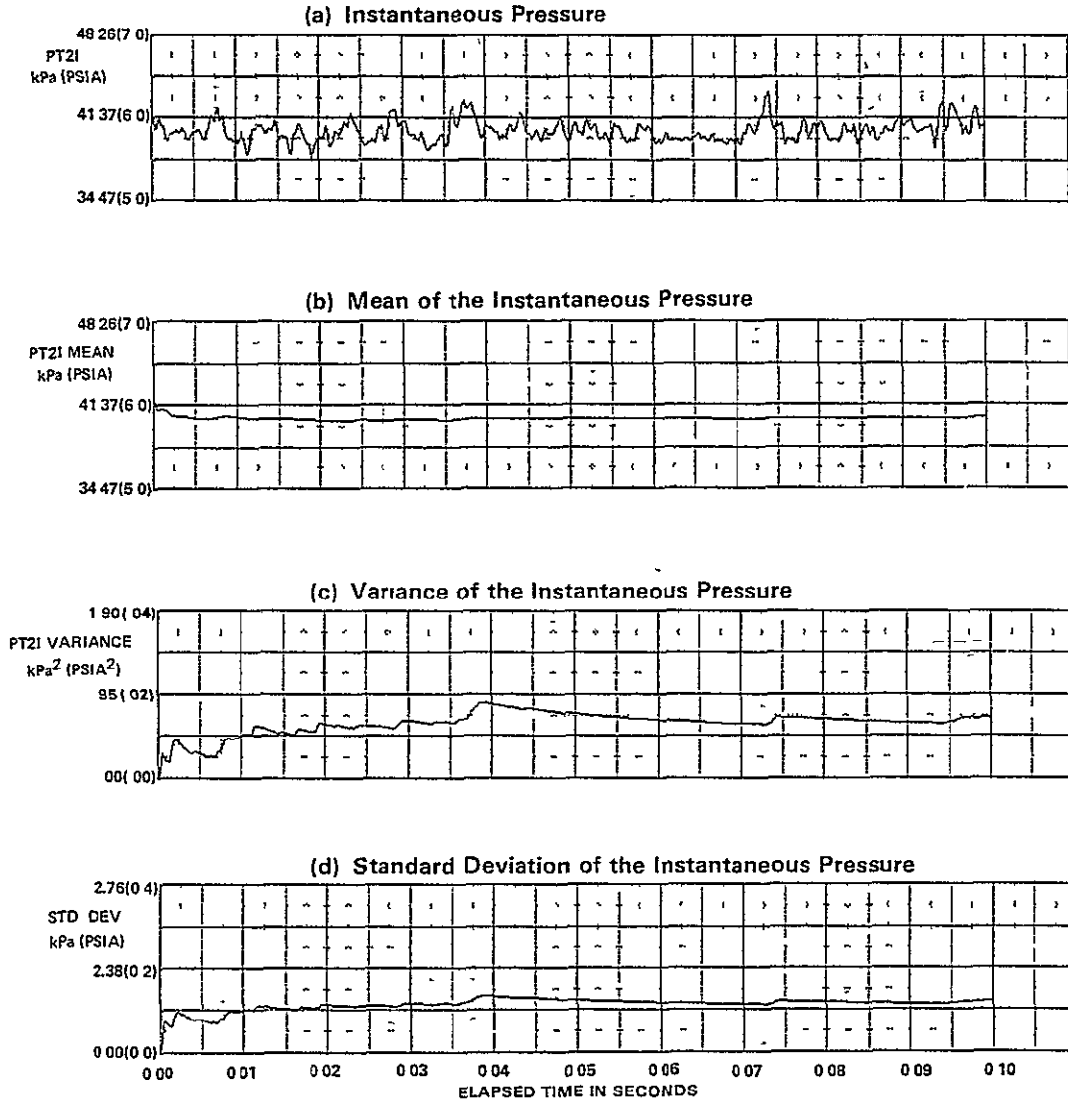


FIGURE C-43  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L7R3,  $M_0 = 2.5$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 68.2%

