HEALTH AND SAFETY EXECUTIVE

HEAVY GAS DISPERSION TRIALS
THORNEY ISLAND 1982-3

DATA FOR TRIAL 037

Research and Laboratory Services Division
Red Hill, Sheffield S3 7HQ Tel: 0742 78141

THORNEY ISLAND TRIALS SPILL 037 14 APRIL 1984

SUMMARY INFORMATION AT THE TIME OF THE SPILL

Gas released at (approx 5 secs after fan start):	18:23 hrs
Enclosure arrangement	Longitudinal
Freon 12/Nitrogen mixture: relative density	1.60
Mean spill rate:	255 m^3/min
Spill duration:	7 min 25 secs
Mean Wind Speed at 10 m height:	
During the first 5 minutes of the main data collection period:	3.4 m/s
From 5 minute cyclic data just before the release:	3.1 m/s
Mean Wind Heading ('A' station) - (relative to the centre line of the array)	-31.8°

NB Positive angles are to the right (clockwise) of the centre line when looking downwind of the gas bag.

Relative Humidity (at 10 m height)	79.3%
Insolation	125 W/m^2
Ambient Air Temperature (at 9 m height)	10.0°C
Treated Runway Surface Temperature	10.1°C
Grass Surface Temperature	9.8°C
Observed Cloud Cover	4/8
Observational Pasquill Stability Category	C

THORNEY ISLAND TRIALS SPILL 037 14 APRIL 1984

DESCRIPTION

This release was intended to be similar to Trial 36 with a mean wind speed at about the middle of the range required by the trials programme.

A blocking high pressure situation existed and the weather pattern was changing very little. Although a northerly wind flow persisted over the UK mainland, a sufficiently large temperature difference developed between land and sea to induce a sea breeze. Preparations for the trial began shortly before midday. The wind speed was a little too high early in the afternoon but was expected to fall as the land cooled down. There was evidence of this trend commencing at about 1600 hours and soon after 1700 hours the gas plant was started and gas delivery began at 1715 hours.

Filling proceeded uneventfully and the gas was ready to release at 1820 hours. At this time the wind was south south westerly, 3 m/sec, cloud cover 3/8 and atmospheric stability estimated at Pasquill category C. As the gas discharged into the bund it did not settle but was all the time on the move and there was little containment within the enclosure. With the wind direction varying up to 45° to the left of the range centre line no gas spread behind and upwind of the container. Gas was steadily advected out of the bund and swept downrange in a visibly large cloud about 6 m high which spread extensively over the field.

THORNEY ISLAND HEAVY GAS DISPERSION TRIALS

Notes on information presented in the Summary Sheets

1 ATMOSPHERIC STABILITY

The atmospheric stability during the period of the experiment was obtained from the following methods:

i) Visual Observation

This is based on the amount of cloud cover, or the judged level of incoming solar radiation and the value of the wind speed (see attached table provided by the Meteorological Office).

ii) Temperature Difference (DT/DZ)

This method is one of the two suggested by the US Nuclear Regulatory Commission and in the present exercise was calculated as:

$$\frac{DT}{DZ} = \frac{T_{30}-T_9}{21} * 100.00$$

The NRC tables, see e.g. Sedefian and Bennett[1] or McQuaid[2] were then consulted to determine the appropriate stability.

iii) Solarimeter

The measured insolation, from the solarimeter, was used together with the wind speed to determine the stability based on the information presented in Pasquill[3] (Figure 6.13).

iv) Heat Flux

Heat flux (H) was calculated from the insolation (R) by the formula $H = 0.4(R-100)$ based on the suggestion by Smith[4]. Pasquill's[3], Figure 6.13 was then consulted to determine the stability. This method therefore agrees generally with the previous method.

v) Richardson Number

The Richardson number is calculated according to Sedefian and Bennett[1] as:

$$R_i = \frac{g(D\theta/DZ)}{T(DU/DZ)^2}$$

where θ is the potential temperature and T is the actual temperature; in this case, the temperature at 16 m above the ground. $D\theta/DZ$ was calculated as:

$$\frac{T_{30}-T_9}{21} + 0.00986$$

$\frac{DU}{DZ}$ was calculated as $\frac{U_{30}-U_{10}}{20}$

Sedefian and Bennett calculate the limits of Richardson number for the various stability categories, however the limits they presented were valid for measurements at heights whose geometric mean was 22 m. Since the measurement stations were at 10 m, 14 m and 20 m the limits of Richardson number for the various stability categories are recalculated to correspond to a geometric mean height of 14 m.

v) Bulk Richardson Number

The bulk Richardson number is also calculated according to Sedefian and Bennett[1] as:

$$R_{i_\infty} = \frac{g(D\theta/DZ)\overline{Z}^2}{\overline{T}\ \overline{U}^2}$$

where $\overline{Z}$ is the geometric mean height = $\sqrt{10 \times 20}$
T is the temperature at 14 m above the ground
and $\overline{U}$ is the mean wind speed at 20 m.

Here again the limits of $R_{i\infty}$ are recalculated to correspond to a geometric mean height of 14 m.

vi) Standard Deviation of Wind Heading

The standard deviation of wind heading is calculated from the Porton wind vane, which has a resolution bandwidth of 11°. The resulting accuracy is predicted to be around ±2° or so, assuming a Gaussian distribution of wind direction. These estimates were compared with the simple assumption that the standard deviation is approximately 1/6 (maximum-minimum angle).

The NRC limits for σ_θ are then used to determine the appropriate stability category.

2 WIND SPEED

Two values of wind speed are presented. The first is the mean value at the 10 m height for the first five minutes of the main data collection period, which generally began about one minute before the start of gas release.

The second wind speed is also a mean value obtained at the 10 m height, but corresponds to data taken over a five minute period just before main data collection began; data during this period is termed the 'cyclic' data.

REFERENCES

1 Sedefian L and Bennett E (1980) "A comparison of Turbulence classification schemes". Atmospheric Environment, Vol 14, No 7, pp741-750.

2 McQuaid J (1981) "Climatological records from the Thorney Island mast". Commercial in Confidence HGDT Report 1981/6.

3 Pasquill F (1974) "Atmospheric Diffusion" 2nd Ed. Published by Ellis Horwood Ltd, Chichester.

4 Smith F B (1979) "The relation between Pasquill stability P and Kazanski-Monin stability (in neutral and unstable conditions). Atmospheric Environment, Vol 13 pp879-881.

MODIFIED PASQUILL STABILITY CATEGORIES

Wind Speed (kt)	DAYTIME (excluding 1 hour after sunrise and 1 hour before sunset)				Within 1 hour before sunset or after	NIGHT-TIME		
	Incoming Solar Radiation (W m^{-2})					Cloud Amount (oktas)		
	Strong (>600)	Mod (300-600)	Slt (<300)	Overcast		0-3	4-7	8
<3	A	A-B	B	C	D	F or G see note 2 below	F	D
4-5	A-B	B	C	C	D	F	E	D
6-9	B	B-C	C	C	D	E	D	D
10-12	C	C-D	D	D	D	D	D	D
>12	C	D	D	D	D	D	D	D

Notes

1 Night was originally defined to include periods of one hour before sunset and after sunrise. These two hours are always categorised here as D.

2 Pasquill said that in light winds on clear nights the vertical spread may be less than for category F but excluded such cases because the surface plume is unlikely to have any definable travel. However, they are important from the point of view of the build up of pollution and category G (night-time, 0 or 1 okta of cloud, wind speed 0 or 1 kt) has been added.

3 1 kt = 0.52 m/s.

KEY TO GRAPHS

1 AVERAGING TIME

Length of the time window over which mean values have been calculated for the purpose of the plots. Since the full record contains 20 samples per second, an averaging time of 0.6 seconds gives the arithmetic mean of 12 samples of the original signal. Note that it is not a running average but a 'box' window which is moved through the data in increments of the averaging time.

2 X:Y:Z

The location in metres of the sensor on the trials site. The (X,Y) axes are defined by the grid of fixed masts, the release point is at X = 400 metres, Y = 200 metres. The Z axis defines the height of the sensor on the mast at location (X, Y) - see mast array. Note that the Z axis is defined by measurement from the mast base and is not absolute in the sense that it takes no account of any slope of the trials site.

3 TYPE

Defines the type of sensor which generated the data shown in the plots.

GAS:	Standard oxygen deficiency sensor Frequency response 1 Hz (at - 3 dB point).
HGAS:	High speed oxygen deficiency sensor Frequency response 10 Hz (at - 3 dB point).
SMOK:	High speed light scattering smoke sensor Frequency response 10 Hz (at - 3 dB point).
WSPD	Wind speed as indicated by cup anemometer in metres/second.
WHDG:	Wind heading as indicated by wind vanes in degrees relative to the site axis. Positive values are to the right of the site axis (looking 'downwind' from the source) and negative values to the left.
AIRT:	Air temperature in degrees centigrade.
SOLA:	Solar radiation as measured by solarimeter in watts/square metre.
BROM:	Barometric pressure measured in millibars.
TEMP:	Rapid response platinum resistance thermometer. Frequency response 10 Hz approximately.
UANA:	Velocity component A of tri-axial anemometers in the horizontal (X Y) plane.
UANB:	Velocity component B of tri-axial anemometer in the horizontal (X Y) plane.

UANW: Velocity component W of tri-axial anemometer in the vertical (Z) direction.

UANT: Temperature, as measured by tri-axial anemometer with this facility.

RUN UP MEAN: The mean value of the appropriate sensor output averaged over the run up period i.e. in the period 5992 to 5692 seconds before the gas container release.

RUN DOWN MEAN: The mean value of the appropriate sensor output averaged over the run down period i.e. in the period 1632 to 1932 seconds after the gas container release.

4 GAS SENSORS

The readings of the GAS and HGAS sensors are in terms of the % concentration of the released gas mixture with an associated error band of either 10% of reading or as determined by calibration checks with a standard gas mixture. An estimate of the accuracy of each sensor for each test will be sent out separately. Note that the SMOK sensors have no absolute calibration in terms of gas concentration but have been included because of the potential high frequency information their outputs contain. An approximate calibration may be obtained by comparing their output to that of the nearest oxygen deficiency sensor.

5 SONIC ANEMOMETERS

Prints of the sonic anemometer outputs are included for completeness but it will be appreciated that analysis of records can only be performed using the data tapes. The three wind velocity components A, B and W can be transposed into components corresponding with the X, Y and Z coordinates of the mast array as follows:

$$X = \frac{1}{\sqrt{3}} (A - B)$$

$$Y = A + B$$

$$Z = W$$

6 RUNNING MEANS

In order to assist analysis, a three minute running mean has been superimposed on all environmental records except the sonic anemometers. The points plotted represent the mean of 300 values (0.6 second averages) and are plotted at 0.6 second intervals.

NOTES ON VALIDATION OF GAS SENSOR DATA FOR TRIAL 037

1 The standard gas sensors listed below were malfunctioning:

X Coordinates (m)	Y Coordinates (m)	Height (m)
414	214	0.4, 4.4
371	269	0.4, 2.4, 4.4, 10.4
400	275	10.4
362	292	6.4, 10.4
400	300	2.4, 4.4
400	350	6.4
300	400	6.4
400	500	0.4, 4.4

2 The fast-response instrument stations at 1 m height at the mobile mast positions could not be mounted on the masts themselves. They are consequently sited 5 m up-range of the masts at points with a Y-coordinate of 270 m. X-coordinates are as for the masts.

3 Plots obtained from standard gas sensors sited inside the gas container are included at pages GB1 and GB5. It should be noted that these sensors are intended to assist NMI Ltd in determining the release conditions and do not form part of the dispersion field. Any interpretation of the output from these sensors should take account of the following:

a) no validation of the gas bag sensor data has been carried out and no corrections have been made to take account of offset or drift before and after release;

b) the sensors are mounted within the central gantry of the gas container which has horizontal platforms at various heights;

c) sensors in the lower and central part of the gas container are always in 100% gas immediately before release;

d) the performance of the sensors is adversely affected by exposure to high concentrations (in the region of 30%) of Freon 12. Specifically, the presence of the high concentrations of Freon 12 reduces the sensitivity of the electrochemical cells in the sensors to oxygen. The cells recover in about four minutes and the effect is manifested by a zero undershoot and slow recovery after the gas has been released.

4 Gas sensor drift during this trial was particularly high, making the gas sensor data very difficult to validate. The drift correction applied to gas sensor data is a linear correction and cannot take account for the non-linear drift which occurred during this trial. In several cases it is difficult to separate gas response from drift and caution in interpreting the data is recommended. In view of the excessive and non-linear drift, the normally quoted gas concentration resolution of 0.1% gas is considered over optimistic.

B ROEBUCK
Special Instruments and Techniques Section
Safety Engineering Laboratory
9 April 1985

INSTRUMENT STATIONS AND DISTRIBUTIONS (EFFECTIVE FOR TRIAL 037)

Note: The Location Coordinates are the X, Y coordinates in metres at 1/100 scale. The source is at (4.0, 2.0).
The table scans the layout by successive rows (i.e. at constant Y) of masts.

LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
							E01
4.0, 0.5	A	32	5	0.4	Solarimeter		E02
		32	6	0.4	Barometric Pressure		E03
		0	0	2.0	Cup Anemometer		E04
		0	1	2.0	Thermometer		E05
		32	4	2.0	Relative Humidity		E06
		0	4	2.0	Sonic Anemometer - XY		E07
		0	5	2.0	Sonic Anemometer - XY		E08
		0	6	2.0	Sonic Anemometer - Z		E09
		0	7	2.0	Sonic Anemometer - Temp		E10
		0	2	4.5	Cup Anemometer		E11
		0	3	6.0	Thermometer		E12
		1	0	10.0	Cup Anemometer		E13
		32	0	10.0	Sonic Anemometer - XY		E14
		32	1	10.0	Sonic Anemometer - XY		E15
		32	2	10.0	Sonic Anemometer - Z		E16
		32	3	10.0	Sonic Anemometer - Temp		E17
		32	7	10.0	Relative Humidity		E18
		1	6	10.0	Wind Vane		E19
		1	1	10.0	Thermometer		E20
		1	3	14.0	Thermometer		E21
		1	2	17.3	Cup Anemometer		E22
		1	4	20.0	Cup Anemometer		E23
		1	5	20.0	Thermometer		E24
		1	7	10.0	Wind Vane		E25
4.2, 0.5	V	5	7	10.0	Wind Vane		E26
4.0, 1.5	V	6	0	0.4	Thermometer		GB1
4.0, 2.0	S	6	1	0.4	Gas Sensor		GB2
		6	4	4.5	Gas Sensor		GB3
		6	6	9.0	Gas Sensor		E27
		6	2	12.0	Thermometer		GB4
		6	3	12.0	Gas Sensor		GB5
		6	7	13.5	Gas Sensor		G01
3.86, 2.14	F	16	0	0.4	Gas Sensor		G02
		16	1	2.4	Gas Sensor		G03
		16	2	4.4	Gas Sensor		G04
		16	7	6.4	Gas Sensor		G05
4.0, 2.1	P	5	0	0.4	Gas Sensor		G06
4.0, 2.2	F	26	5	0.4	Gas Sensor		G07
		26	6	2.4	Gas Sensor		G08
		26	7	4.4	Gas Sensor		G09
4.0, 2.3		5	1	0.4	Gas Sensor		
4.14, 2.14	F	5	3	0.4	Gas Sensor		G10
		5	4	2.4	Gas Sensor		
		5	5	4.4	Gas Sensor		G11
		5	6	6.4	Gas Sensor		
3.72, 2.28	F	4	0	0.4	Gas Sensor		
		4	1	2.4	Gas Sensor		
		4	2	4.4	Gas Sensor		
		28	4	6.4	Gas Sensor		G12
4.0, 2.4	F	16	3	0.4	Gas Sensor		G13
		16	4	2.4	Gas Sensor		G14
		16	5	4.4	Gas Sensor		G15
		16	6	6.4	Gas Sensor		
3.52, 2.28	P	28	5	0.4	Gas Sensor		
4.28, 2.28	F	28	0	0.4	Gas Sensor		
		28	1	2.4	Gas Sensor		
		28	2	4.4	Gas Sensor		
		28	3	6.4	Gas Sensor		
4.48, 2.28	P	34	7	0.4	Gas Sensor		G16
3.73, 2.48	P	28	6	0.4	Gas Sensor		
4.28, 2.48	P	34	6	0.4	Gas Sensor		
3.5, 2.5	F	4	3	0.4	Gas Sensor		
		4	4	2.4	Gas Sensor		
		4	5	4.4	Gas Sensor		
		4	6	6.4	Gas Sensor		
		4	7	10.4	Gas Sensor		
4.0, 2.5	P	28	7	0.4	Gas Sensor		
4.5, 2.5	F	34	0	0.4	Gas Sensor		
		34	1	2.4	Gas Sensor		
		34	2	4.4	Gas Sensor		
		34	3	6.4	Gas Sensor		
		34	4	10.4	Gas Sensor		

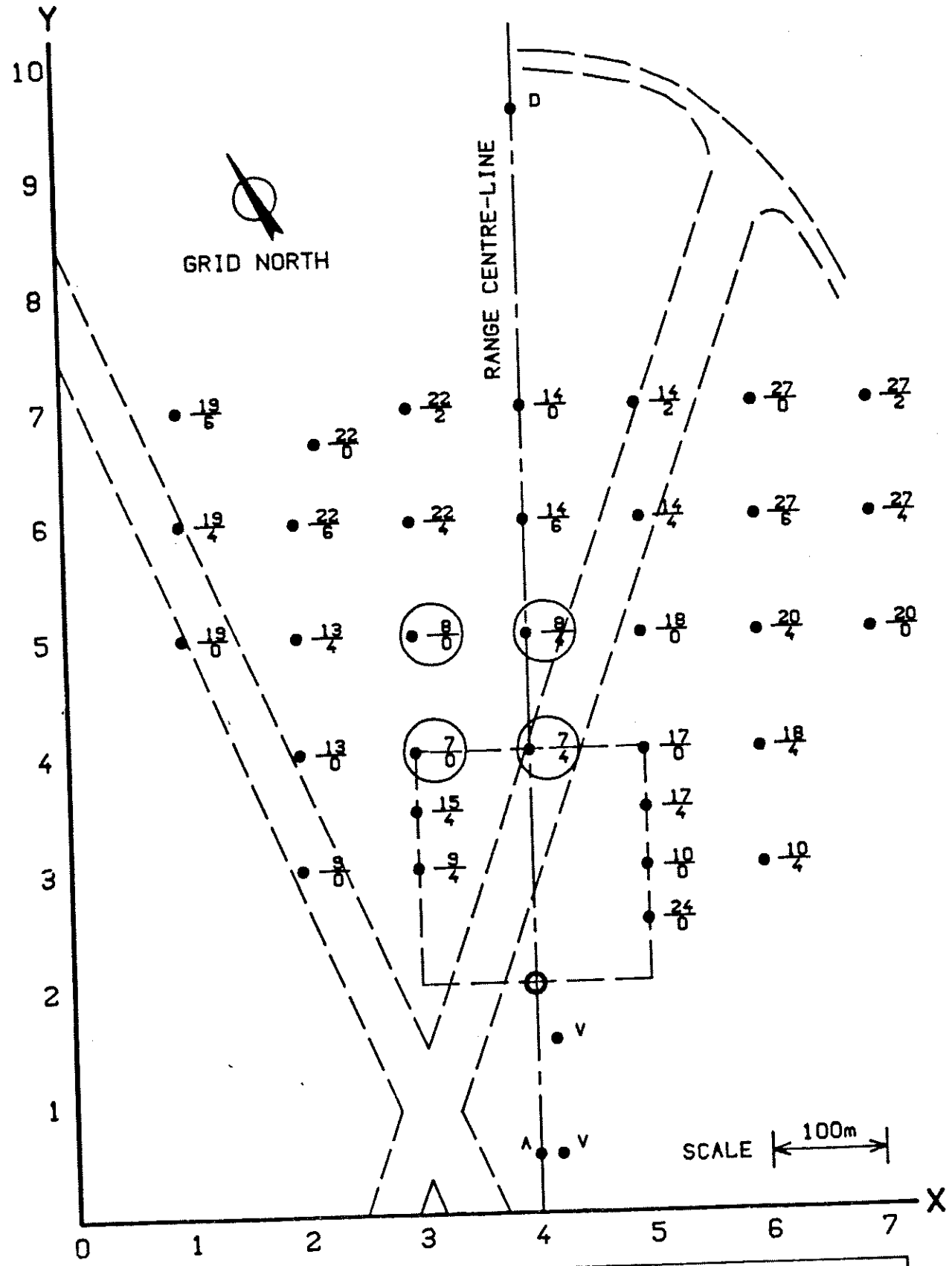
LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
							G17
4.0, 2.55	P	3	7	0.4	Gas Sensor		
3.25, 2.75	P	31	1	0.4	Gas Sensor		
		31	2	2.4	Gas Sensor		
3.71, 2.69	F	30	0	0.4	Gas Sensor		
		30	1	2.4	Gas Sensor		
		30	2	4.4	Gas Sensor		G18
		30	3	6.4	Gas Sensor		
		30	4	10.4	Gas Sensor		G19
4.0, 2.75	M2	3	0	0.4	Gas Sensor		G20
		3	5	1.0	High Speed Gas Sensor		E28
		2	0	1.0	Sonic Anemometer - XY		E29
		2	1	1.0	Sonic Anemometer - XY		E30
		2	2	1.0	Sonic Anemometer - Z		E31
		2	3	1.0	Sonic Anemometer - Temp		
		3	6	2.0	Smoke Sensor		G21
		3	1	2.4	Gas Sensor		G22
		3	2	4.4	Gas Sensor		G23
		3	3	6.4	Gas Sensor		
		3	4	10.4	Gas Sensor		E32
		2	4	15.0	Sonic Anemometer - XY		E33
		2	5	15.0	Sonic Anemometer - XY		E34
		2	6	15.0	Sonic Anemometer - Z		E35
		2	7	15.0	Sonic Anemometer - Temp		
4.29, 2.69		26	0	0.4	Gas Sensor		
		26	1	2.4	Gas Sensor		
		26	2	4.4	Gas Sensor		
		26	3	6.4	Gas Sensor		
		26	4	10.4	Gas Sensor	Not connected	
4.50, 2.75	M3	12	0	0.4	Gas Sensor		
		11	0	1.0	Sonic Anemometer - XY		E36
		11	1	1.0	Sonic Anemometer - XY		E37
		11	2	1.0	Sonic Anemometer - Z		E38
		11	3	1.0	Sonic Anemometer - Temp		E39
		12	4	1.0	Thermometer		E40
		33	4	1.0	High Speed Gas Sensor		
		33	7	2.0	High Speed Gas Sensor		
		33	0	2.0	Sonic Anemometer - XY		E41
		33	1	2.0	Sonic Anemometer - XY		E42
		33	2	2.0	Sonic Anemometer - Z		E43
		33	3	2.0	Sonic Anemometer - Temp		E44
		12	6	2.0	Thermometer		E45
		12	1	2.4	Gas Sensor		
		12	2	4.4	Gas Sensor		
		12	3	6.4	Gas Sensor		
		12	5	10.4	Gas Sensor		
		11	4	15.0	Sonic Anemometer - XY		E46
		11	5	15.0	Sonic Anemometer - XY		E47
		11	6	15.0	Sonic Anemometer - Z		E48
		11	7	15.0	Sonic Anemometer - Temp		E49
5.00, 2.75	M3	24	0	0.4	Gas Sensor		
		25	4	1.0	Sonic Anemometer - XY		E50
		25	5	1.0	Sonic Anemometer - XY		E51
		25	6	1.0	Sonic Anemometer - Z		E52
		25	7	1.0	Sonic Anemometer - Temp		E53
		25	1	1.0	High Speed Gas Sensor		
		25	2	2.0	High Speed Gas Sensor		
		24	1	2.4	Gas Sensor		
		24	2	4.4	Gas Sensor		
		24	3	6.4	Gas Sensor		
		25	0	10.4	Gas Sensor		
		24	4	15.0	Sonic Anemometer - XY		E54
		24	5	15.0	Sonic Anemometer - XY		E55
		24	6	15.0	Sonic Anemometer - Z		E56
		24	7	15.0	Sonic Anemometer - Temp		E57
2.0, 3.0	F	9	0	0.4	Gas Sensor		
		9	1	2.4	Gas Sensor		
		9	2	4.4	Gas Sensor		
		9	3	6.4	Gas Sensor		

LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
3.0, 3.0	F	9	4	0.4	Gas Sensor		
		9	5	2.4	Gas Sensor		
		9	6	4.4	Gas Sensor		
		9	7	6.4	Gas Sensor		
		31	0	10.4	Gas Sensor		
3.62, 2.92		23	0	0.4	Gas Sensor		G24
		23	1	2.4	Gas Sensor		G25
		23	2	4.4	Gas Sensor		G26
		23	3	6.4	Gas Sensor		
		23	4	10.4	Gas Sensor		
4.0, 3.0		23	5	0.4	Gas Sensor		G27
		23	6	2.4	Gas Sensor		
		23	7	4.4	Gas Sensor		
		21	0	6.4	Gas Sensor		G28
		21	1	10.4	Gas Sensor		G29
4.38, 2.92		21	3	0.4	Gas Sensor		
		21	4	2.4	Gas Sensor		
		21	5	4.4	Gas Sensor		
		21	6	6.4	Gas Sensor		
			7	10.4	Gas Sensor		
5.0, 3.0	F	10	0	0.4	Gas Sensor		
		10	1	2.4	Gas Sensor		
		10	2	4.4	Gas Sensor		
		10	3	6.4	Gas Sensor		
6.0, 3.0	F	10	4	0.4	Gas Sensor		
		10	5	2.4	Gas Sensor		
		10	6	4.4	Gas Sensor		
		10	7	6.4	Gas Sensor		
3.0, 3.5	F	15	4	0.4	Gas Sensor		
		15	6	2.4	Gas Sensor		
		15	7	4.4	Gas Sensor		
		15	5	6.4	Gas Sensor		G30
4.0, 3.5	F	15	0	0.4	Gas Sensor		G31
		15	1	2.4	Gas Sensor		G32
		15	2	4.4	Gas Sensor		
		15	3	6.4	Gas Sensor		
5.0, 3.5	F	17	4	0.4	Gas Sensor		
		17	5	2.4	Gas Sensor		
		17	6	4.4	Gas Sensor		
		17	7	6.4	Gas Sensor		
2.0, 4.0	F	13	0	0.4	Gas Sensor		
		13	1	2.4	Gas Sensor		
		13	2	4.4	Gas Sensor		
		13	3	6.4	Gas Sensor		G33
3.0, 4.0		7	0	0.4	Gas Sensor		G34
		7	1	2.4	Gas Sensor		G35
		7	2	4.4	Gas Sensor		
		7	3	6.4	Gas Sensor		G36
4.0, 4.0	F	7	4	0.4	Gas Sensor		G37
		7	5	2.4	Gas Sensor		G38
		7	6	4.4	Gas Sensor		G39
		7	7	6.4	Gas Sensor		
5.0, 4.0	F	17	0	0.4	Gas Sensor		
		17	1	2.4	Gas Sensor		
		17	2	4.4	Gas Sensor		
		17	3	6.4	Gas Sensor		
6.0, 4.0	F	18	4	0.4	Gas Sensor		
		18	5	2.4	Gas Sensor		
		18	6	4.4	Gas Sensor		
		18	7	6.4	Gas Sensor		
2.0, 5.0	F	13	4	0.4	Gas Sensor		
		13	5	2.4	Gas Sensor		
		13	6	4.4	Gas Sensor		
		13	7	6.4	Gas Sensor		G40
3.0, 5.0	F	8	0	0.4	Gas Sensor		G41
		8	1	2.4	Gas Sensor		G42
		8	2	4.4	Gas Sensor		G43
		8	3	6.4	Gas Sensor		

LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
4.0, 5.0	F	8	4	0.4	Gas Sensor		G44
		8	5	2.4	Gas Sensor		
		8	6	4.4	Gas Sensor		G45
		8	7	6.4	Gas Sensor		
5.0, 5.0	F	18	0	0.4	Gas Sensor		
		18	1	2.4	Gas Sensor		
		18	2	4.4	Gas Sensor		
		18	3	6.4	Gas Sensor		
6.0, 5.0	F	20	4	0.4	Gas Sensor		
		20	5	2.4	Gas Sensor		
		20	6	4.4	Gas Sensor		
		20	7	6.4	Gas Sensor		E58
7.0, 5.0	F	20	2	0.4	Solarimeter		
		20	0	0.4	Gas Sensor	Not connected	
		20	1	2.4	Gas Sensor	Not connected	
2.0, 6.0	F	22	6	0.4	Gas Sensor	Not connected	
		22	7	2.4	Gas Sensor	Not connected	
3.0, 6.0	F	22	4	0.4	Gas Sensor		
		22	5	2.4	Gas Sensor		
4.0, 6.0	F	14	6	0.4	Gas Sensor		
		14	7	2.4	Gas Sensor		
5.0, 6.0	F	14	4	0.4	Gas Sensor		
		14	5	2.4	Gas Sensor		
6.0, 6.0	F	27	6	0.4	Gas Sensor	Not connected	
		27	7	2.4	Gas Sensor		
7.0, 6.0	F	27	4	0.4	Gas Sensor		
		27	5	2.4	Gas Sensor	Not connected	
2.2, 6.7	F	22	0	0.4	Gas Sensor	Not connected	
		22	1	2.4	Gas Sensor		
3.0, 7.0	F	22	2	0.4	Gas Sensor		
		22	3	2.4	Gas Sensor	Not connected	
4.0, 7.0	F	14	0	0.4	Gas Sensor		
		14	1	2.4	Gas Sensor		
5.0, 7.0	F	14	2	0.4	Gas Sensor		
		14	3	2.4	Gas Sensor	Not connected	
6.0, 7.0	F	27	0	0.4	Gas Sensor	Not connected	
		27	1	2.4	Gas Sensor		
7.0, 7.0	F	27	2	0.4	Gas Sensor		
		27	3	2.4	Gas Sensor	Not connected	
4.0, 9.5	D	29	4	10.0	Wind Speed		E59
		29	5	10.0	Relative Humidity		E60
		29	6	10.0	Thermometer		E61
		29	7	10.0	Wind Vane		E62

TRIAL No. - 037 DATE - 14/4/84 45 SENSORS SAW GAS

WIND SPEED (U_{10}) 3.4 m/sec PASQUILL CATEGORY C

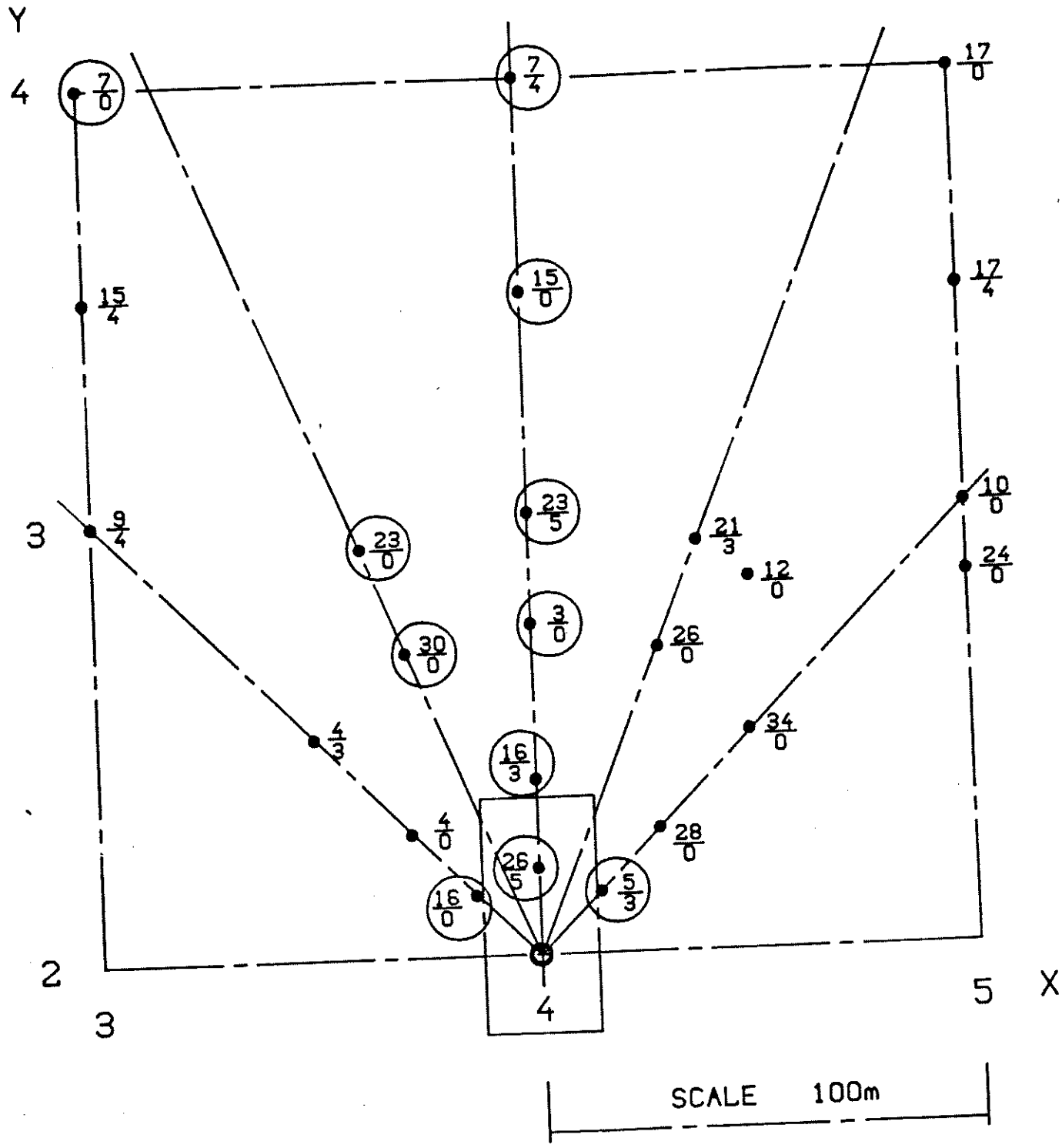


$\frac{21}{4}$ = $\frac{\text{DATA TERMINAL}}{\text{CHANNEL NUMBER}}$ OF GAS SENSORS AT 0.4m HEIGHT

○ = SENSORS AT 0.4m HEIGHT VERIFIED TO HAVE SEEN GAS

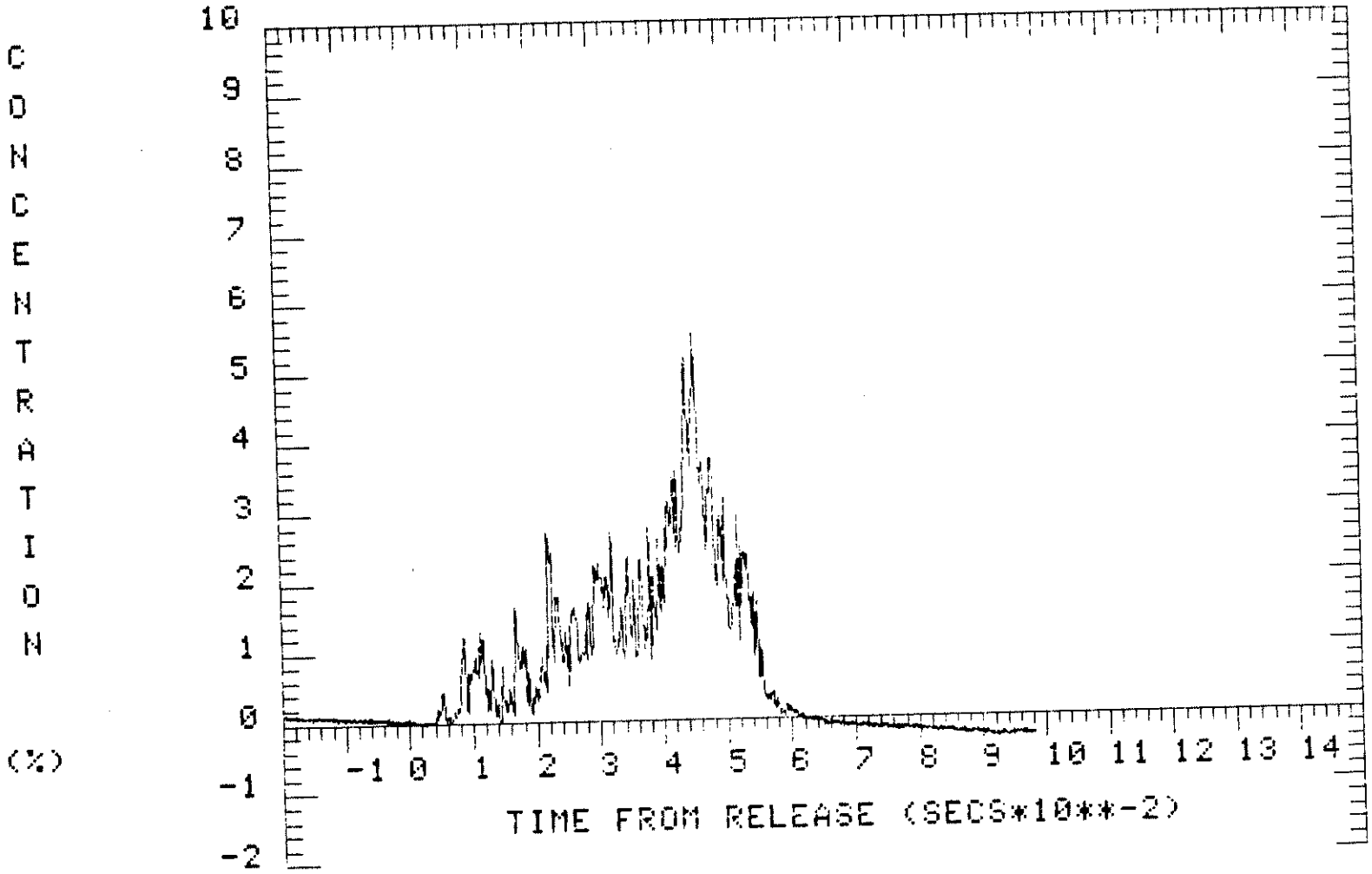
TRIAL No. - 037 DATE - 14/4/84 45 SENSORS SAW GAS

WIND SPEED (U_{10}) 3.4 m/sec PASQUILL CATEGORY C



$\frac{21}{4}$ = $\frac{\text{DATA TERMINAL}}{\text{CHANNEL NUMBER}}$ OF GAS SENSORS AT 0.4m HEIGHT

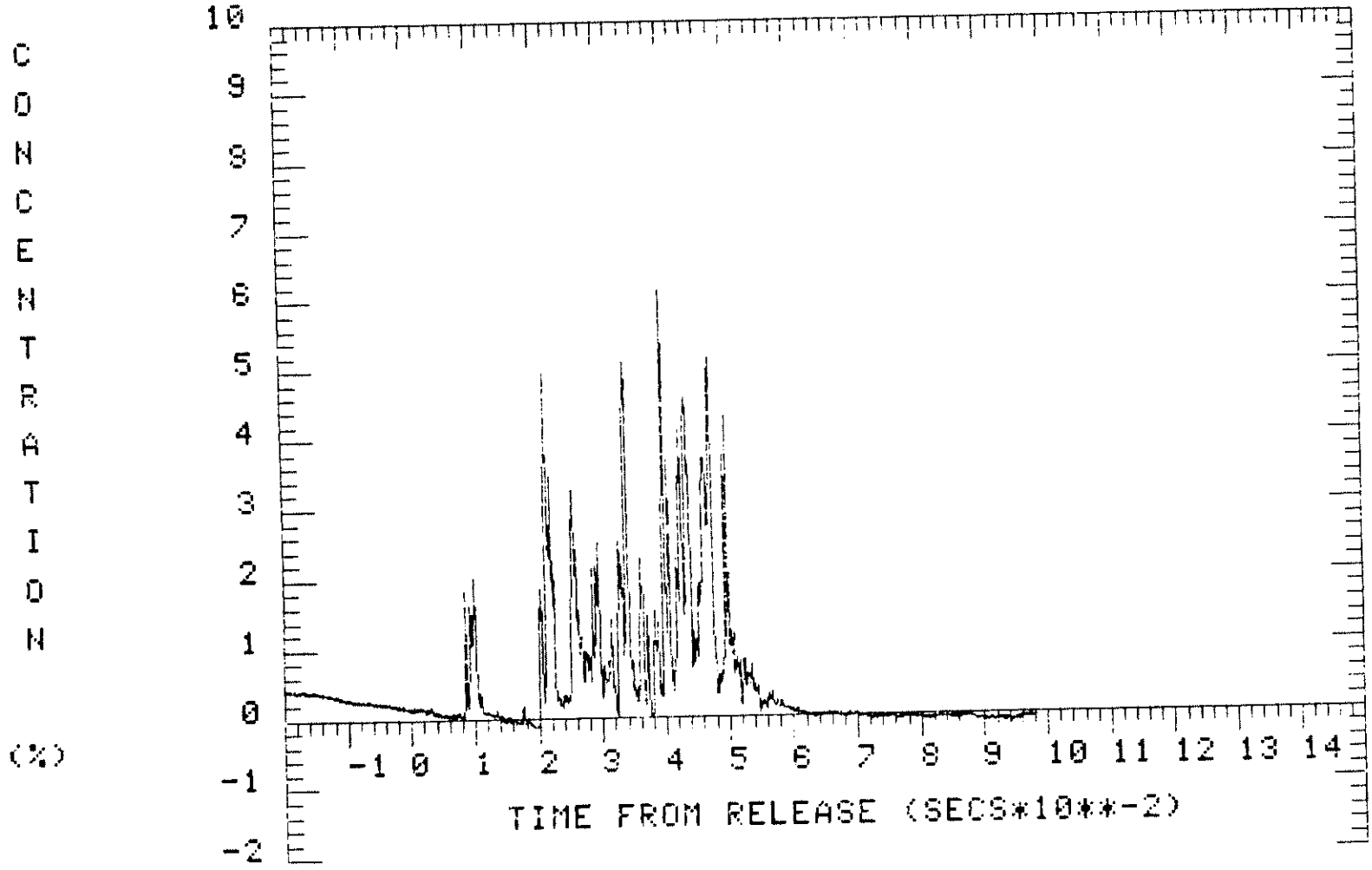
○ = SENSORS AT 0.4m HEIGHT VERIFIED TO HAVE SEEN GAS



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 386 M Y: 214 M Z: 0.4 M

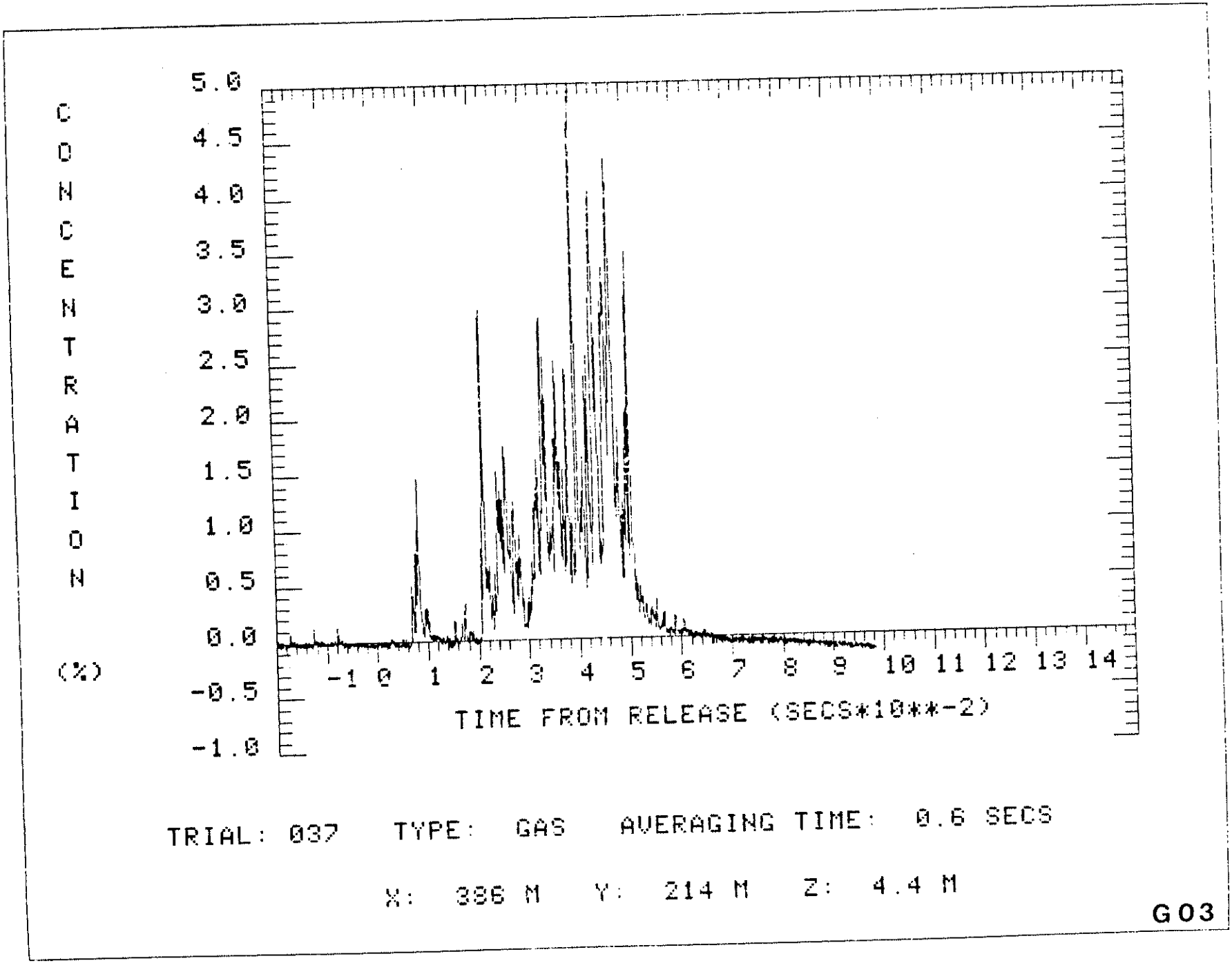
G01

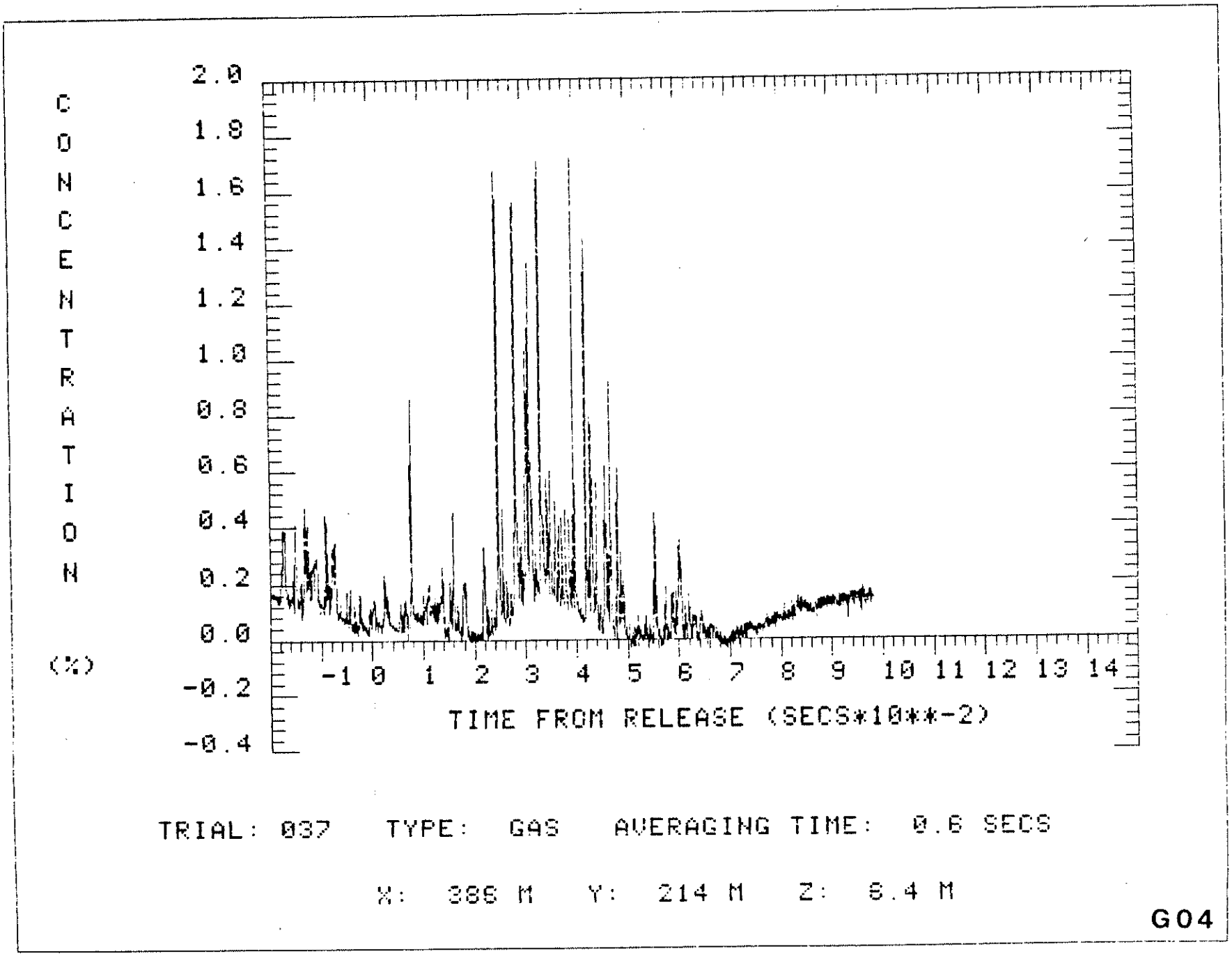


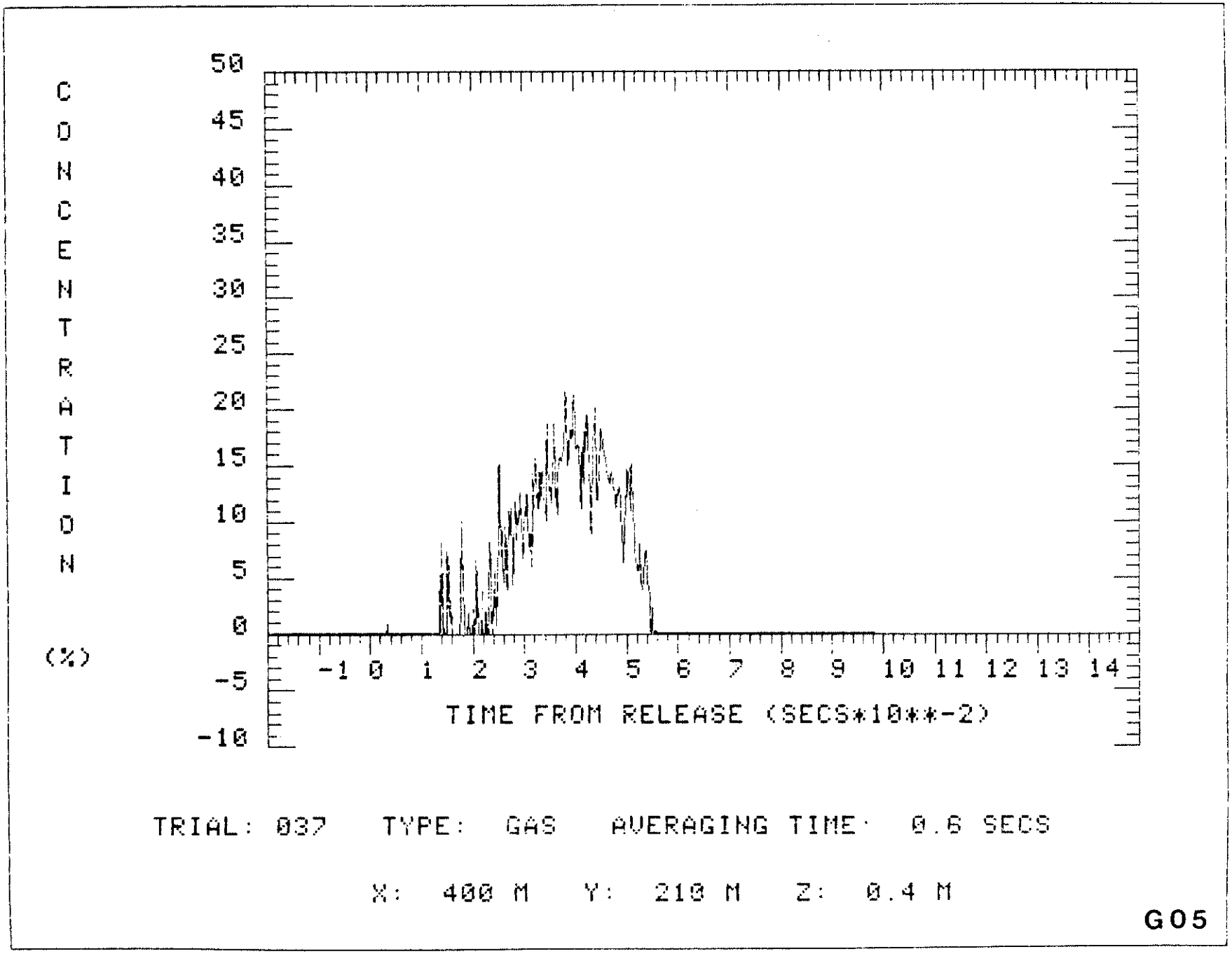
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

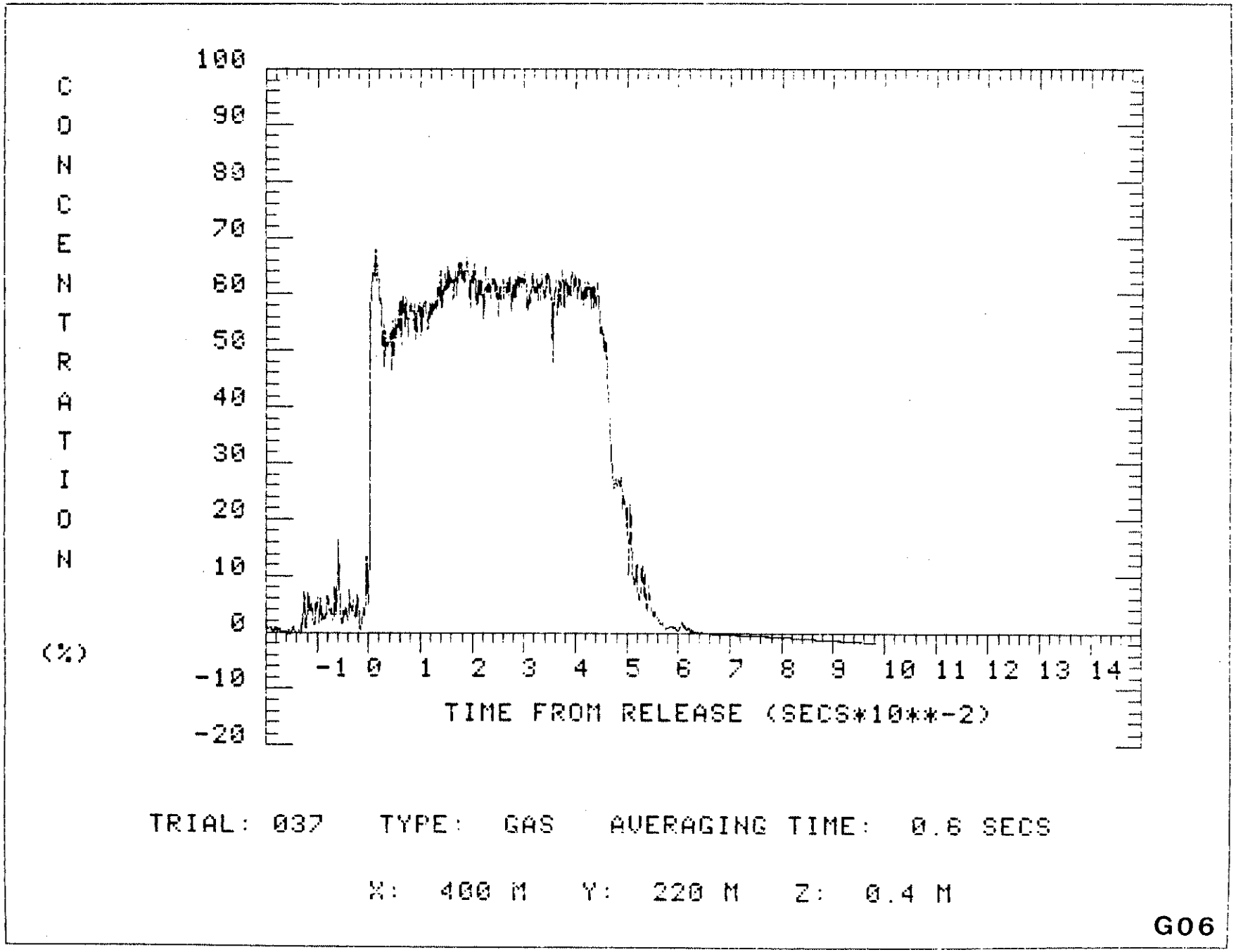
X: 385 M Y: 214 M Z: 2.4 M

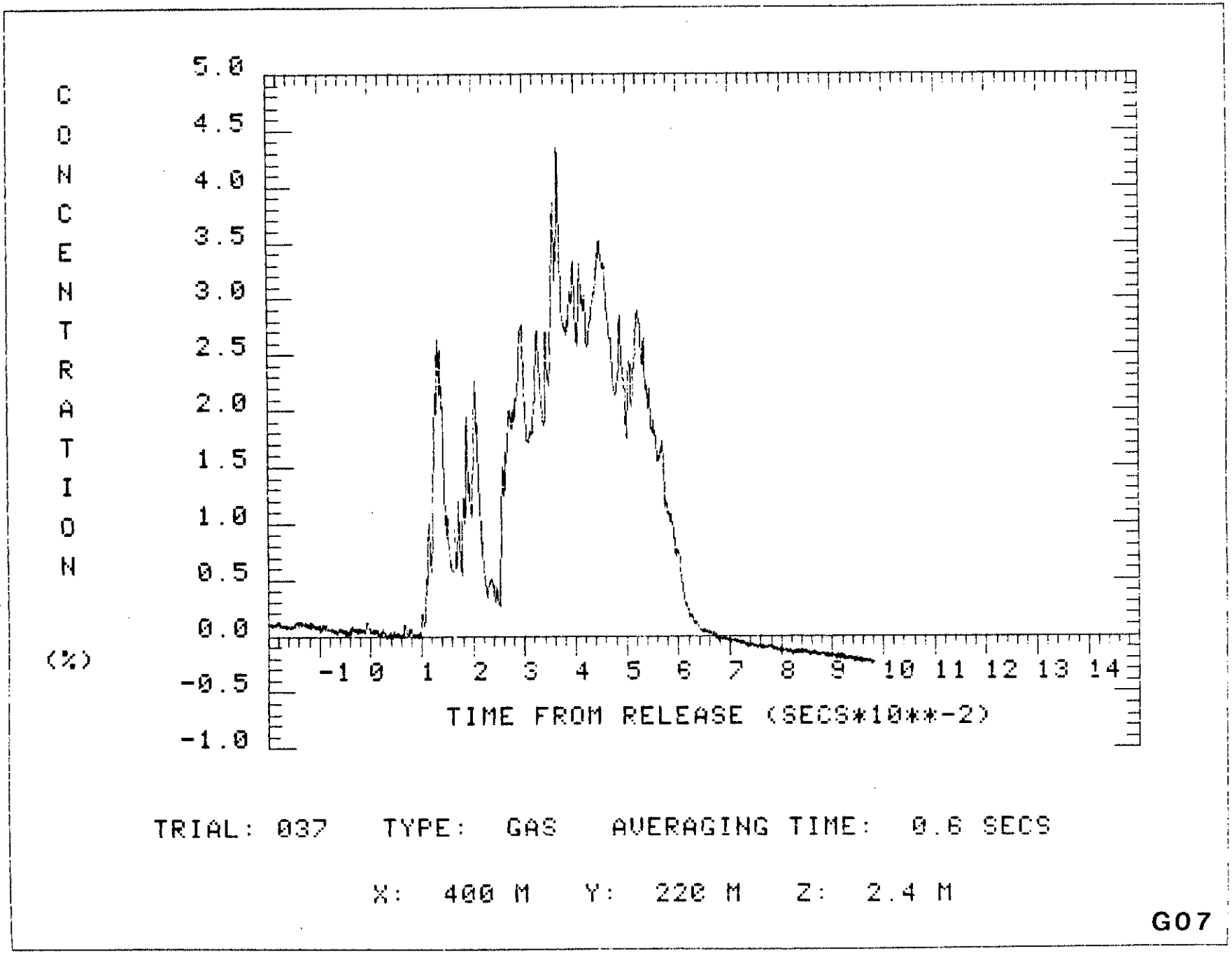
G02


CONCENTRATION
(%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 386 M Y: 214 M Z: 4.4 M
G03


CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 386 M Y: 214 M Z: 8.4 M
G04


CONCENTRATION (%)
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 210 M Z: 0.4 M
G05

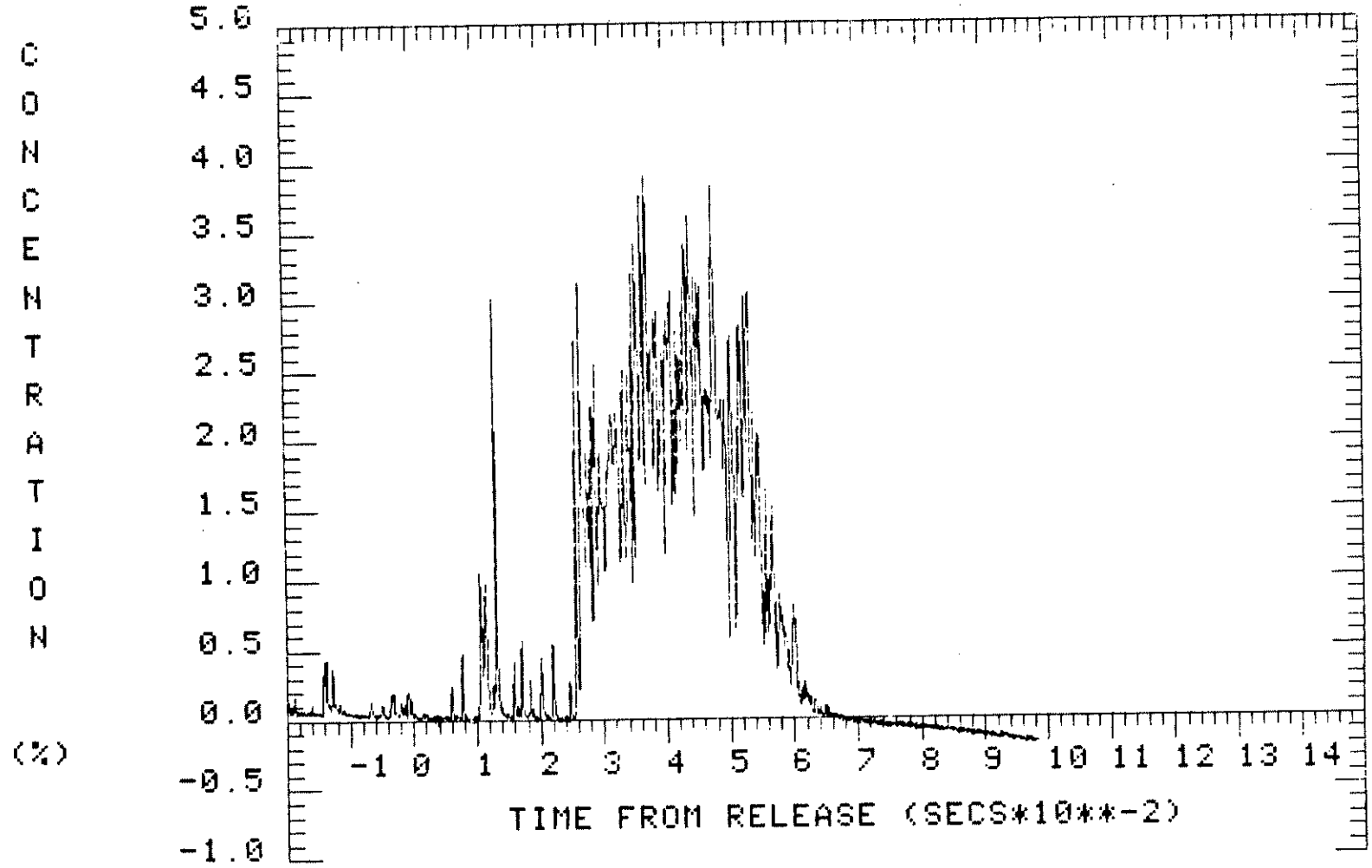

CONCENTRATION (%)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 220 M Z: 0.4 M
G06



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 220 M Z: 2.4 M

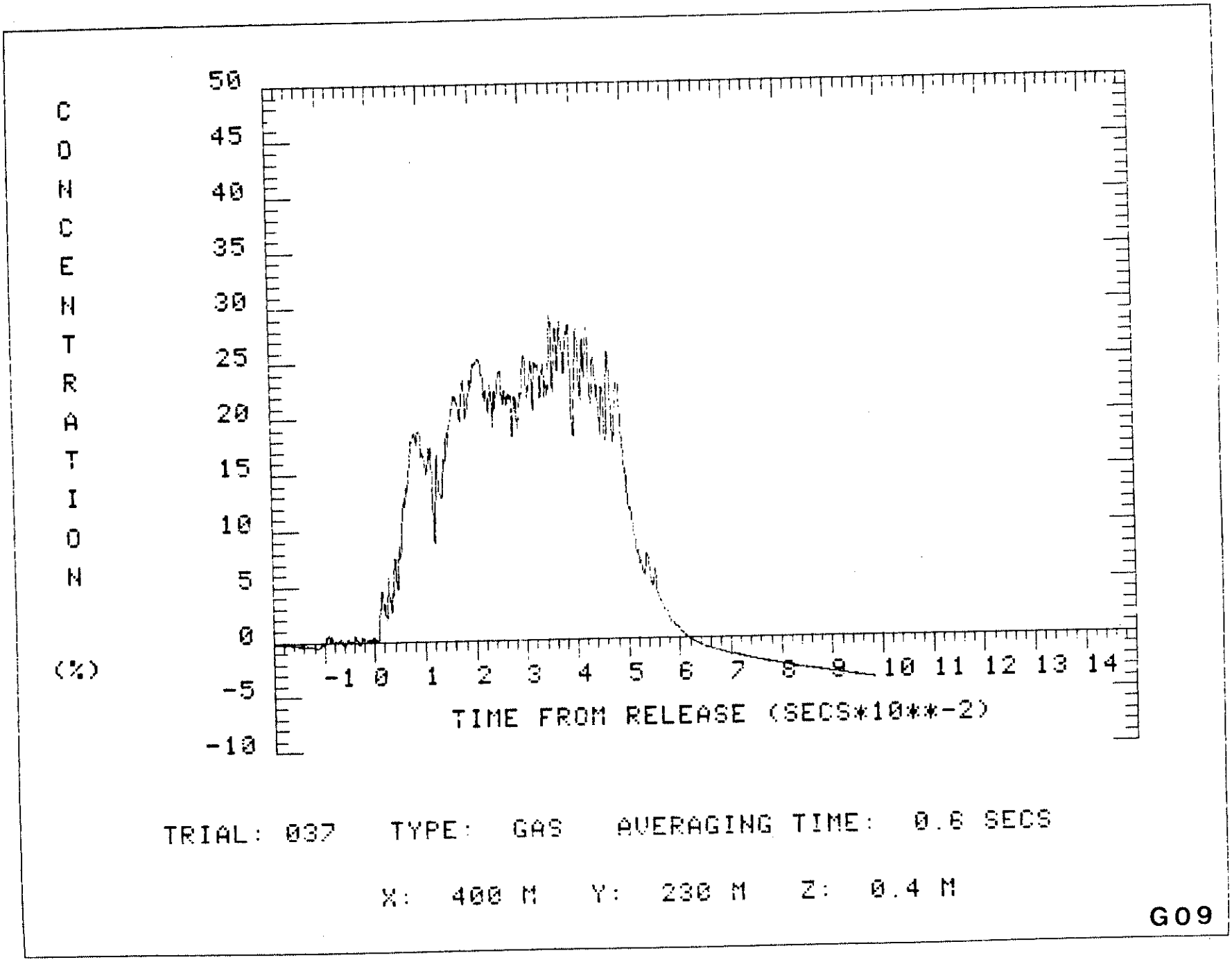
G07

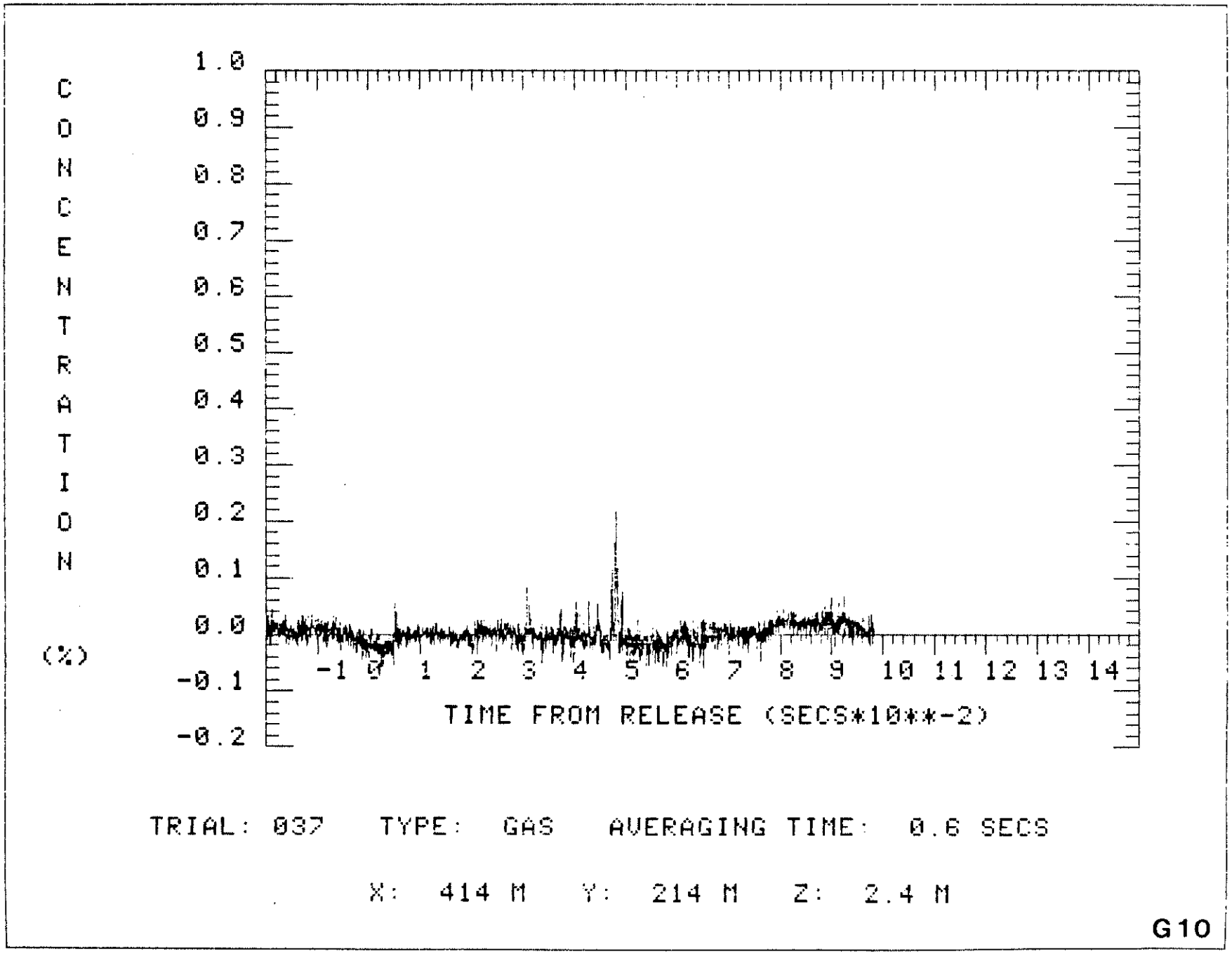


TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

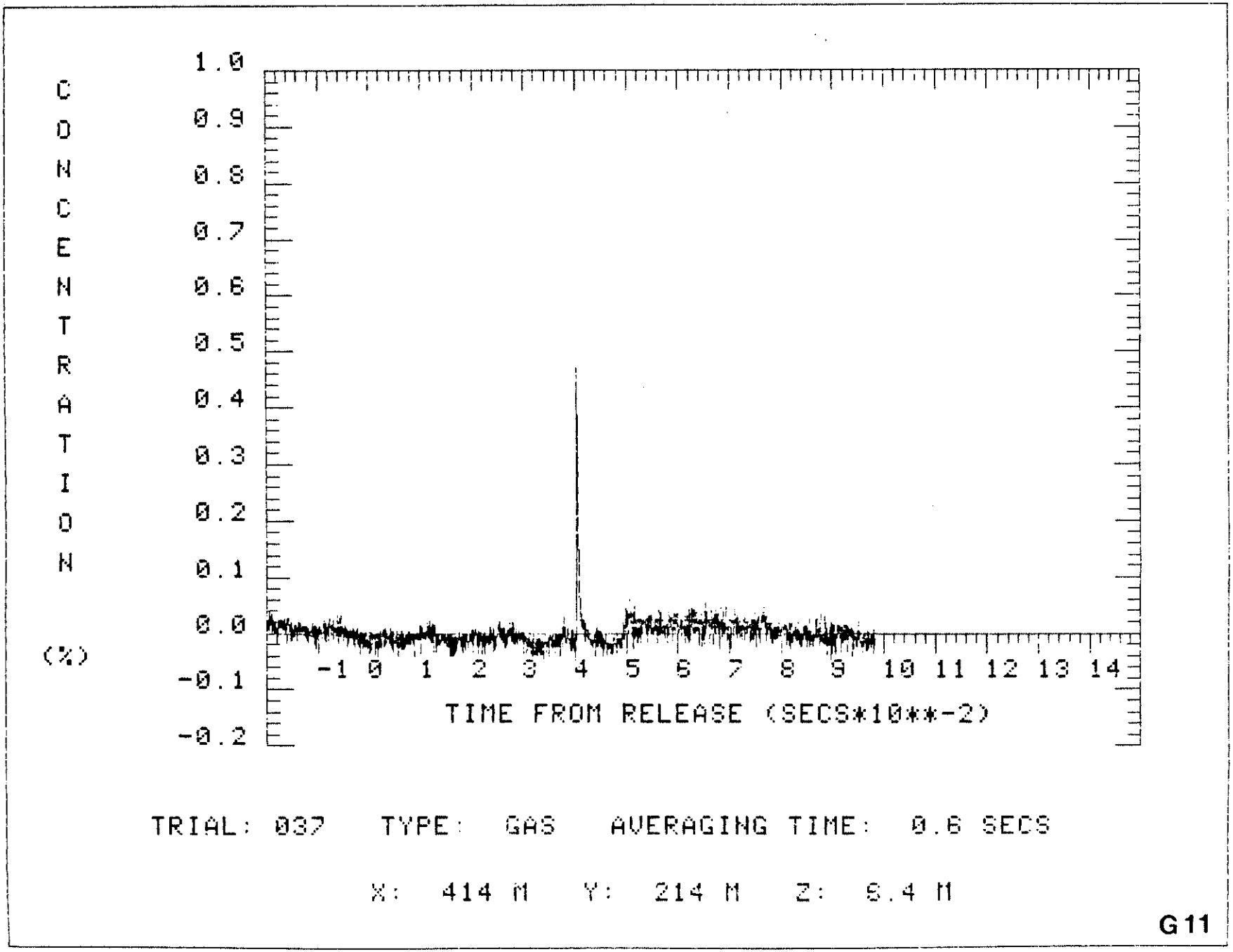
X: 400 M Y: 220 M Z: 4.4 M

G08

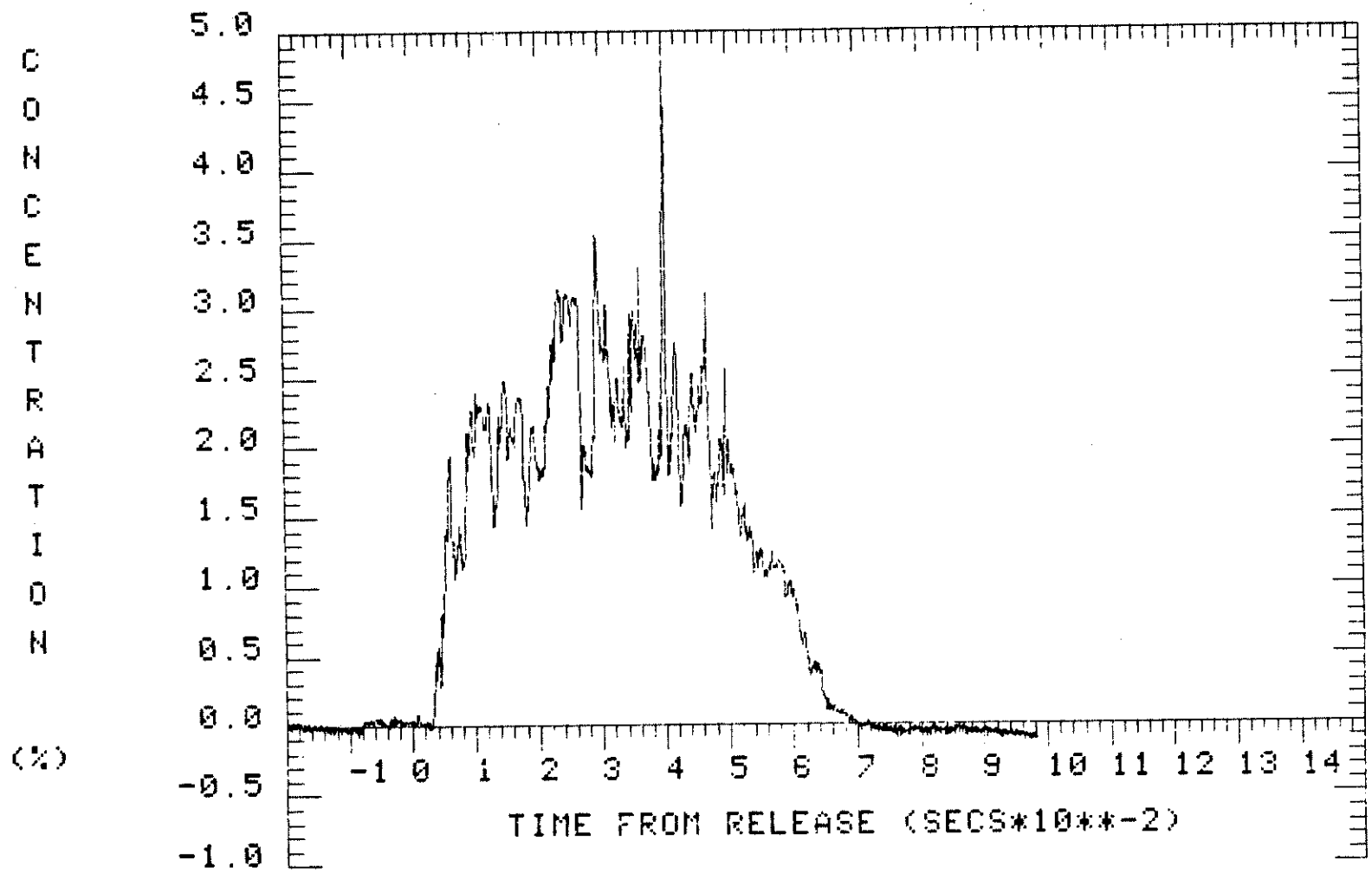

CONCENTRATION
(%)
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 230 M Z: 0.4 M
G09