# FSCP - NASA DATA STUDY

DATA POINT/POINT USE 'S IDENT 81'e 170 HZ PROBE L8R3  
 THE SEGMENT START TIME WAS AT 3-23 40 091

MACH 2.5 ALPHA 0 BETA 0 RHO -4 DELTA3 25 BYPASS 0 07806 (121 0) WAT2 62.8% CIVV -25.0

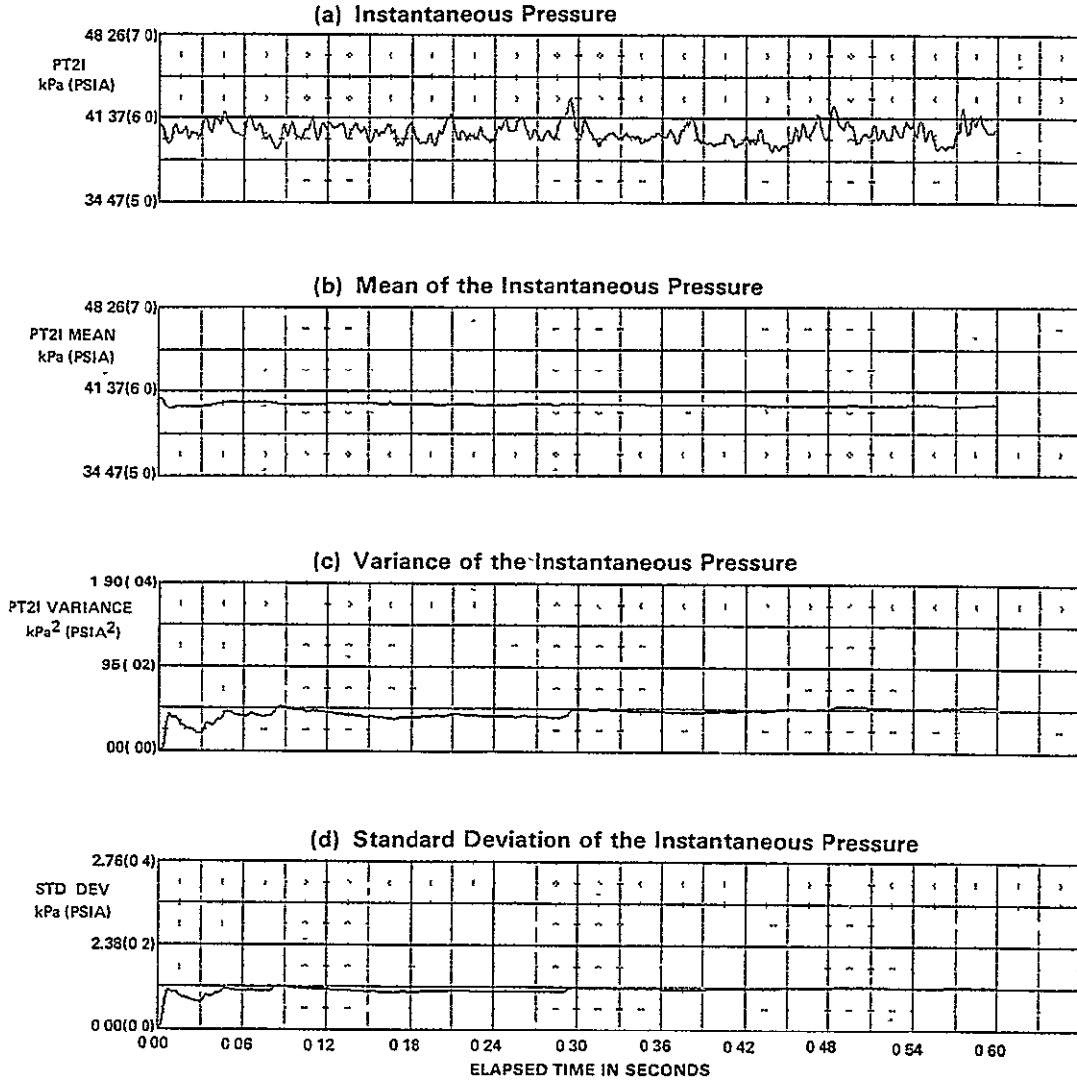


FIGURE C-44  
 TIME VARIANT DATA QUALITY ANALYSIS FOR  
 PROBE = L8R3,  $M_0 = 2.5$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 62.8 %