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 414 M Y: 214 M Z: 2.4 M

G10


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 414 M Y: 214 M Z: 8.4 M

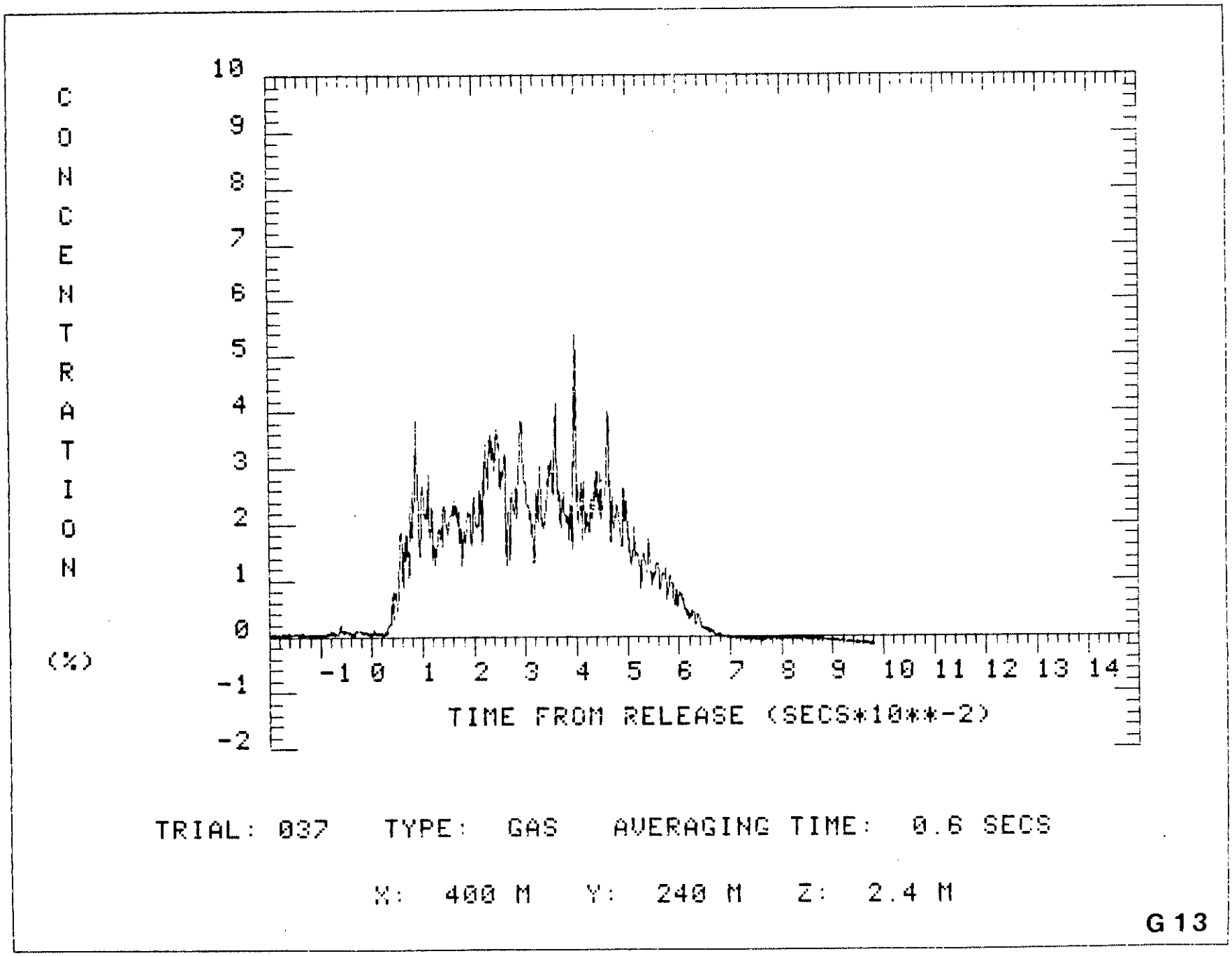
G11



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.8 SECS

X: 400 M Y: 240 M Z: 0.4 M

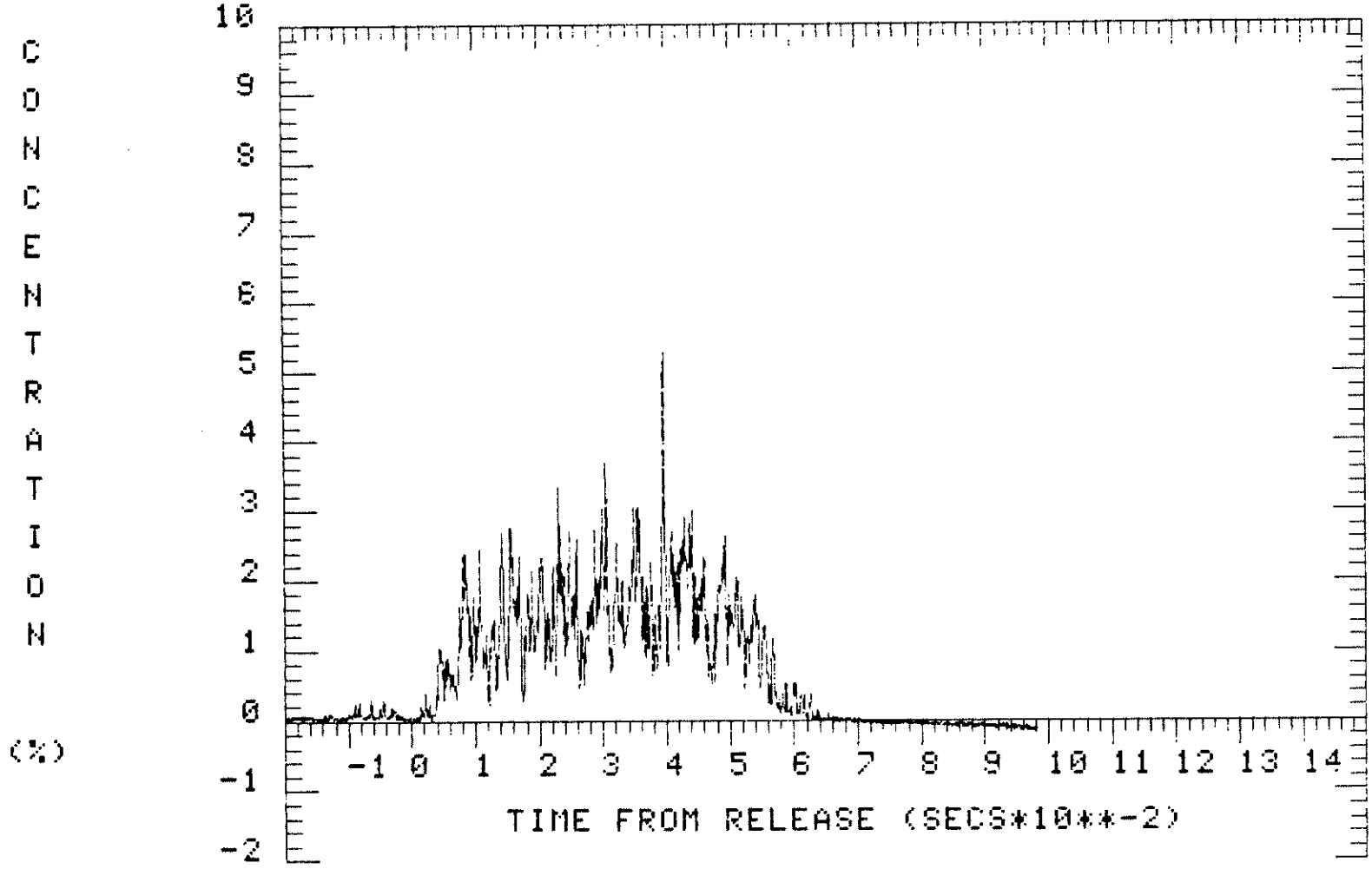
G12



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 240 M Z: 2.4 M

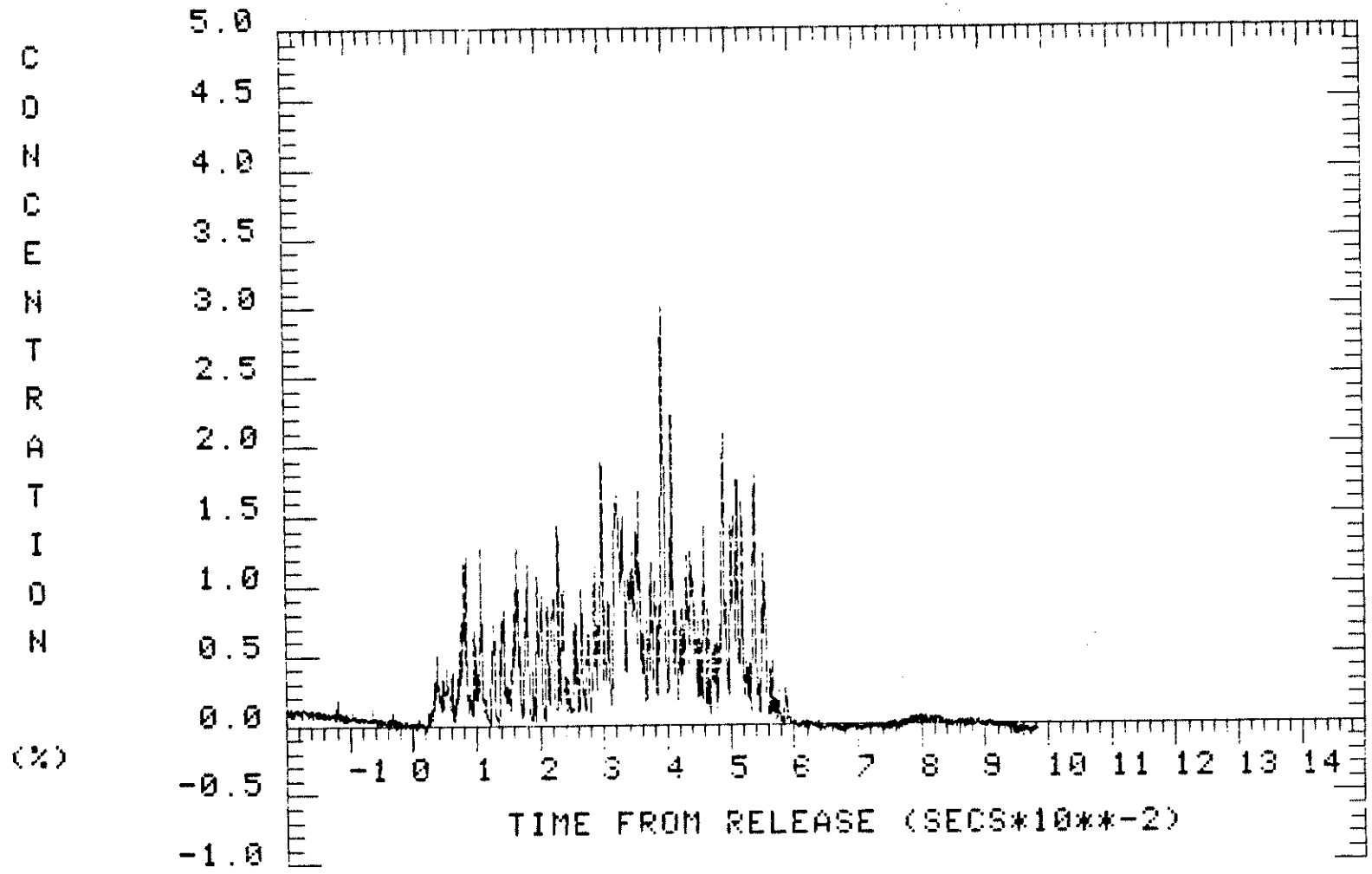
G 13



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 240 M Z: 4.4 M

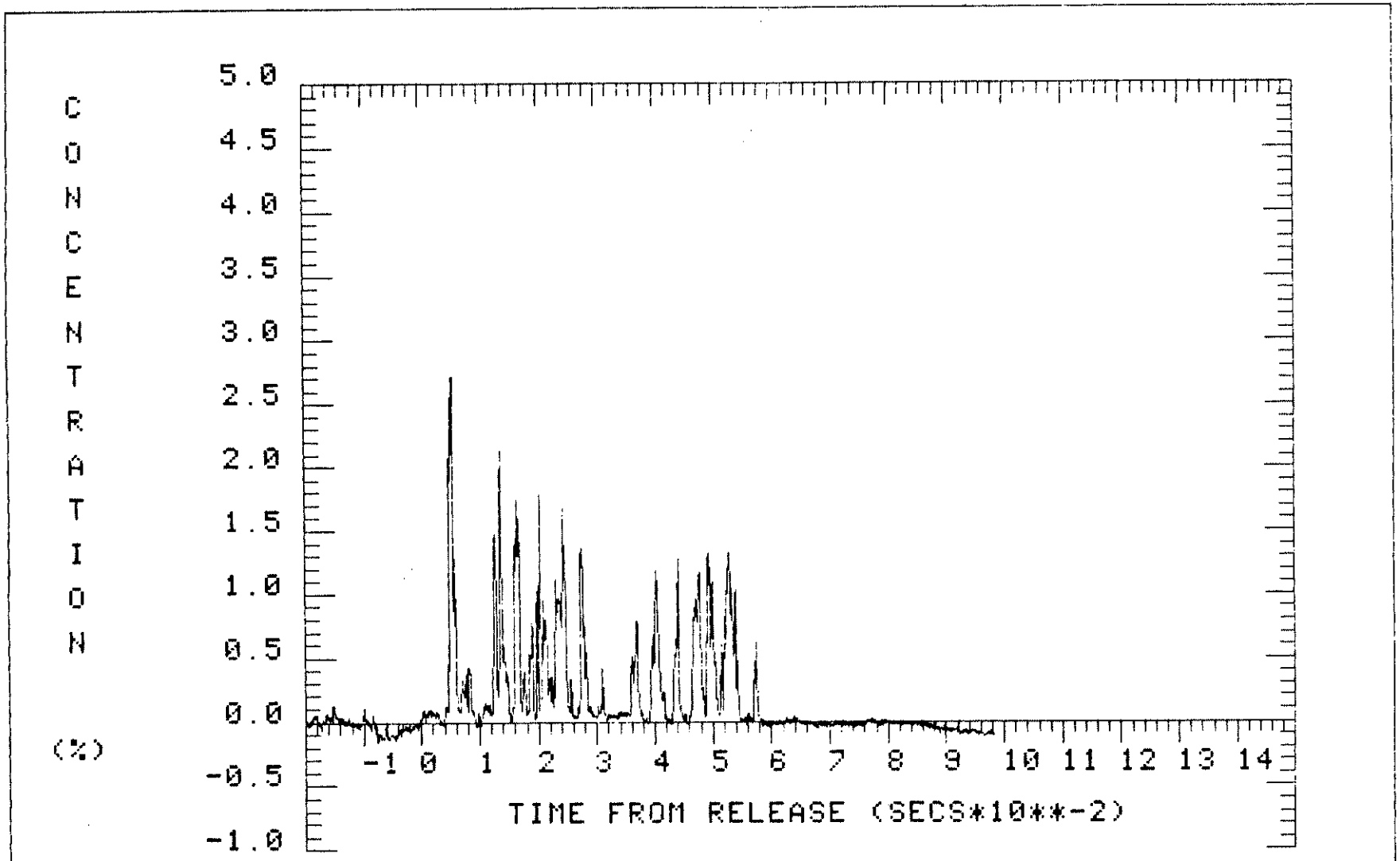
G 14



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 240 M Z: 6.4 M

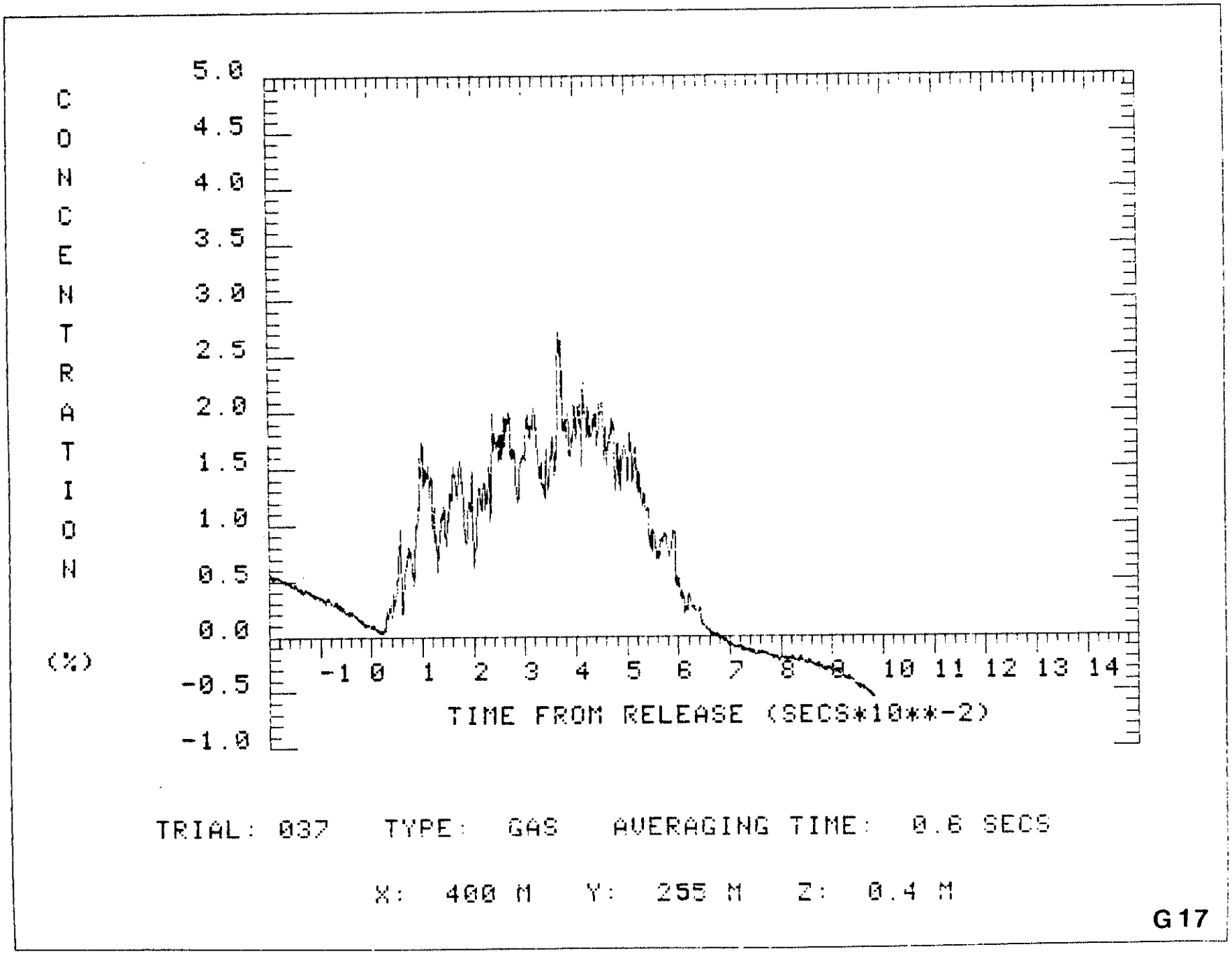
G15



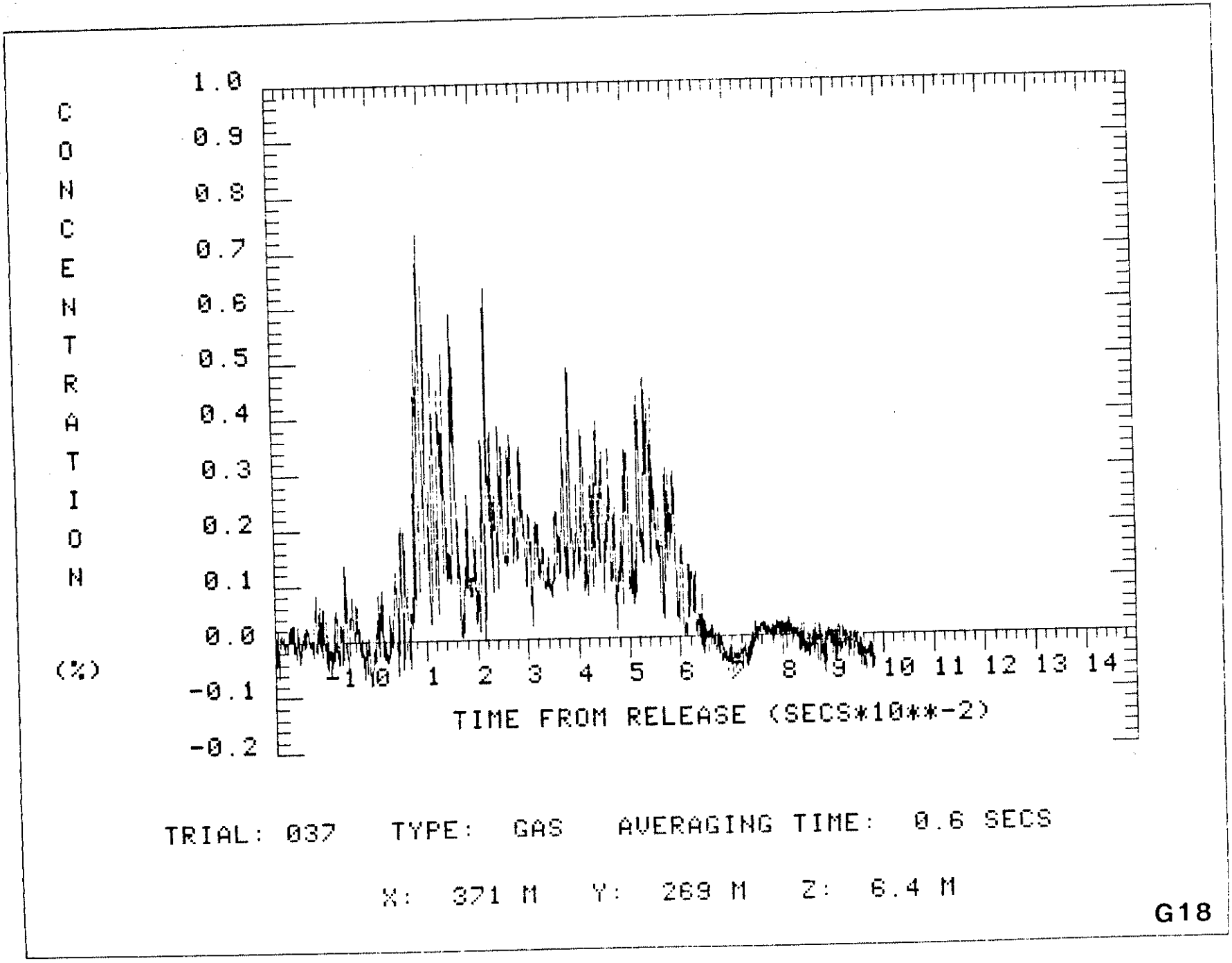
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 373 M Y: 248 M Z: 0.4 M

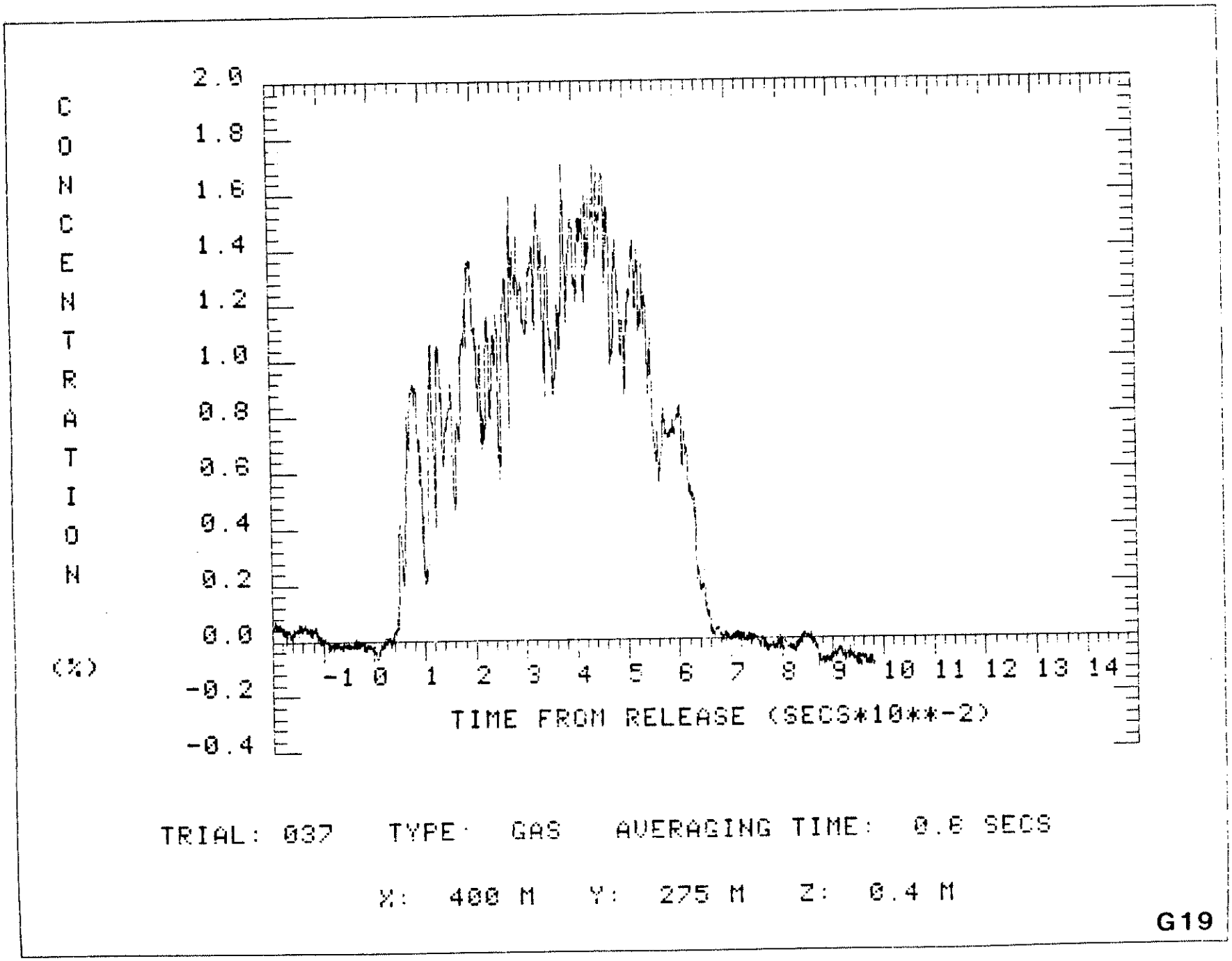
G16

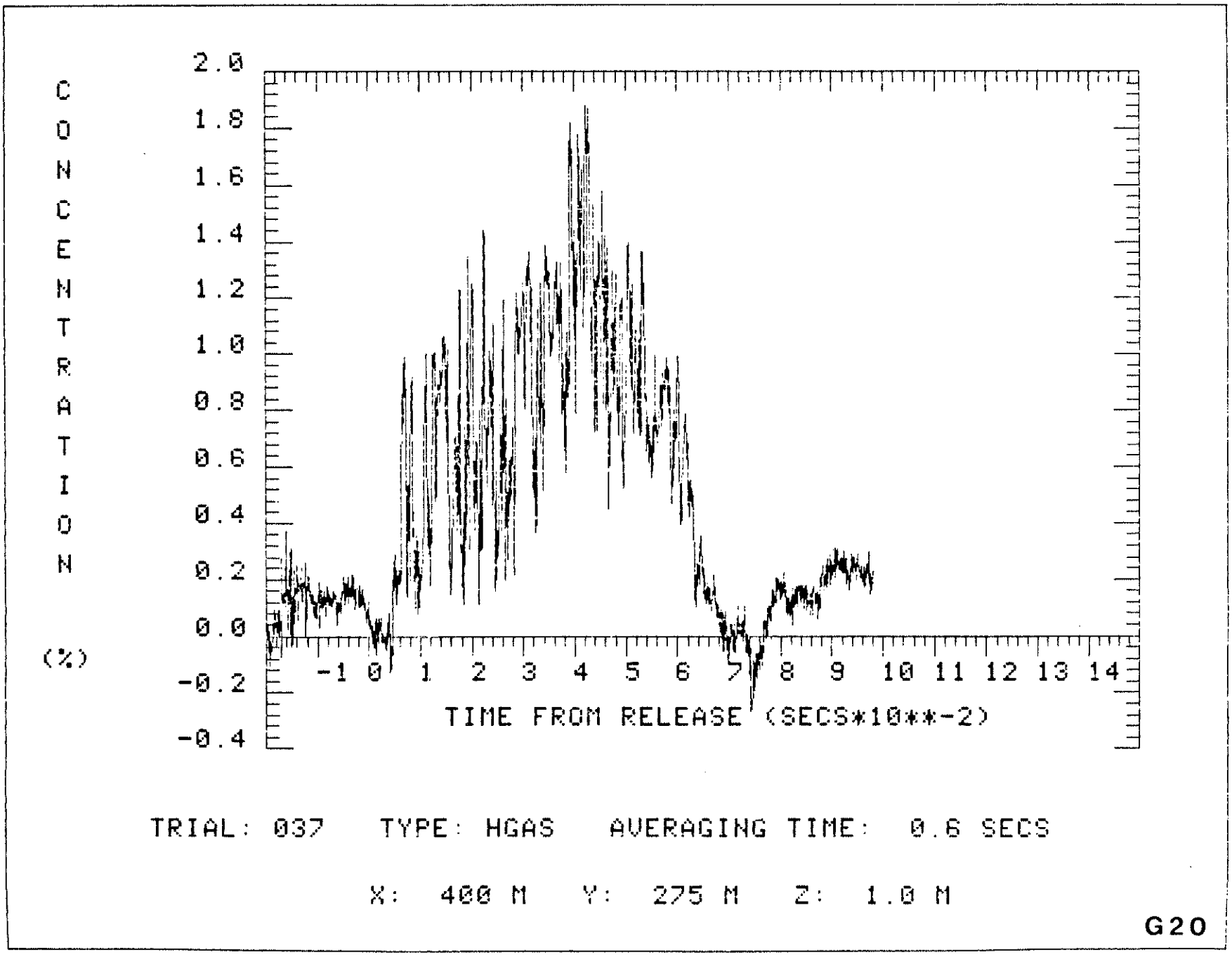

CONCENTRATION
(%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 255 M Z: 0.4 M

G17

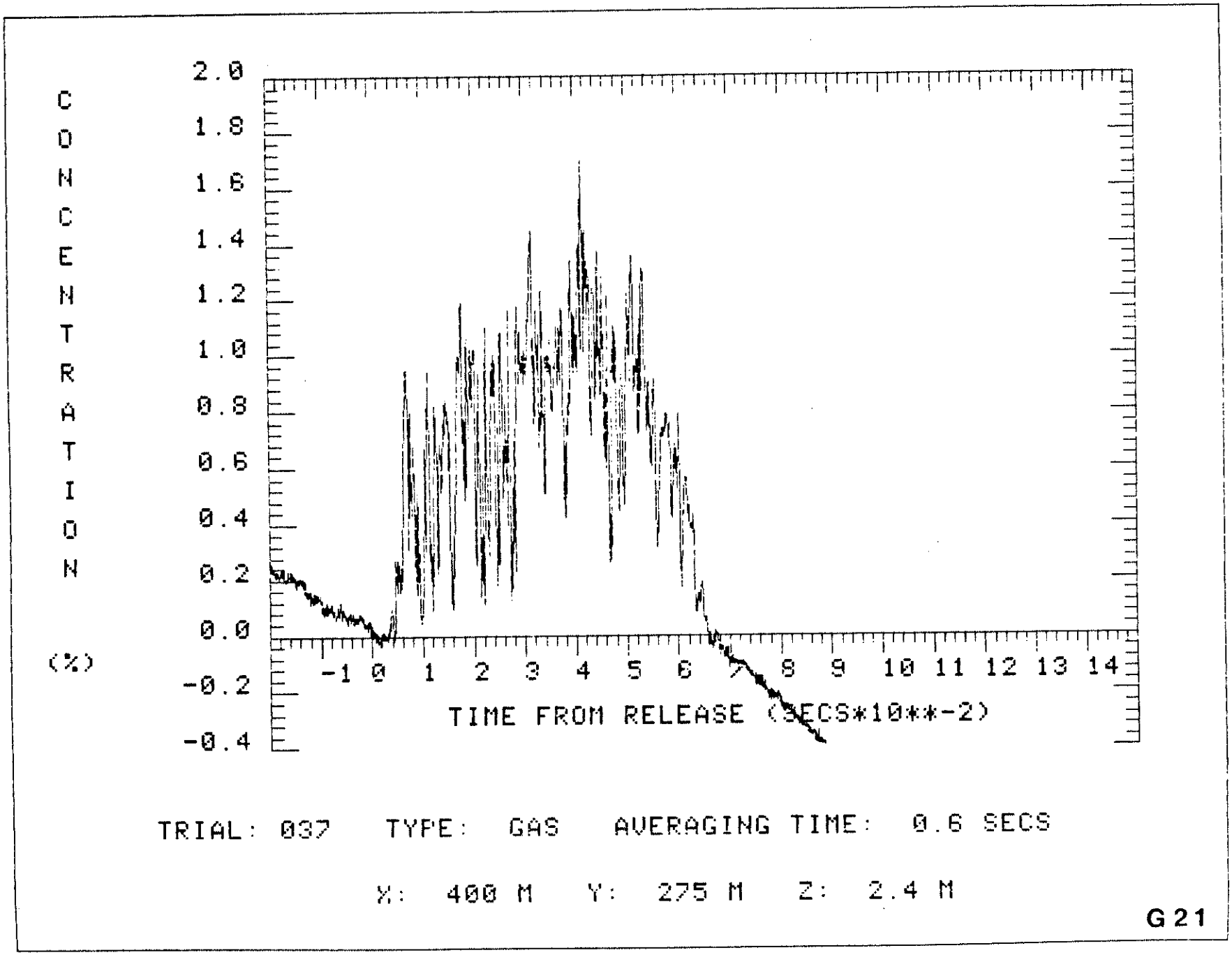

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 371 M Y: 269 M Z: 6.4 M

G18

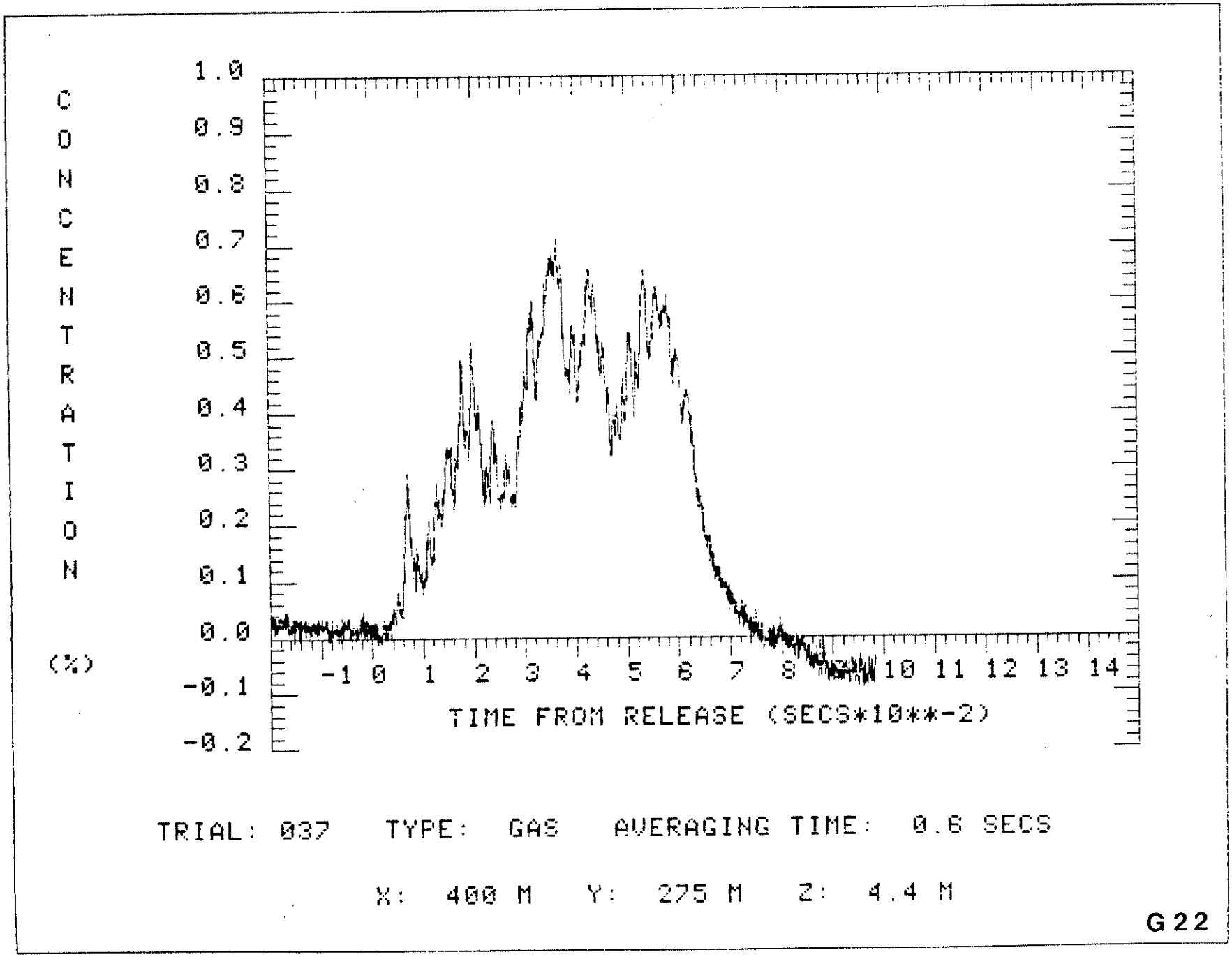

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.8 SECS
X: 400 M Y: 275 M Z: 0.4 M
G19

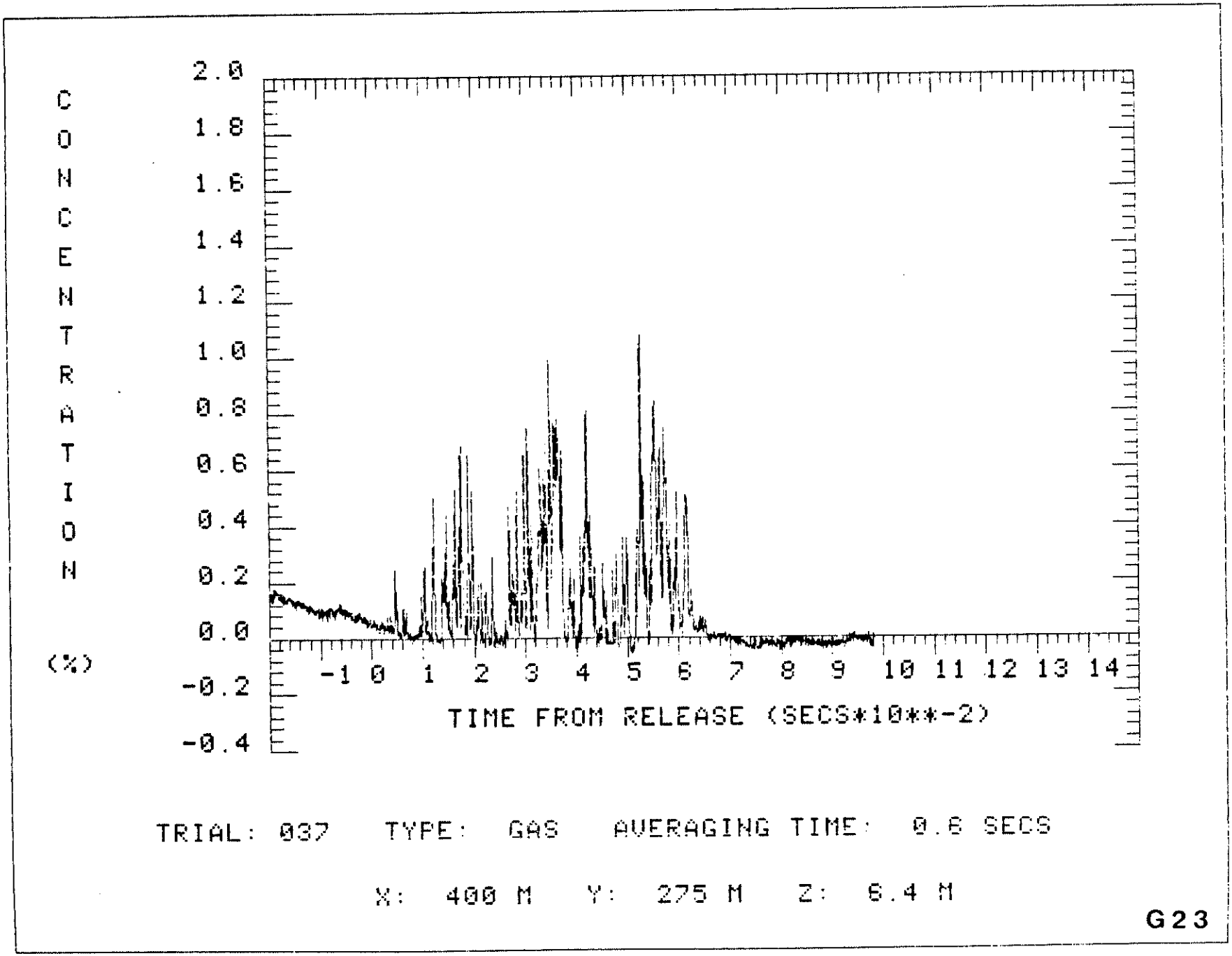

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: HGAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 275 M Z: 1.0 M

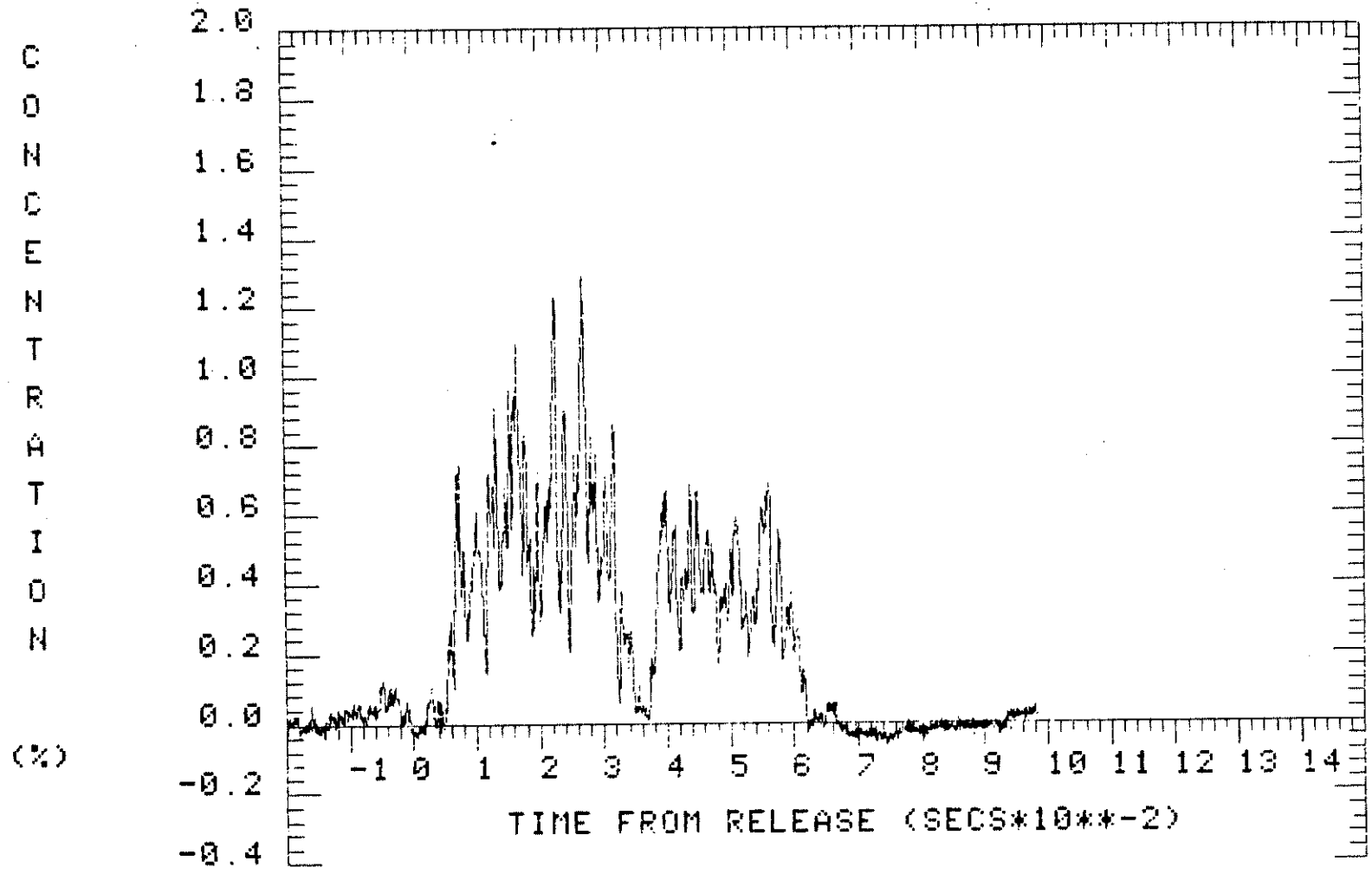
G20


CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 275 M Z: 2.4 M

G21


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 275 M Z: 4.4 M
G22

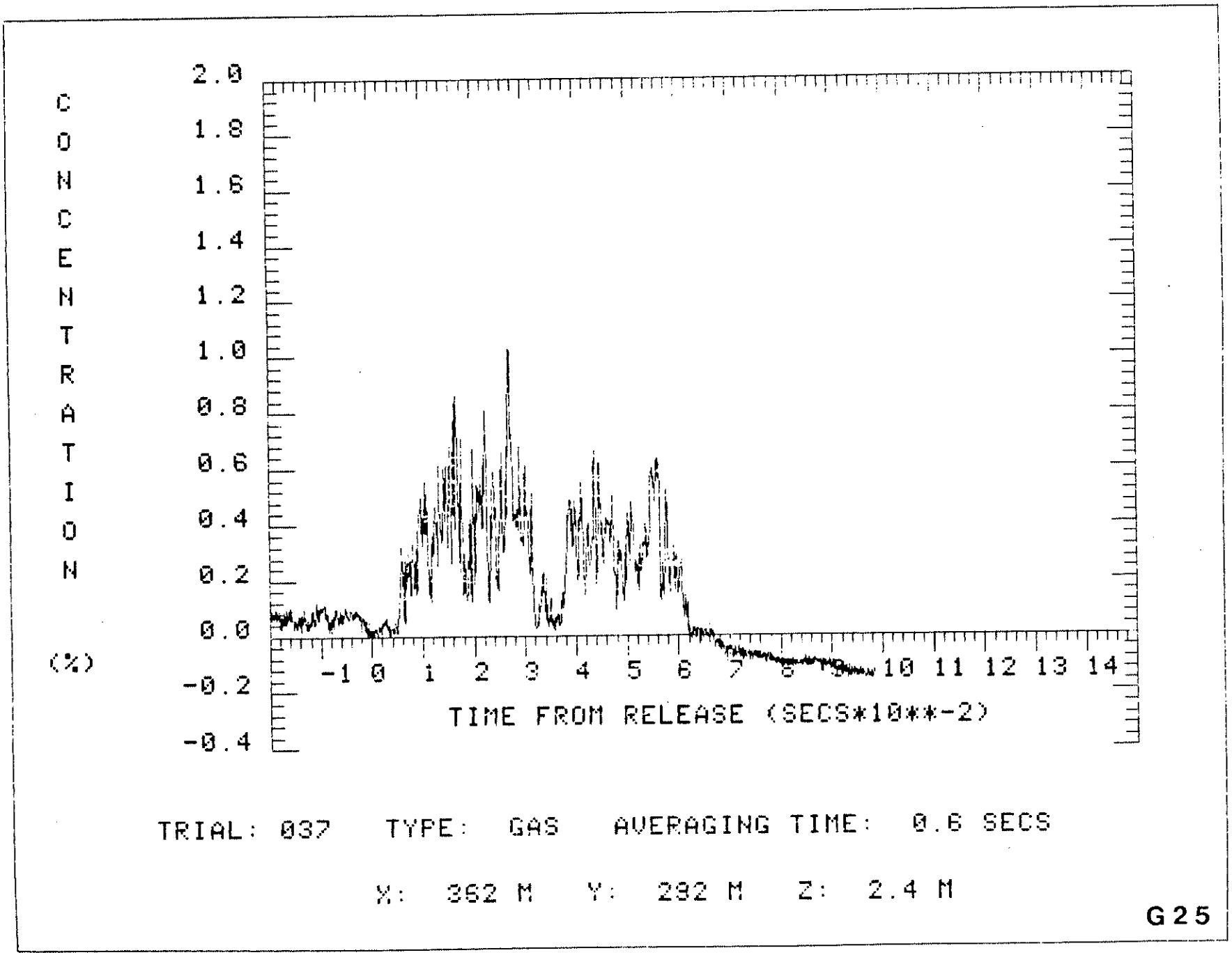

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.8 SECS
X: 400 M Y: 275 M Z: 6.4 M
G23

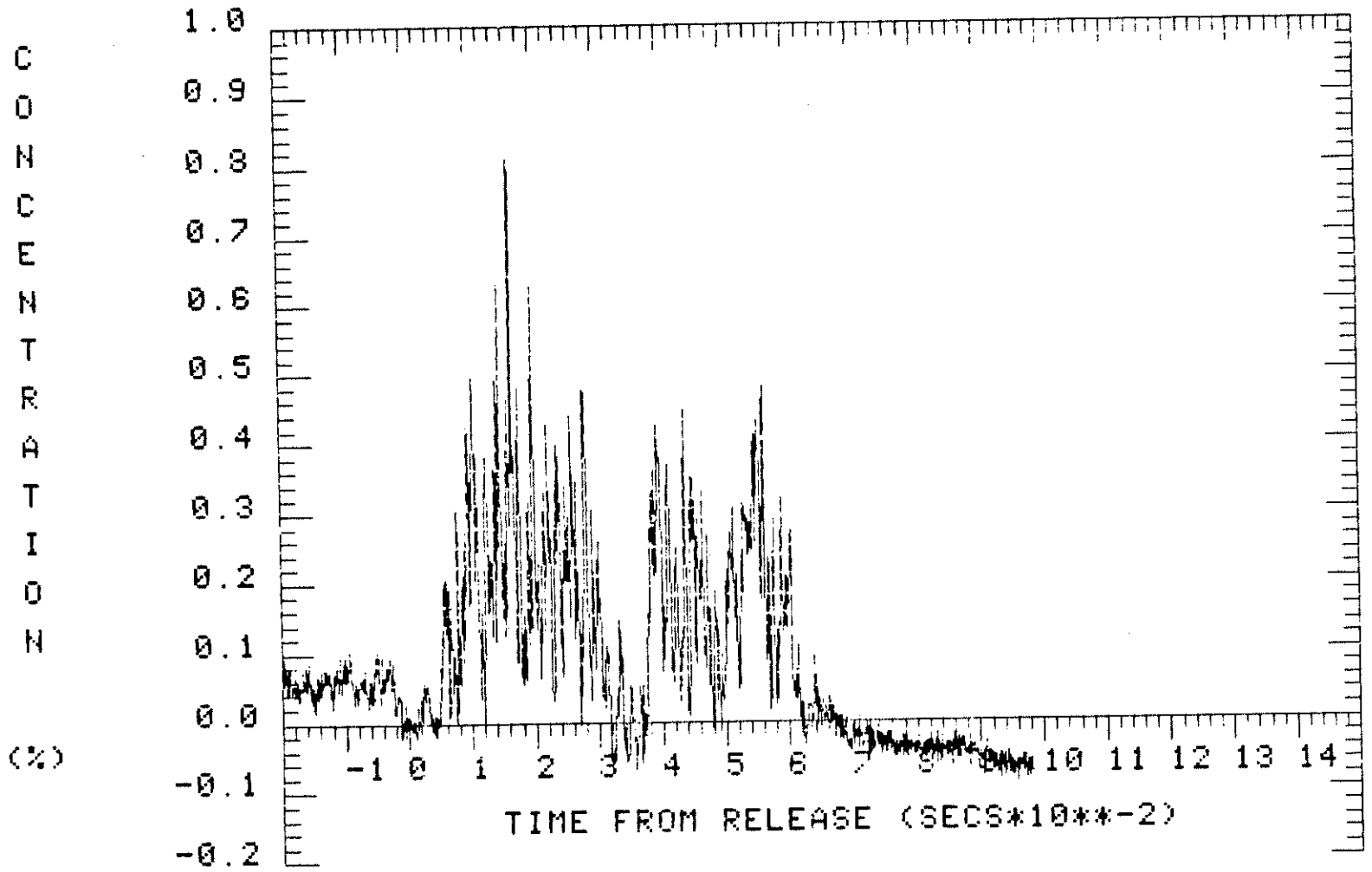


TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 362 M Y: 292 M Z: 0.4 M

G24

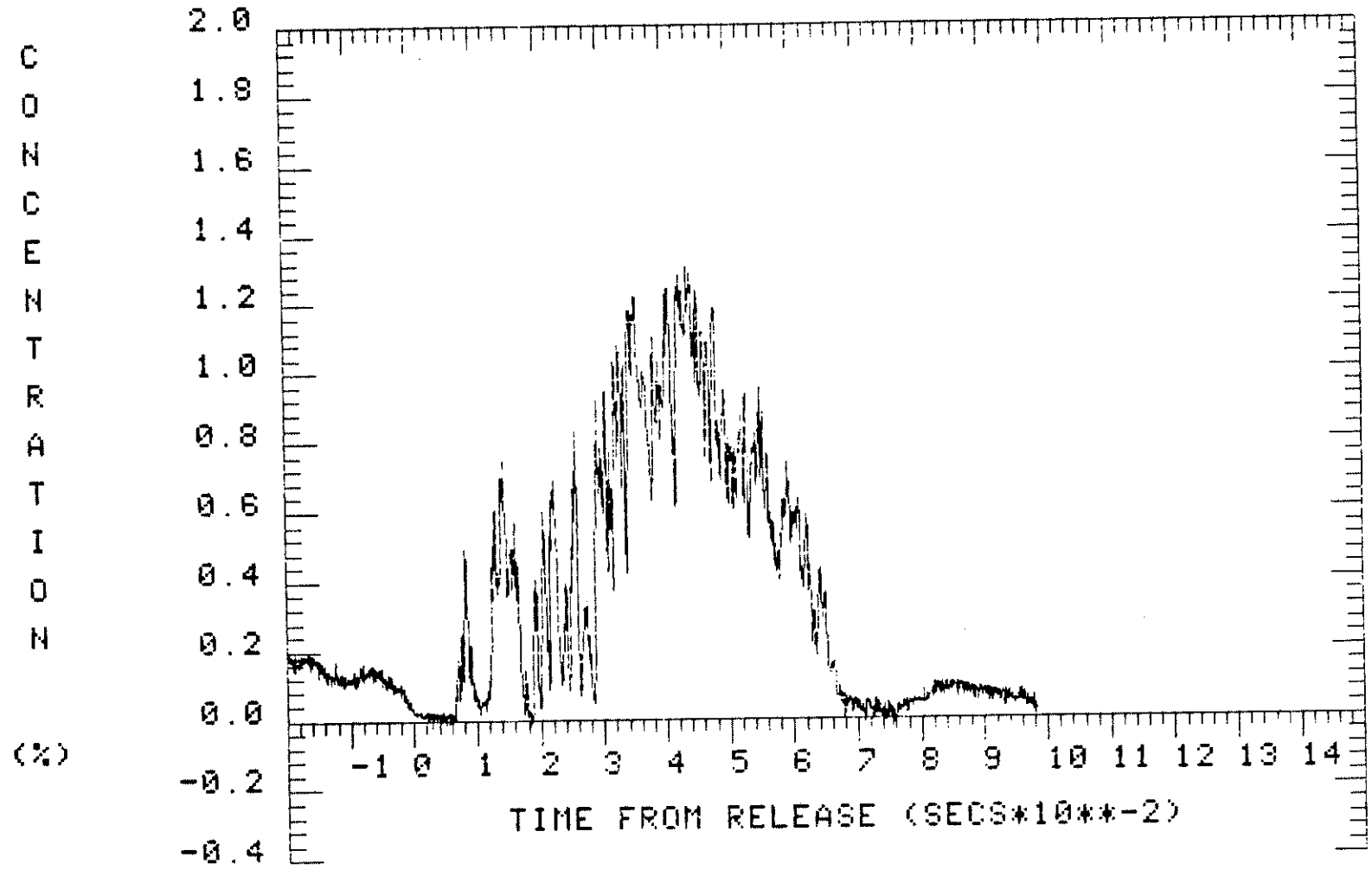

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 362 M Y: 292 M Z: 2.4 M
G25



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 352 M Y: 292 M Z: 4.4 M

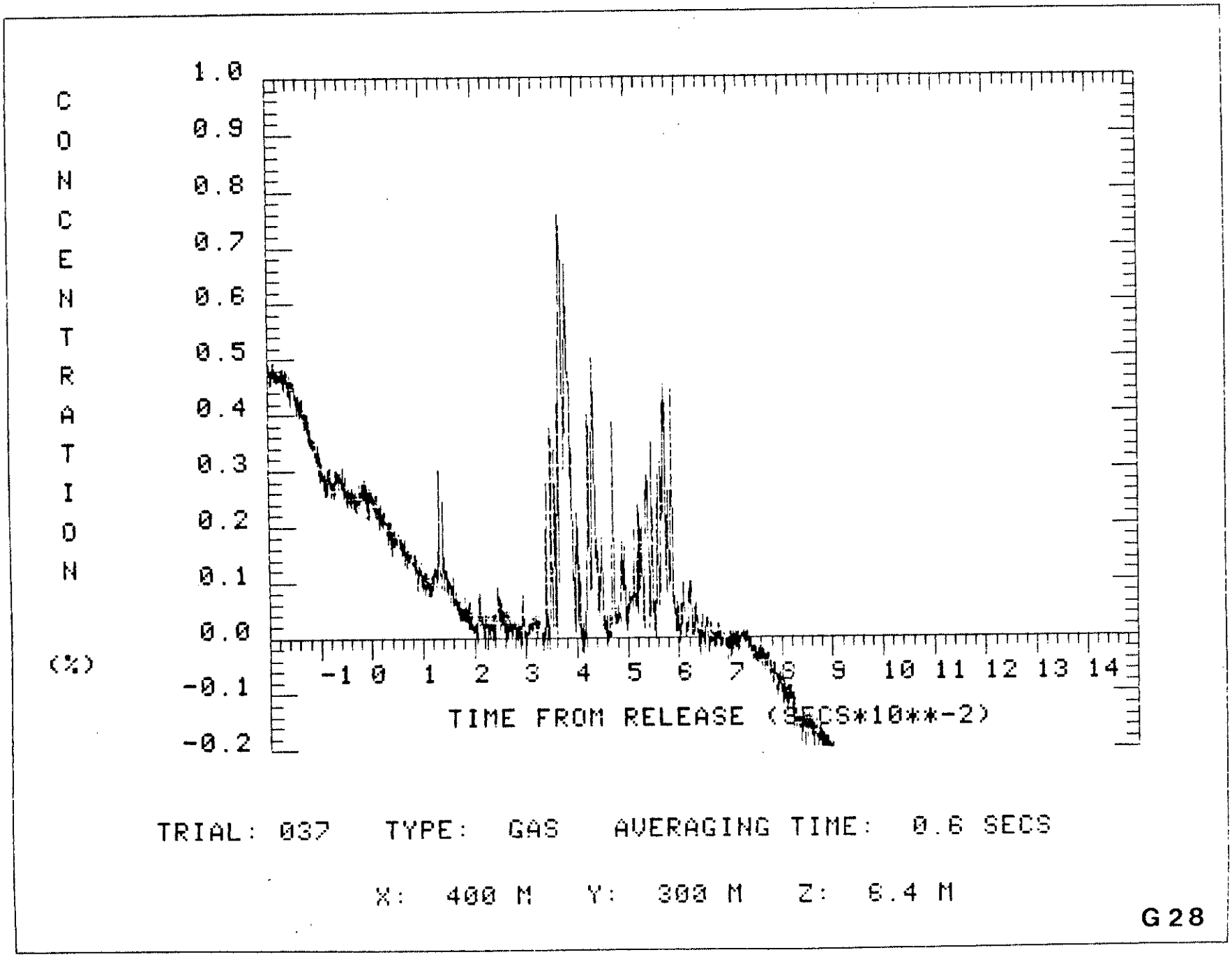
G 26



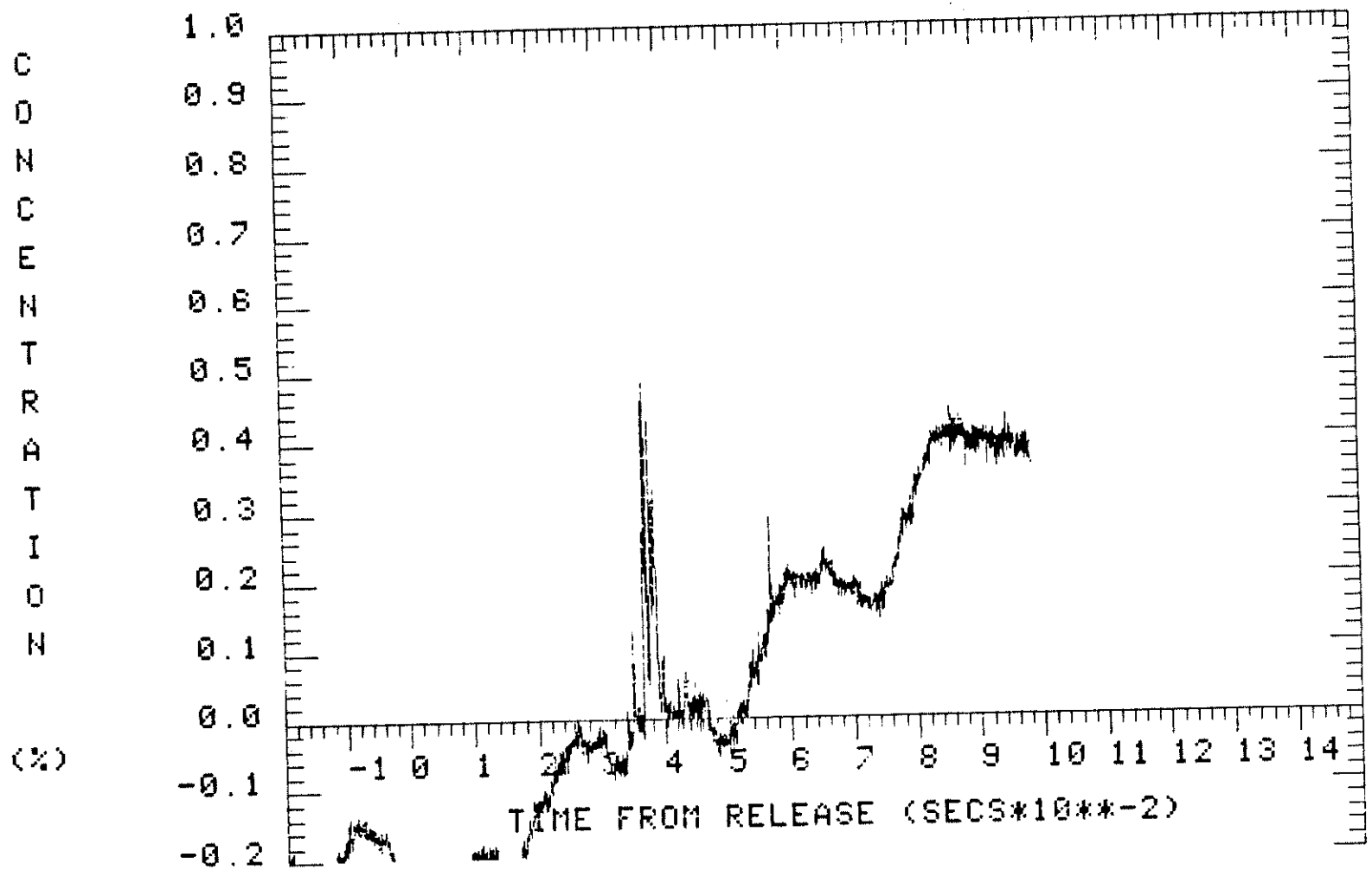
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 300 M Z: 0.4 M