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FSCP - NASA DATA STUDY

DATA PART/POINT 465 / 5 IDENT. 82 @ 170 HZ. PROBE L8R3  
THE SEGMENT START TIME WAS AT 3 21 4 091

MACH 2.5 ALPHA 0 BETA 0 RHO -4.0 DELTA3 26.0 BYPASS 0 07806 (121 0) WAT2 68.9% CIVV -25 0

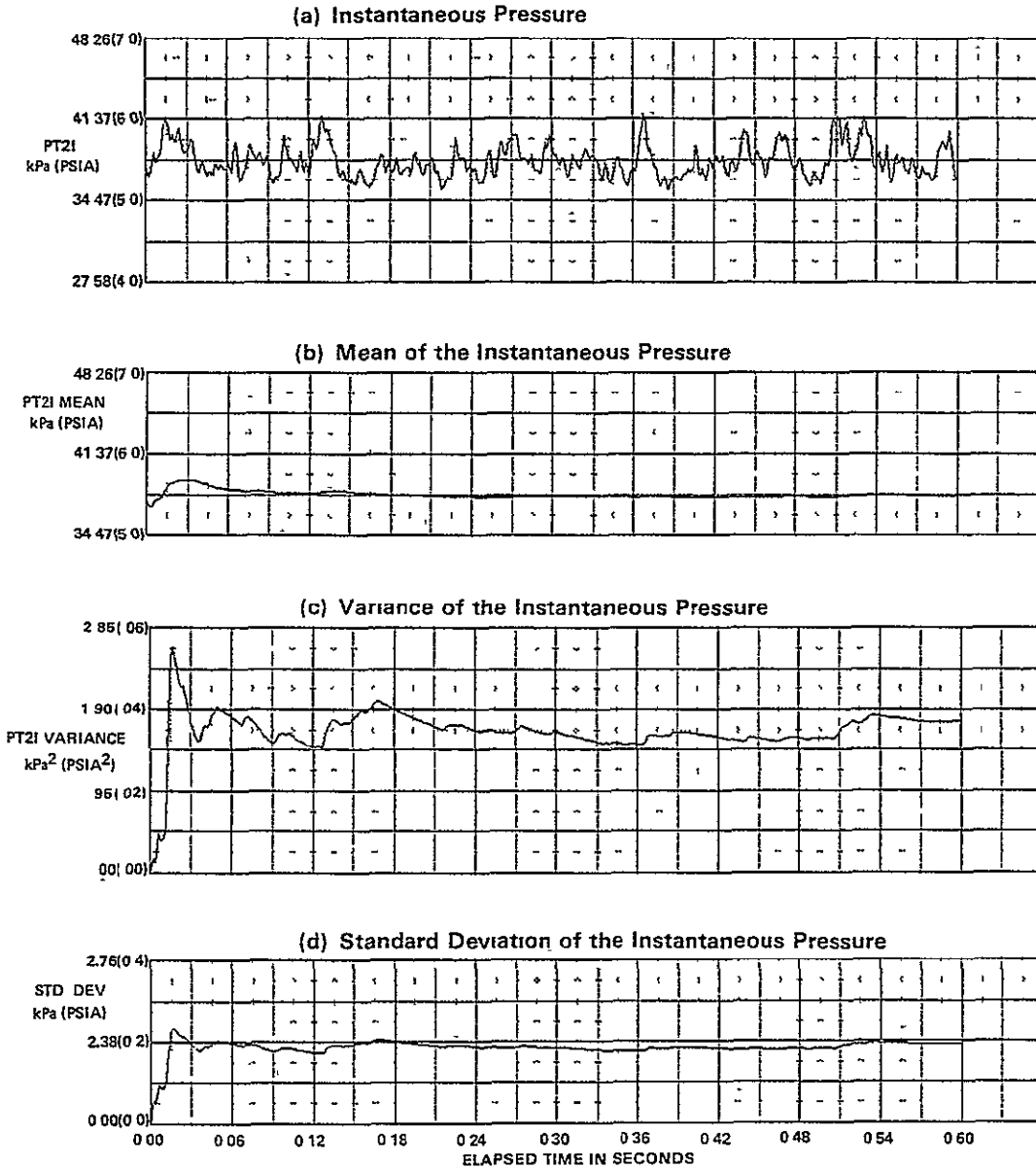


FIGURE C-45  
TIME VARIANT DATA QUALITY ANALYSIS FOR  
PROBE = L8R3,  $M_0 = 2.5$ ,  $\alpha = 0.0$ ,  $\beta = 0.0$ , WAT2 = 68.9 %