G 27


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 300 M Z: 6.4 M

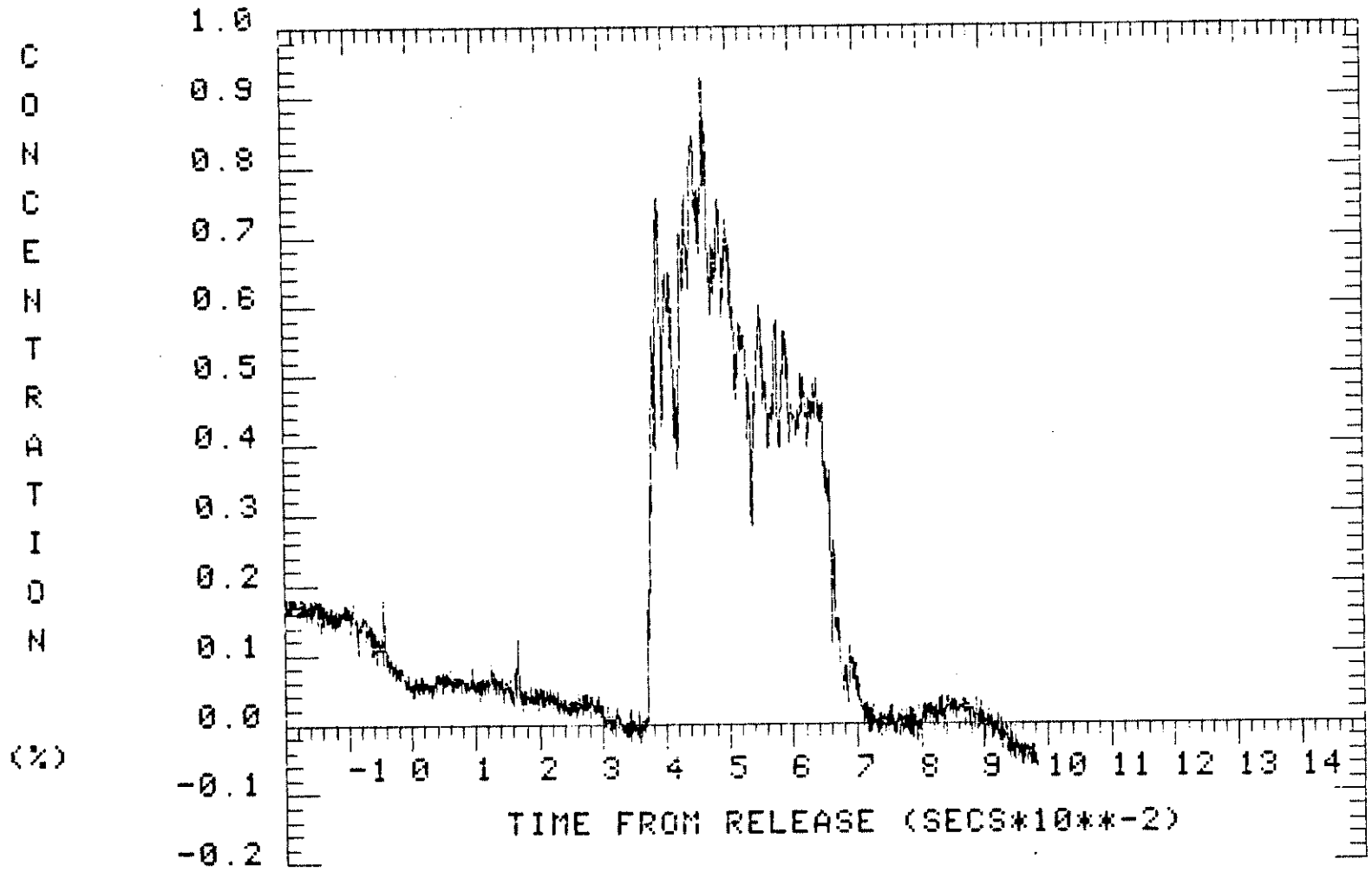
G 28



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 300 M Z: 10.4 M

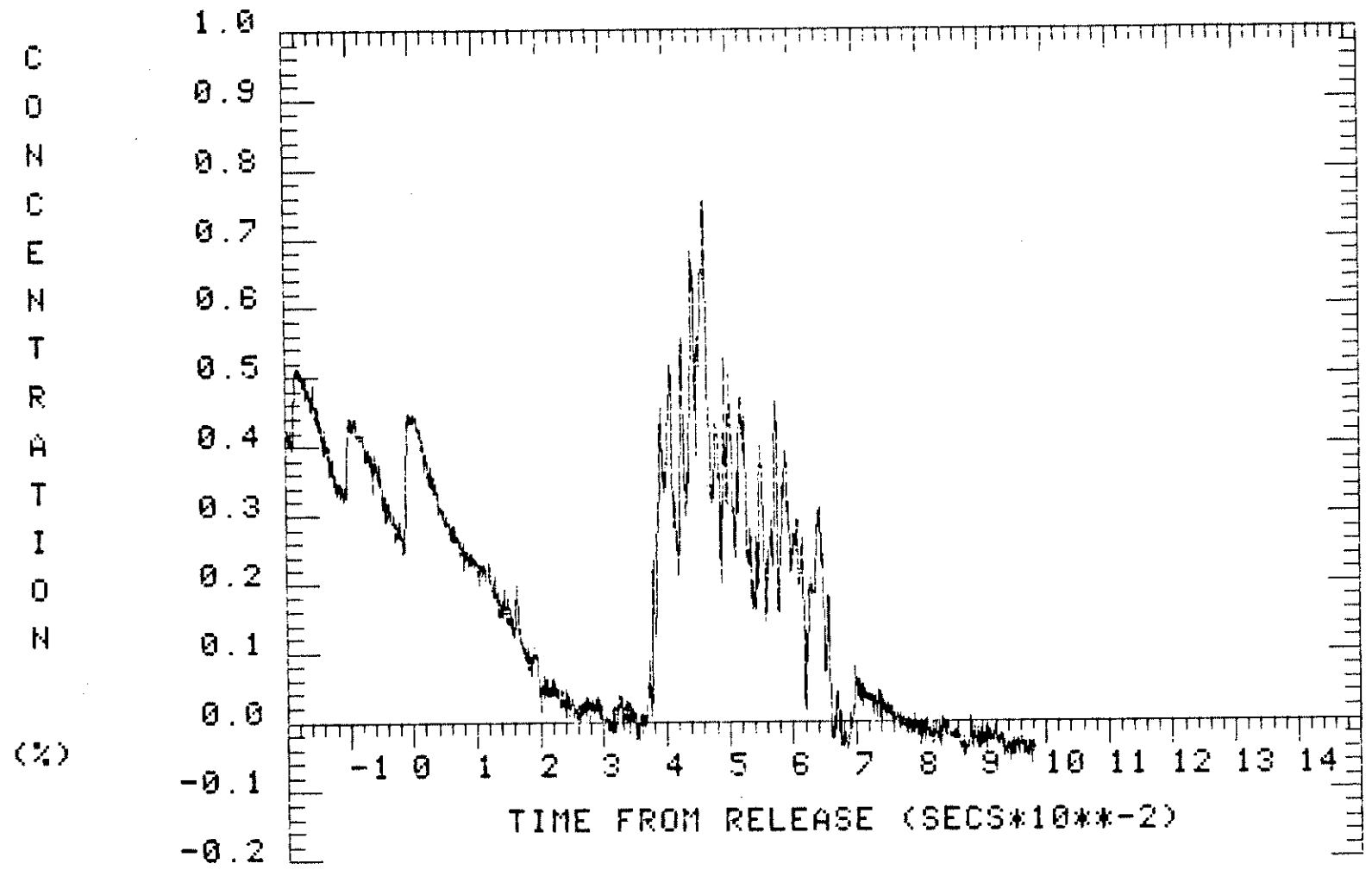
G29



TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 350 M Z: 0.4 M

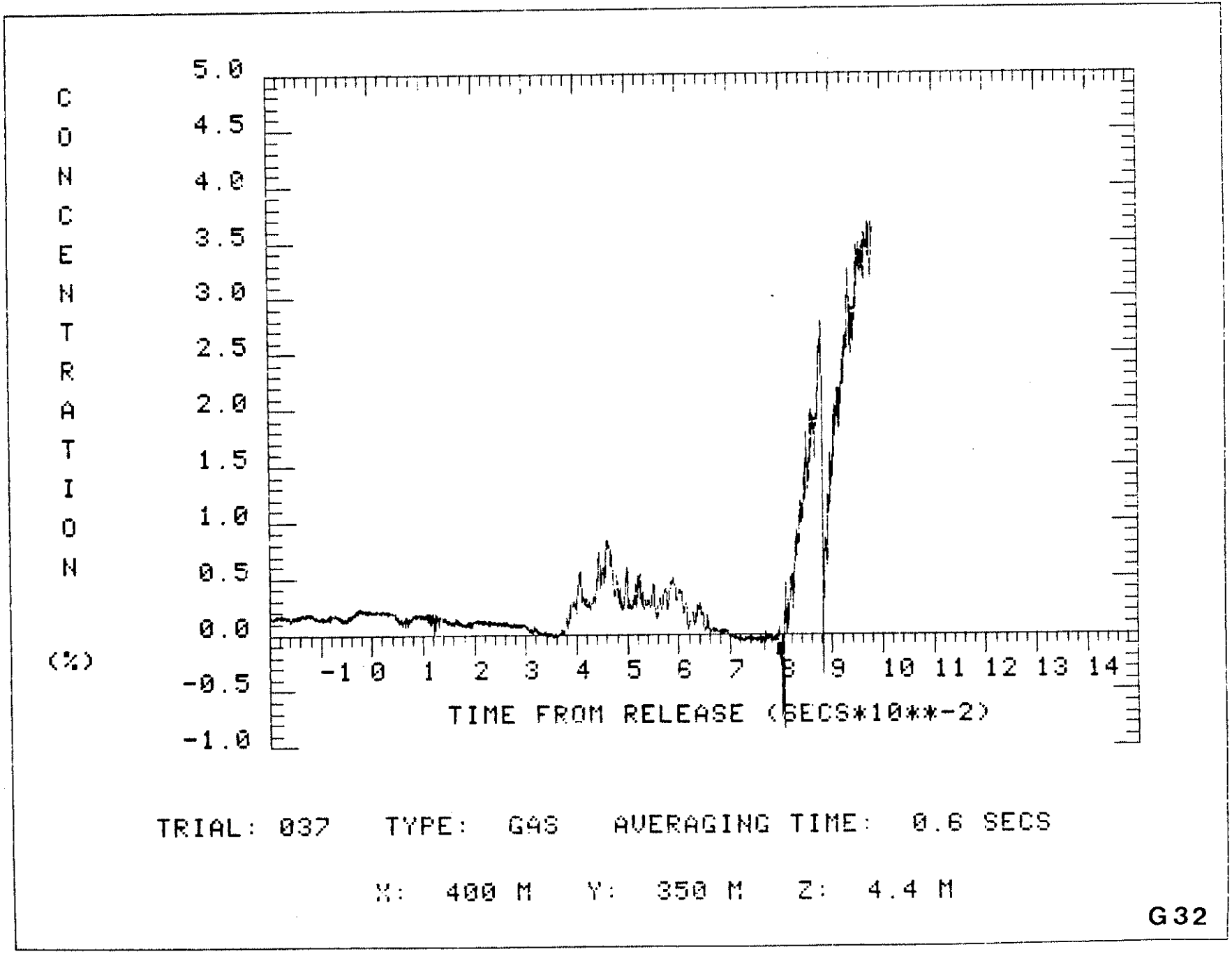
G30

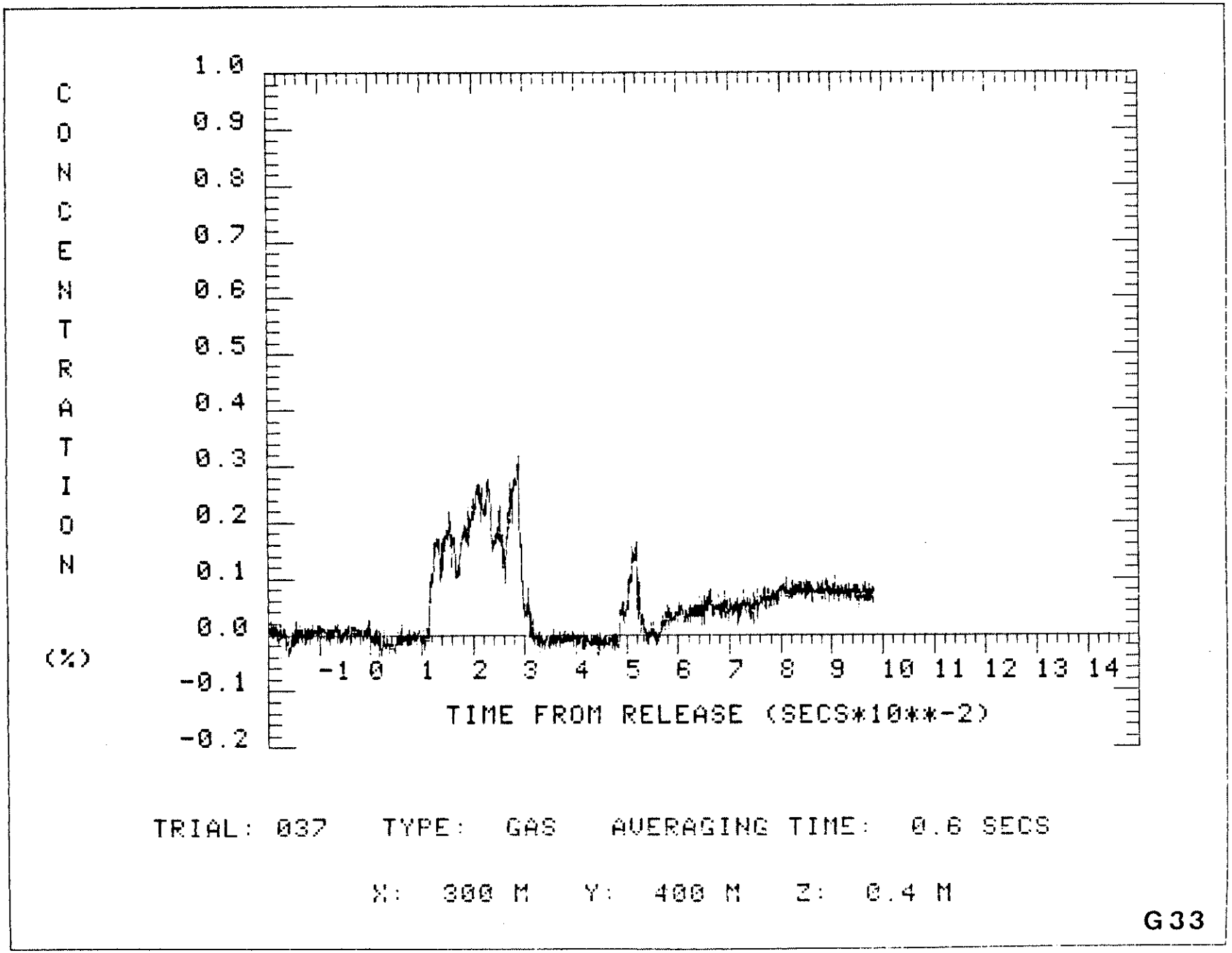


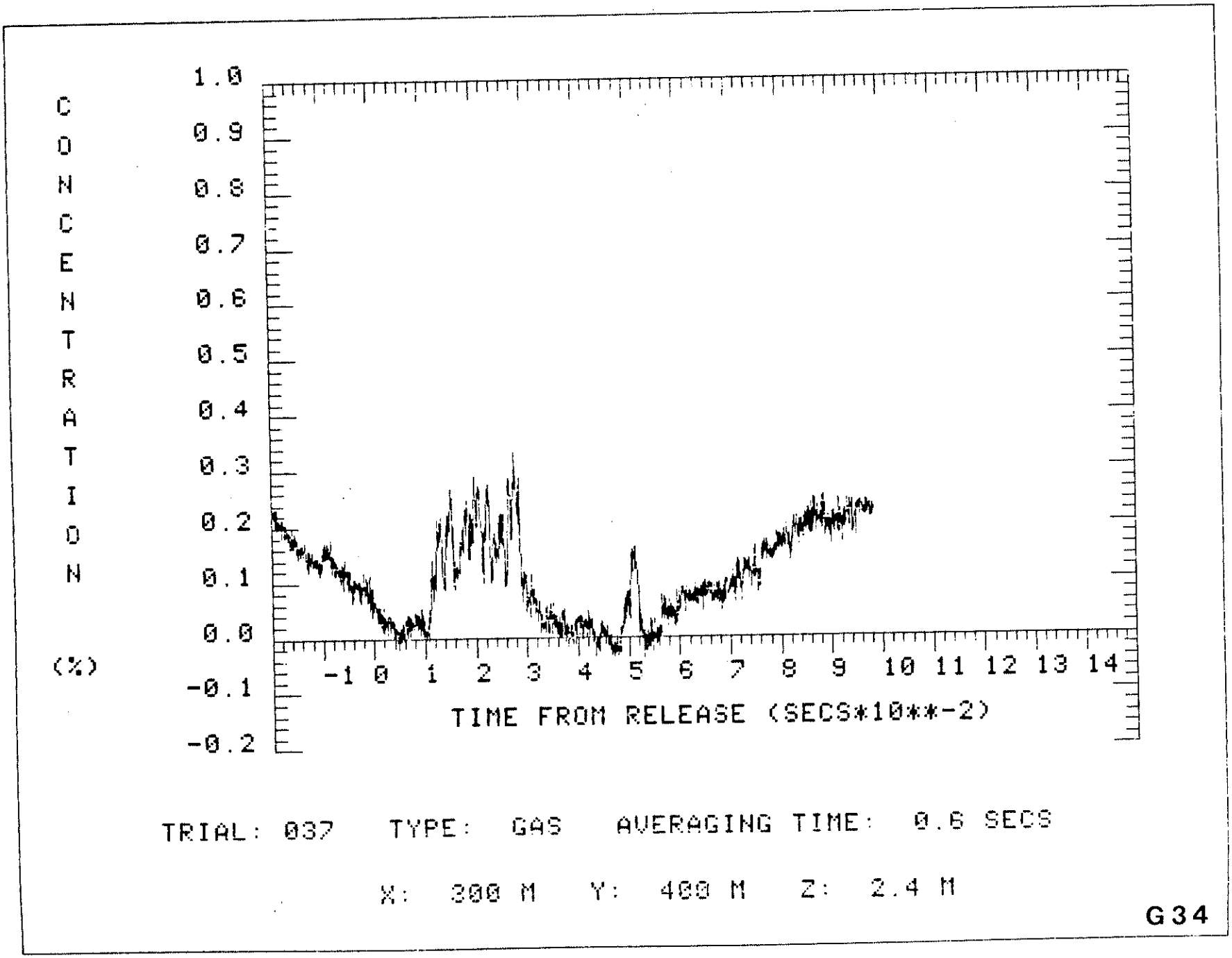
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

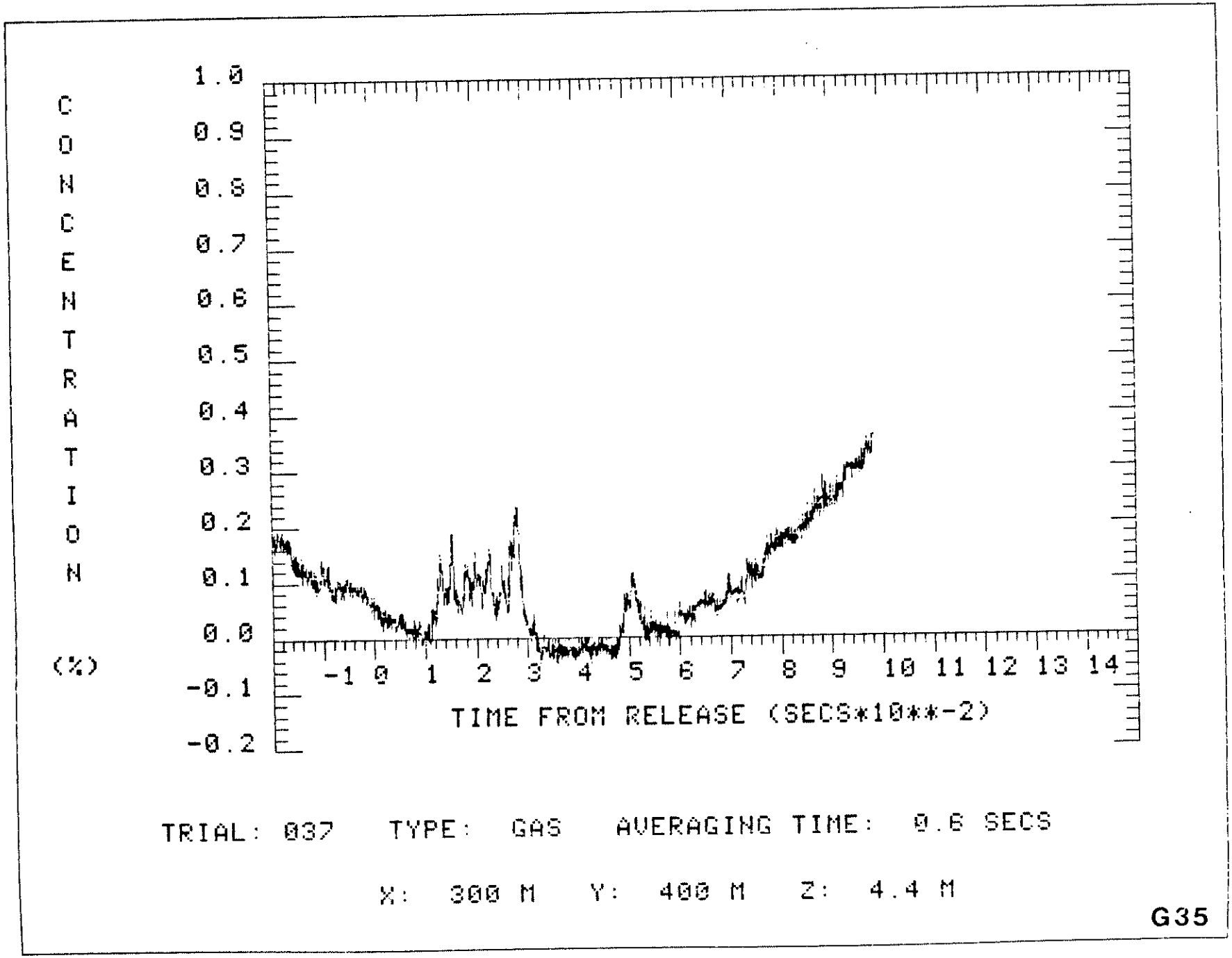
X: 400 M Y: 350 M Z: 2.4 M

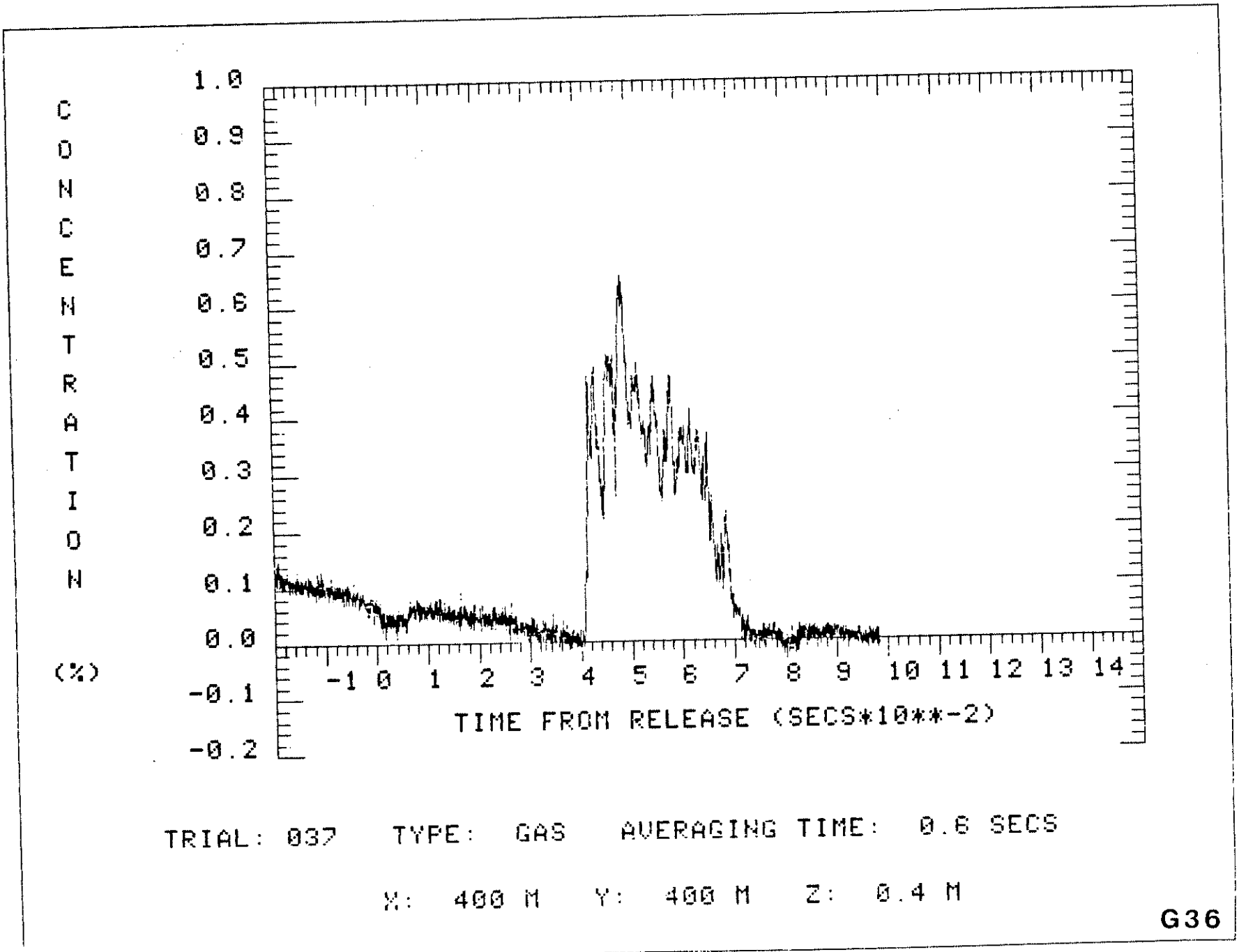
G 31


CONCENTRATION
(%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 350 M Z: 4.4 M
G32

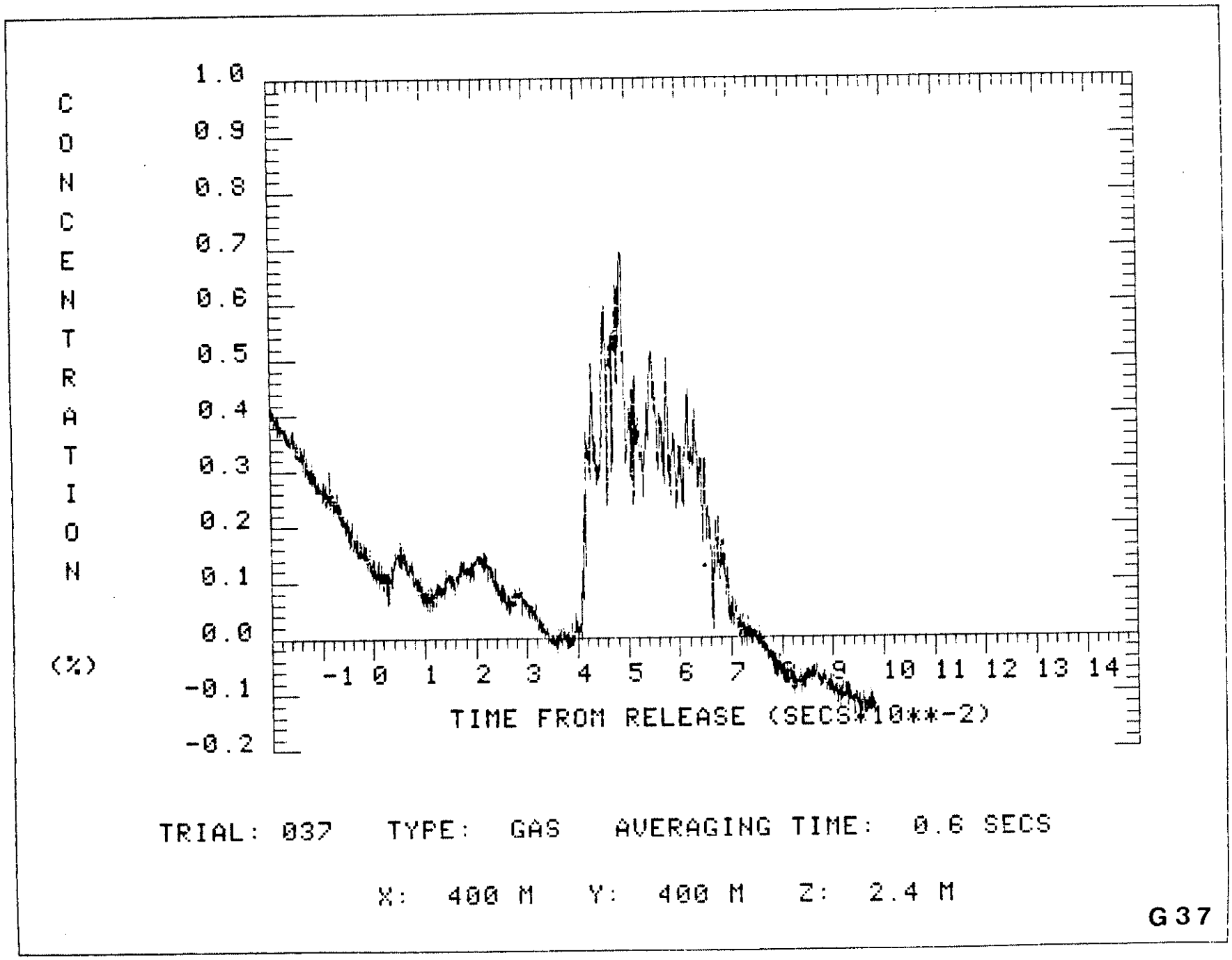

CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 400 M Z: 0.4 M
G33

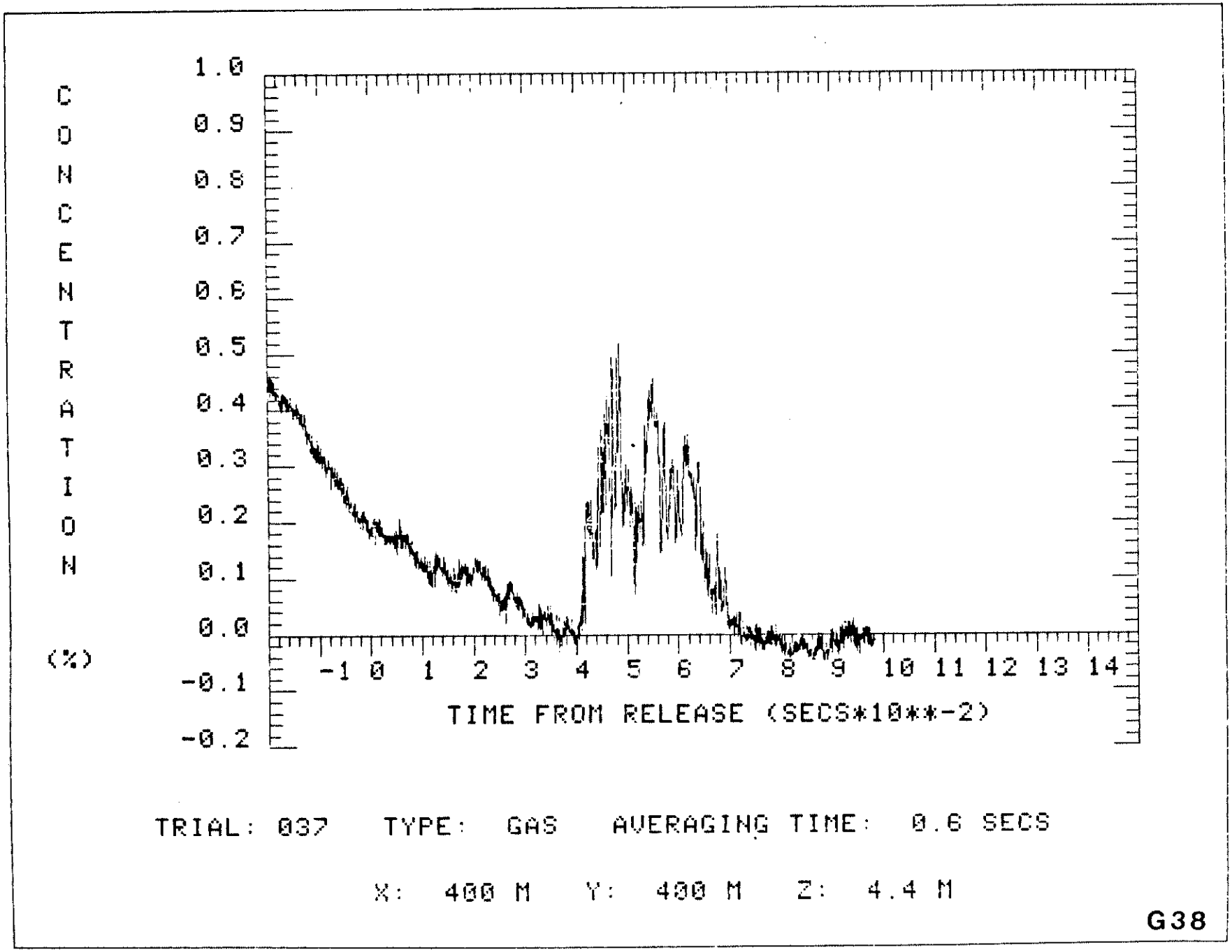

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 400 M Z: 2.4 M
G34

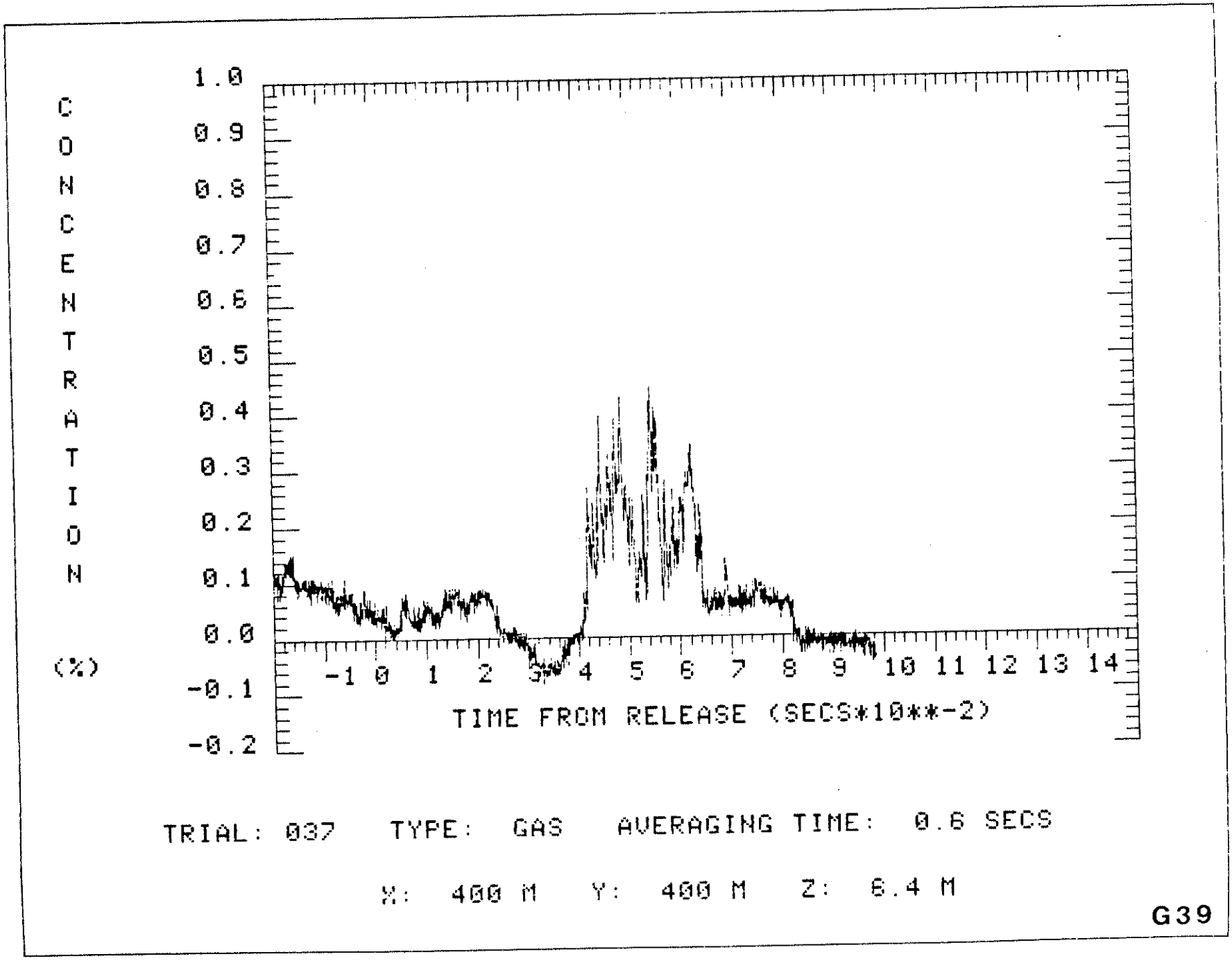

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 400 M Z: 4.4 M
G35

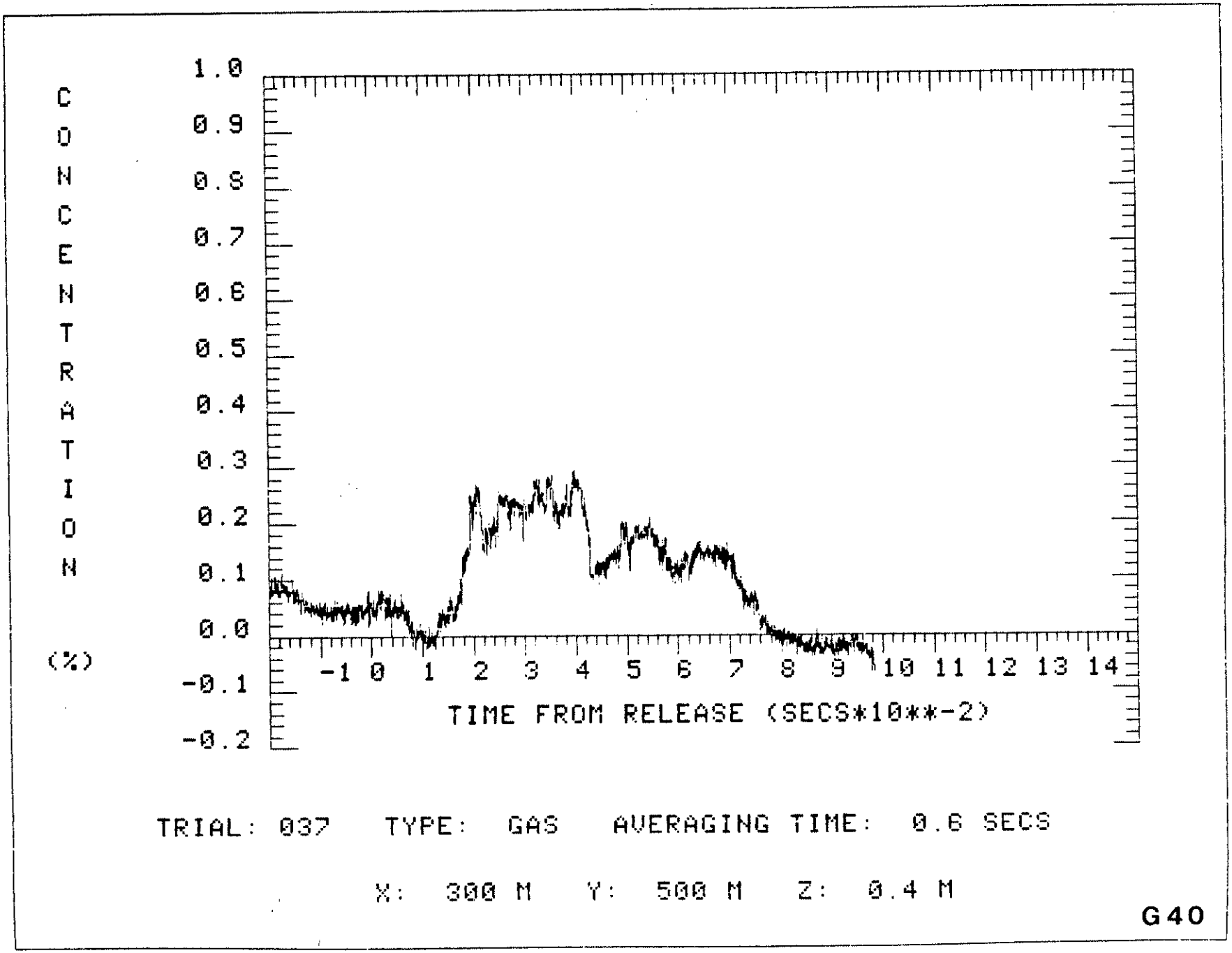

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 400 M Z: 0.4 M

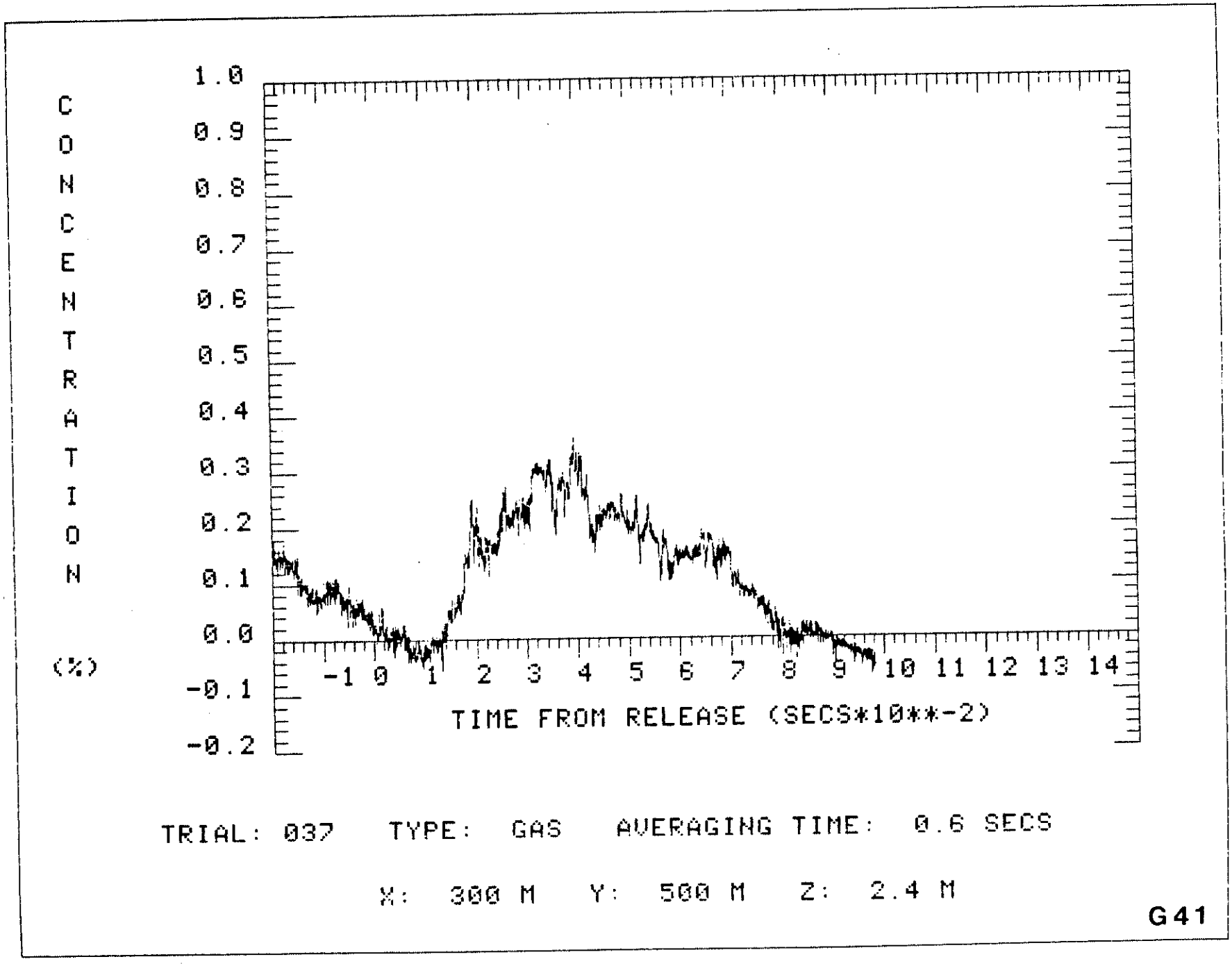
G36


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 400 M Z: 2.4 M
G37

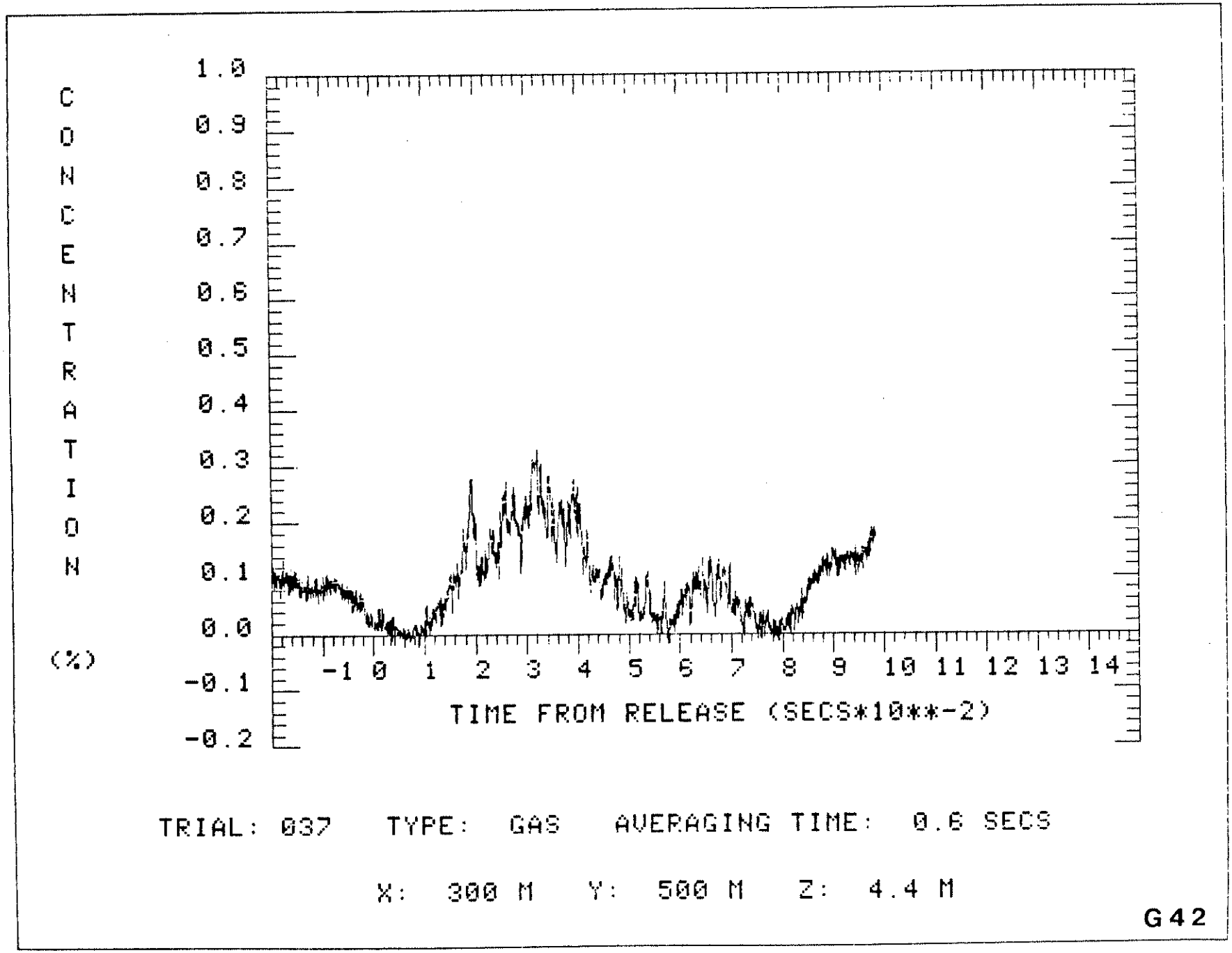

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 400 M Z: 4.4 M
G38

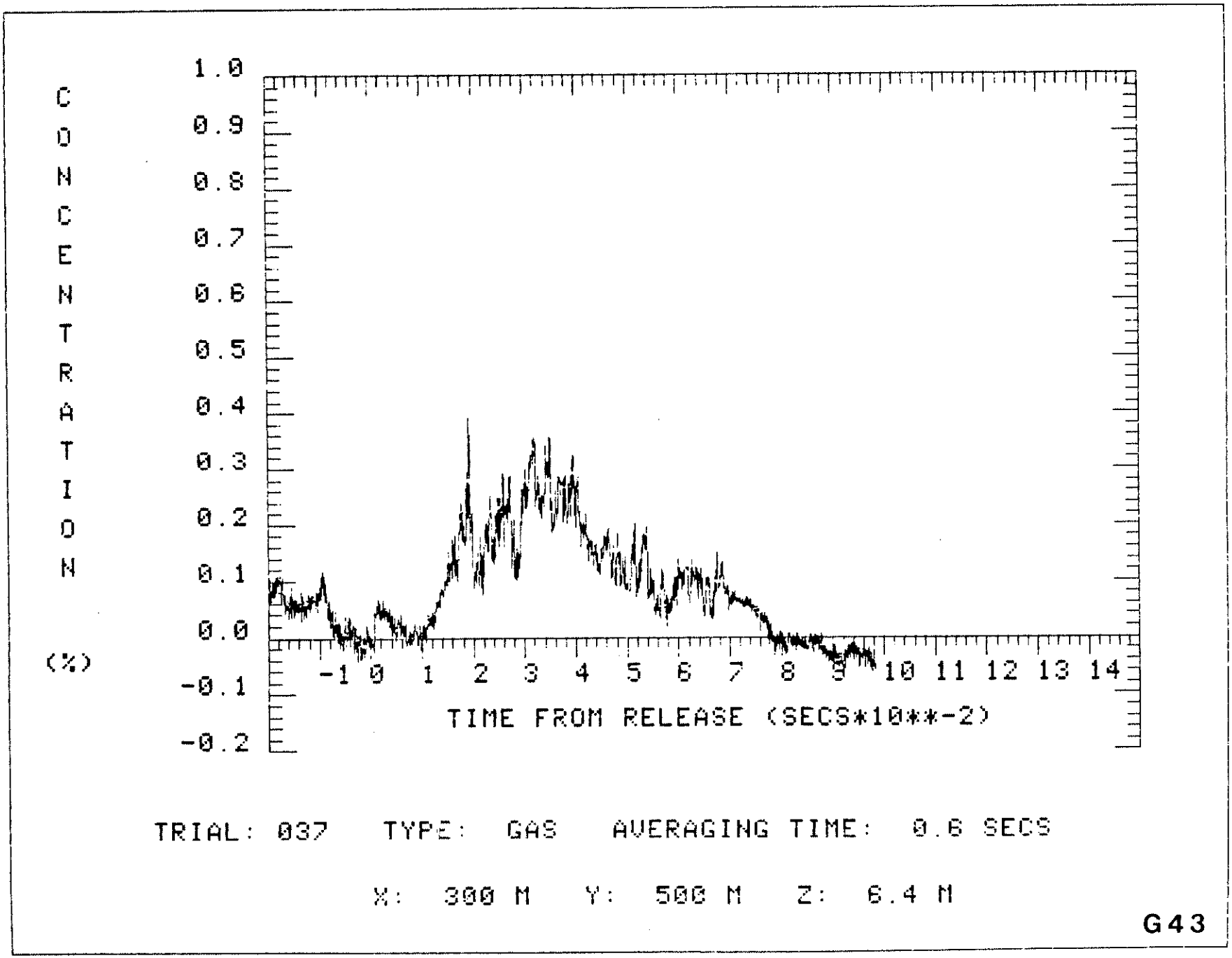

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 400 M Z: 6.4 M
G39

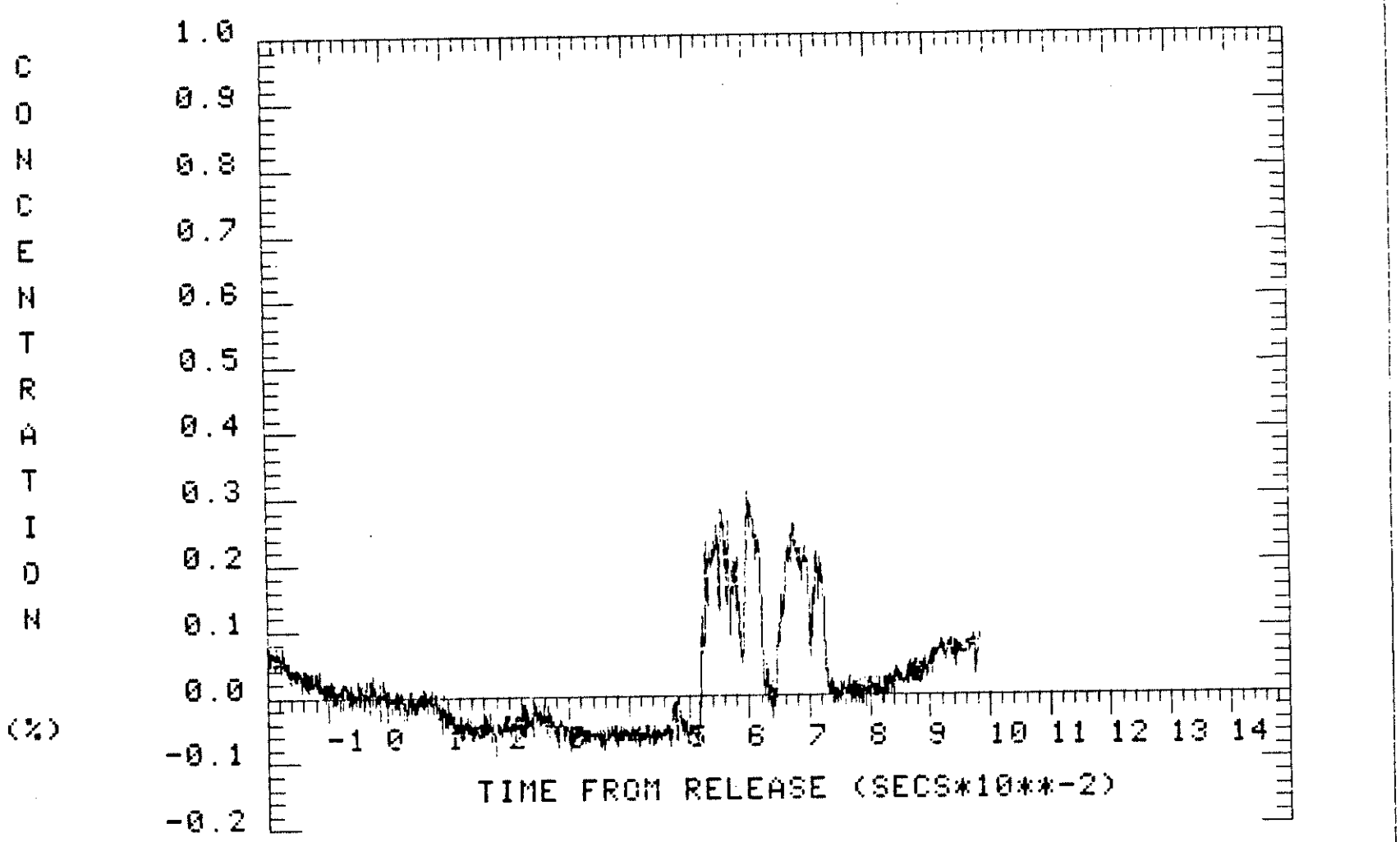

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 500 M Z: 0.4 M
G40


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 500 M Z: 2.4 M

G41


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 500 M Z: 4.4 M
G42

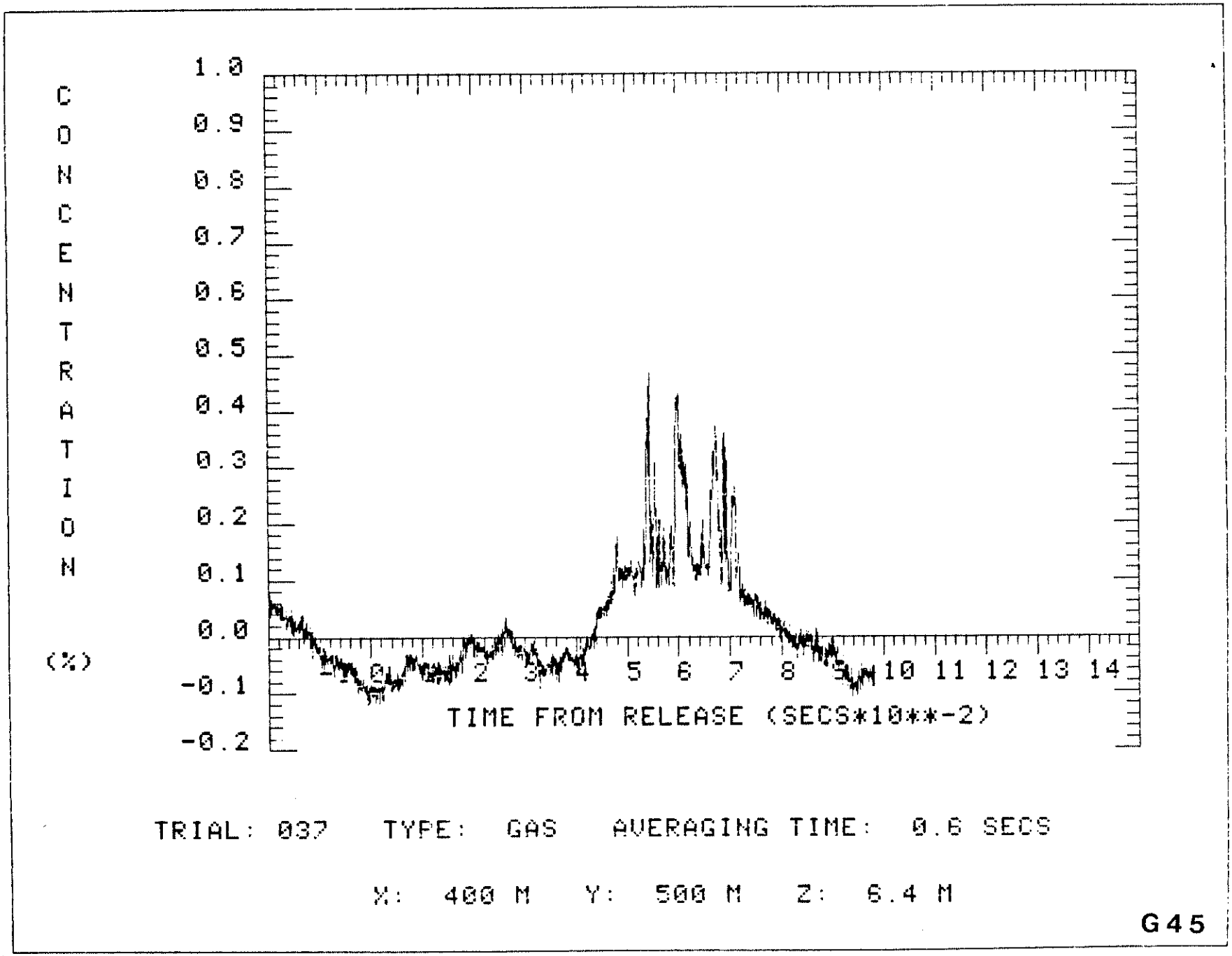

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 300 M Y: 500 M Z: 6.4 M
G43

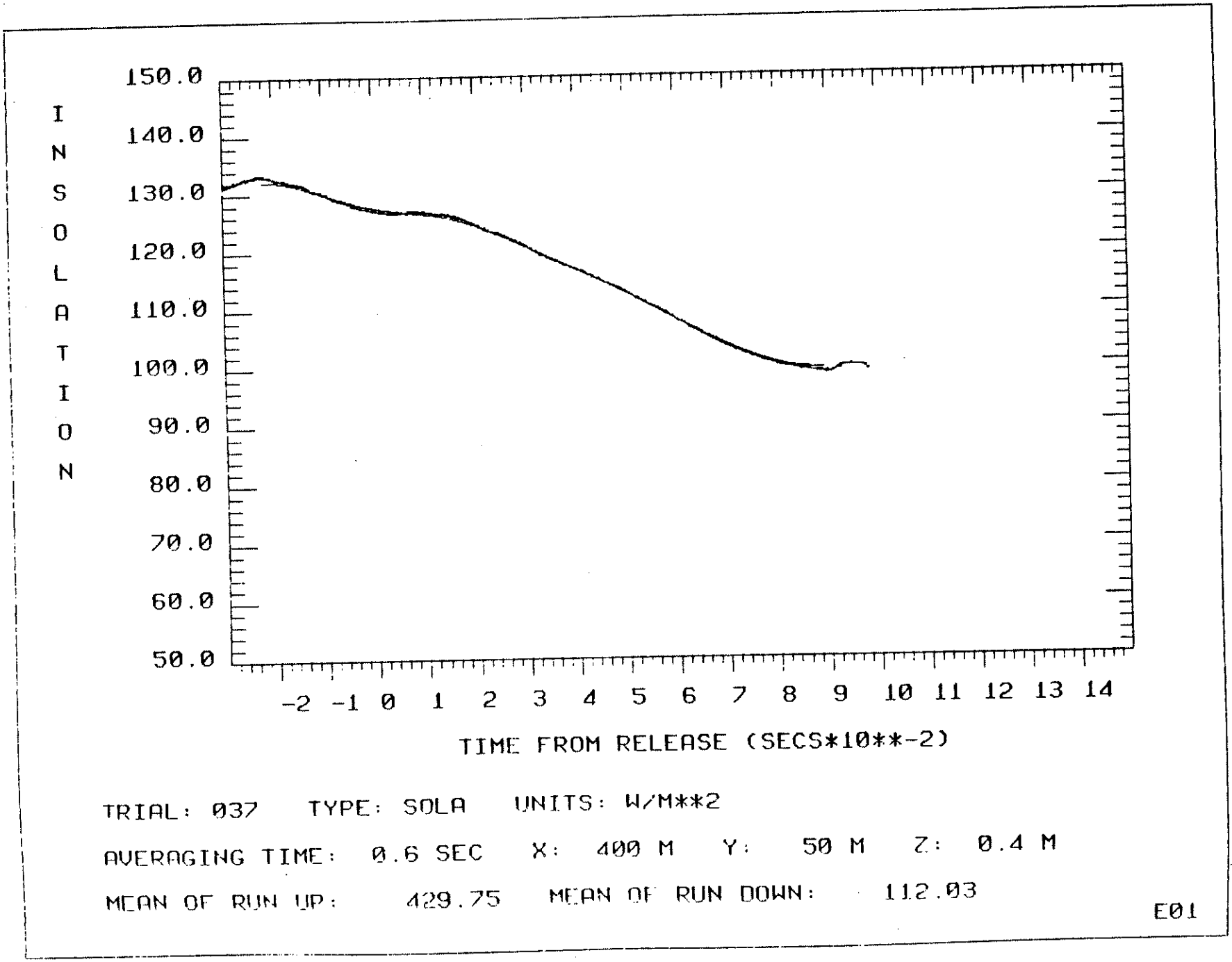


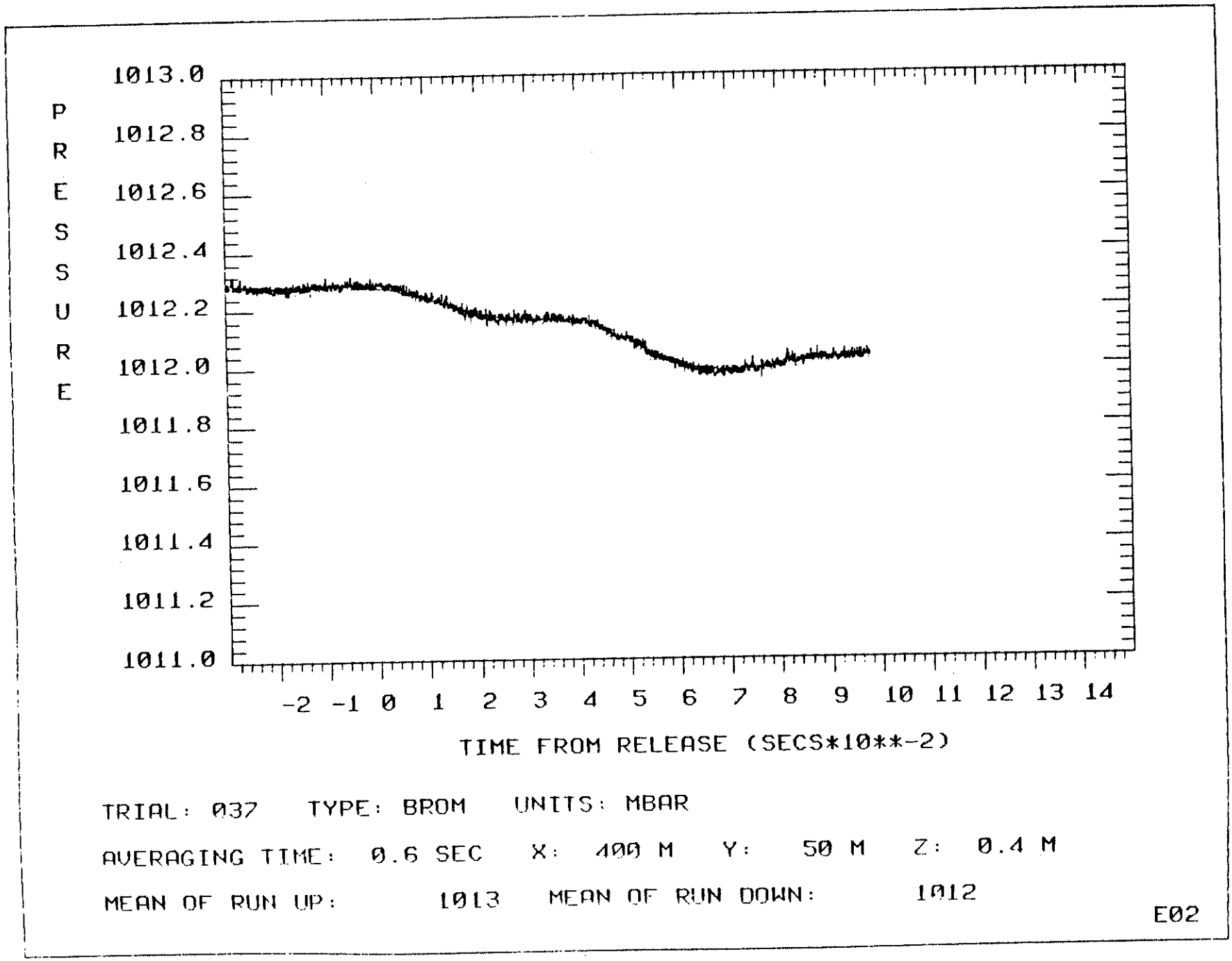
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS

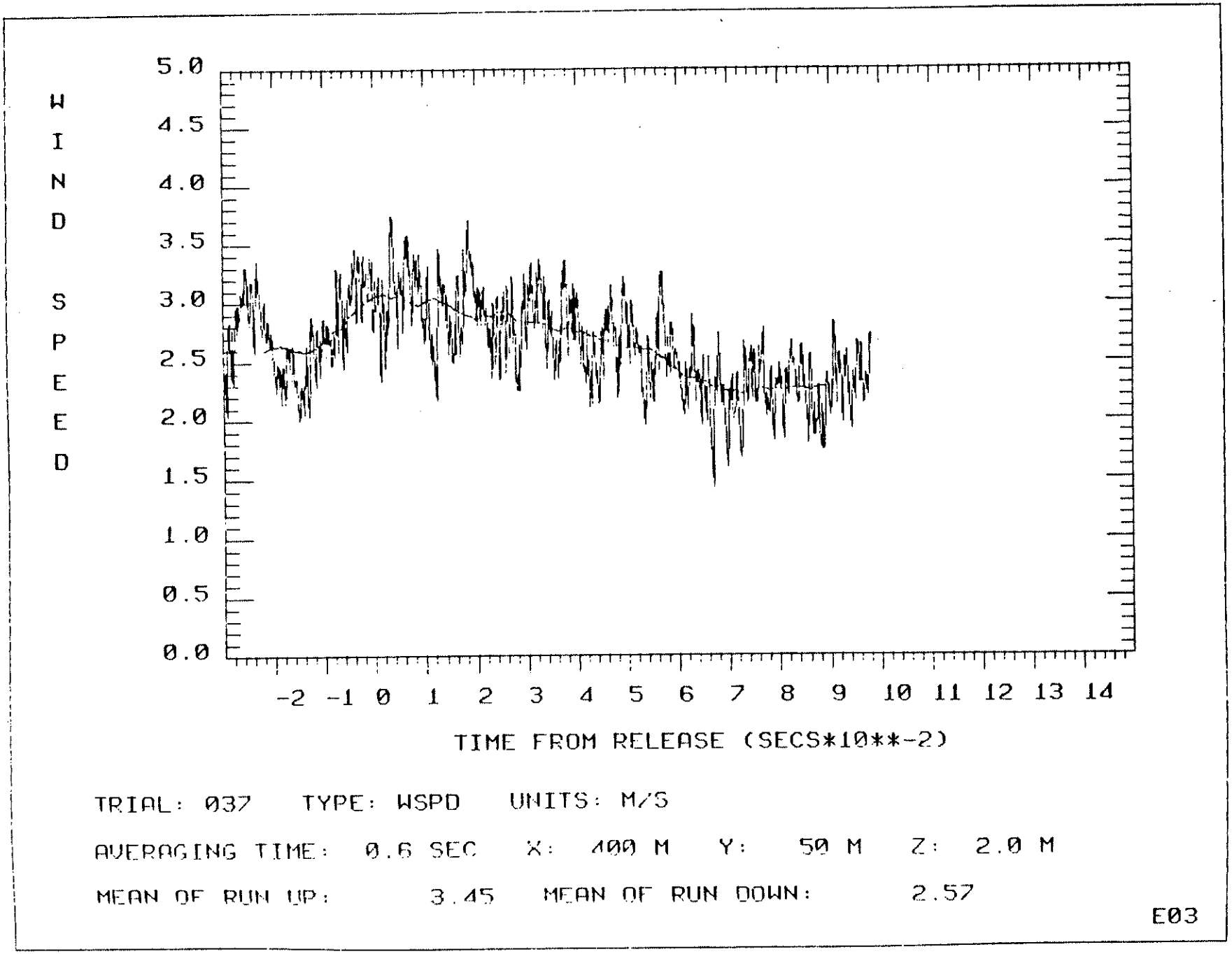
X: 400 M Y: 500 M Z: 2.4 M

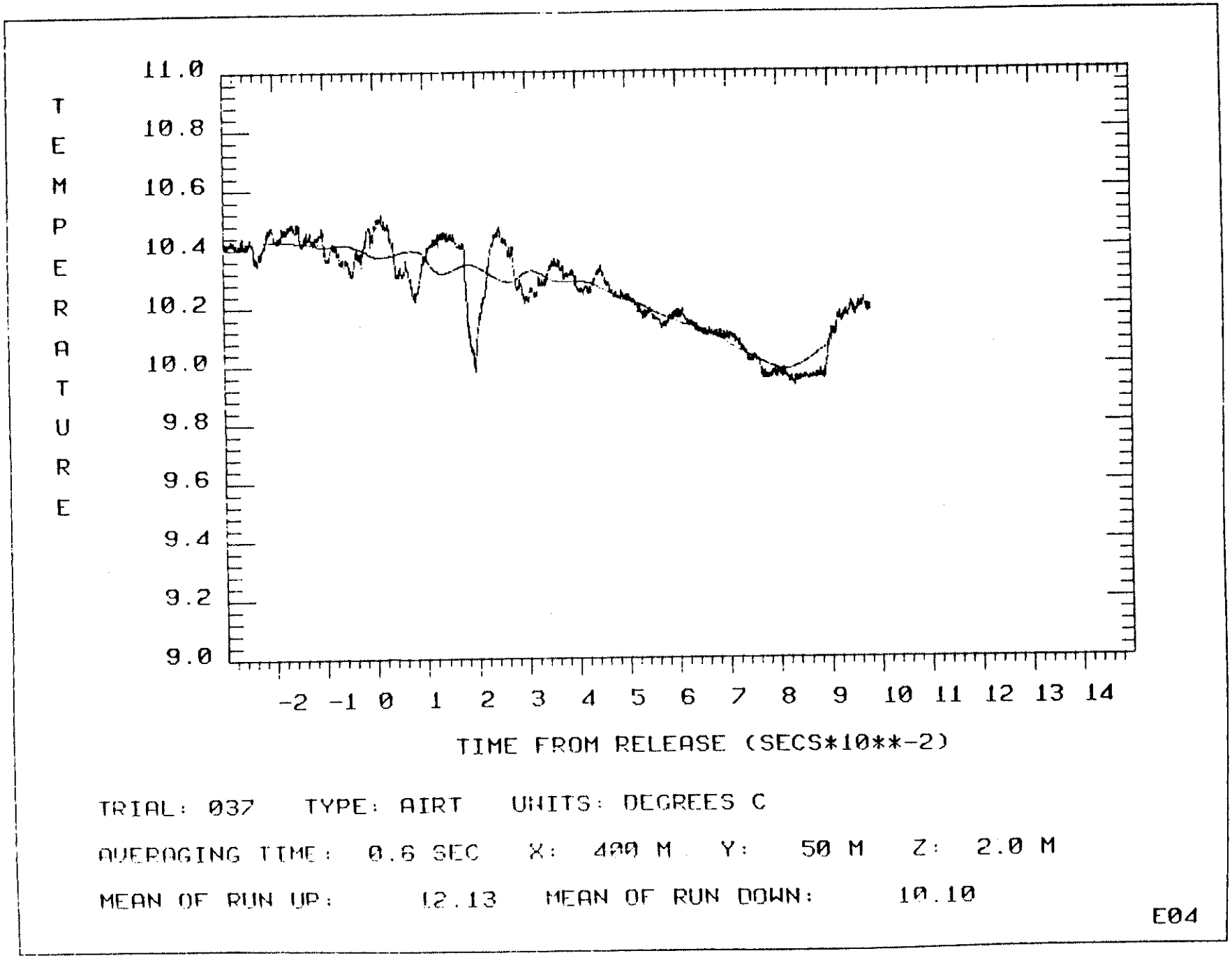
G44


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 500 M Z: 6.4 M
G45


INSOLATION
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: SOLA UNITS: W/M**2
AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 0.4 M
MEAN OF RUN UP: 429.75 MEAN OF RUN DOWN: 112.03
E01


PRESSURE
1013.0
1012.8
1012.6
1012.4
1012.2
1012.0
1011.8
1011.6
1011.4
1011.2
1011.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: BROM UNITS: MBAR
AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 0.4 M
MEAN OF RUN UP: 1013 MEAN OF RUN DOWN: 1012
E02


WIND SPEED
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: WSPD UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M
MEAN OF RUN UP: 3.45 MEAN OF RUN DOWN: 2.57
E03

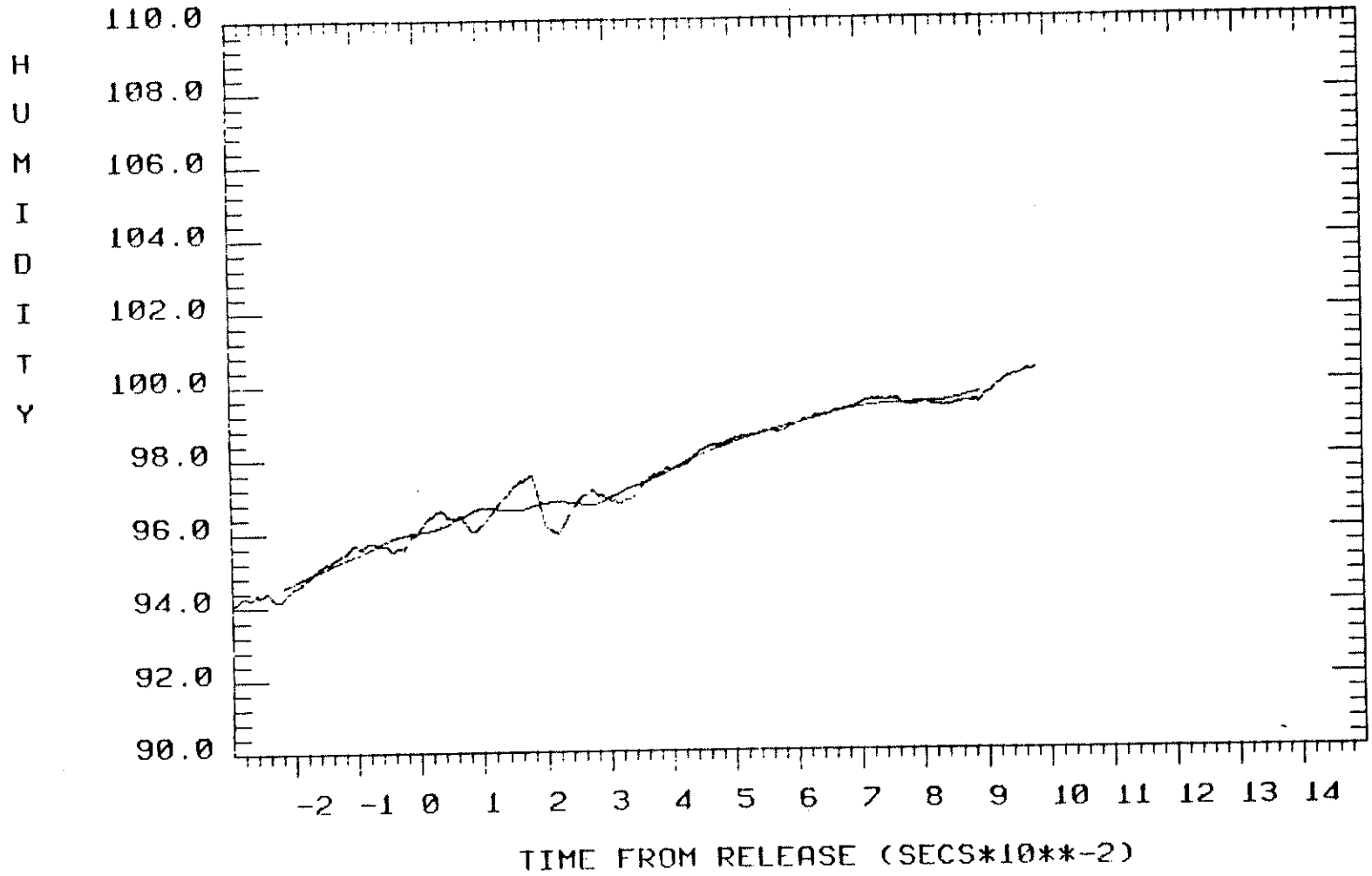


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 12.13 MEAN OF RUN DOWN: 10.10

E04

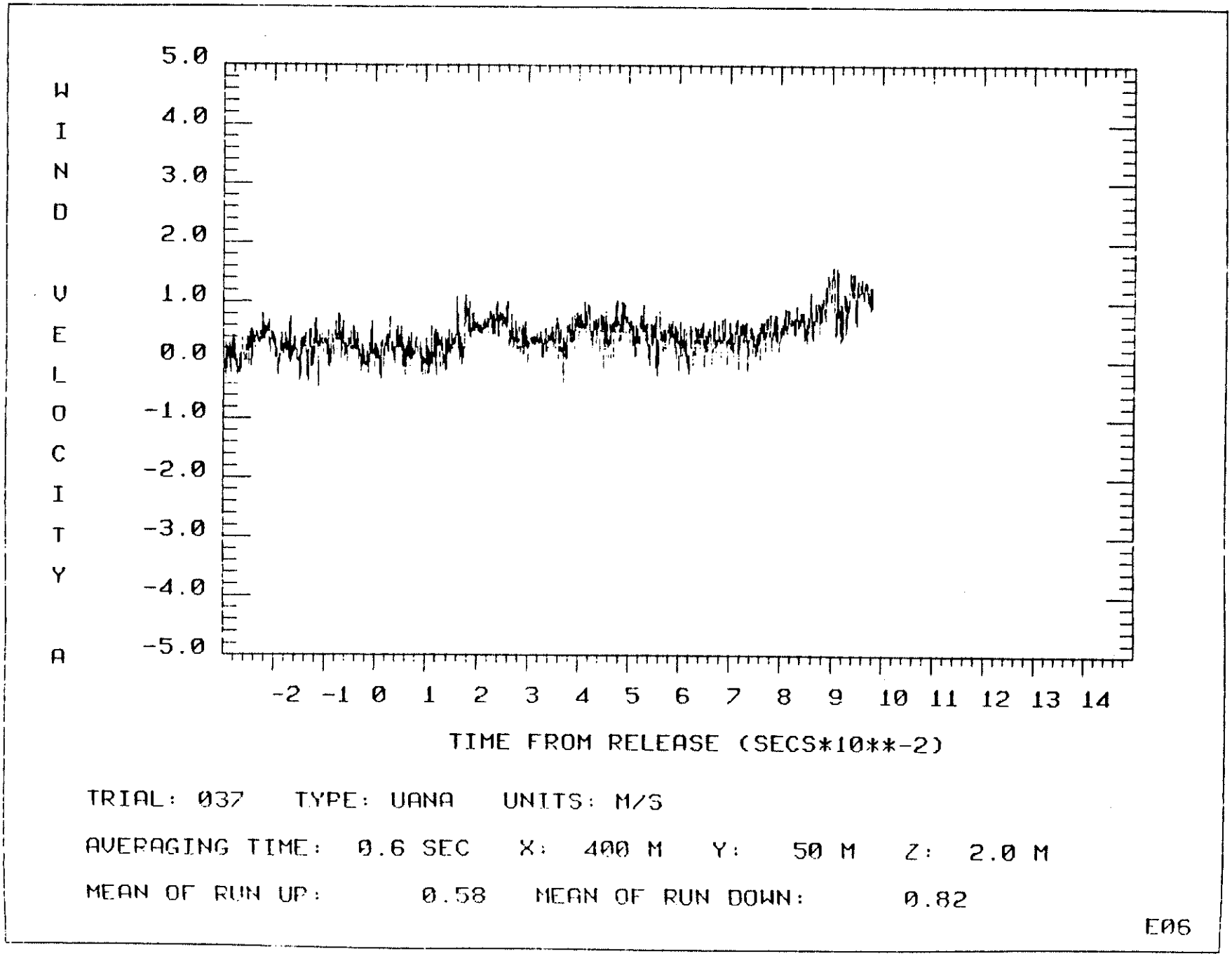


TRIAL: 037 TYPE: RHUM UNITS: PER CENT

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 80.31 MEAN OF RUN DOWN: 99.65

E05

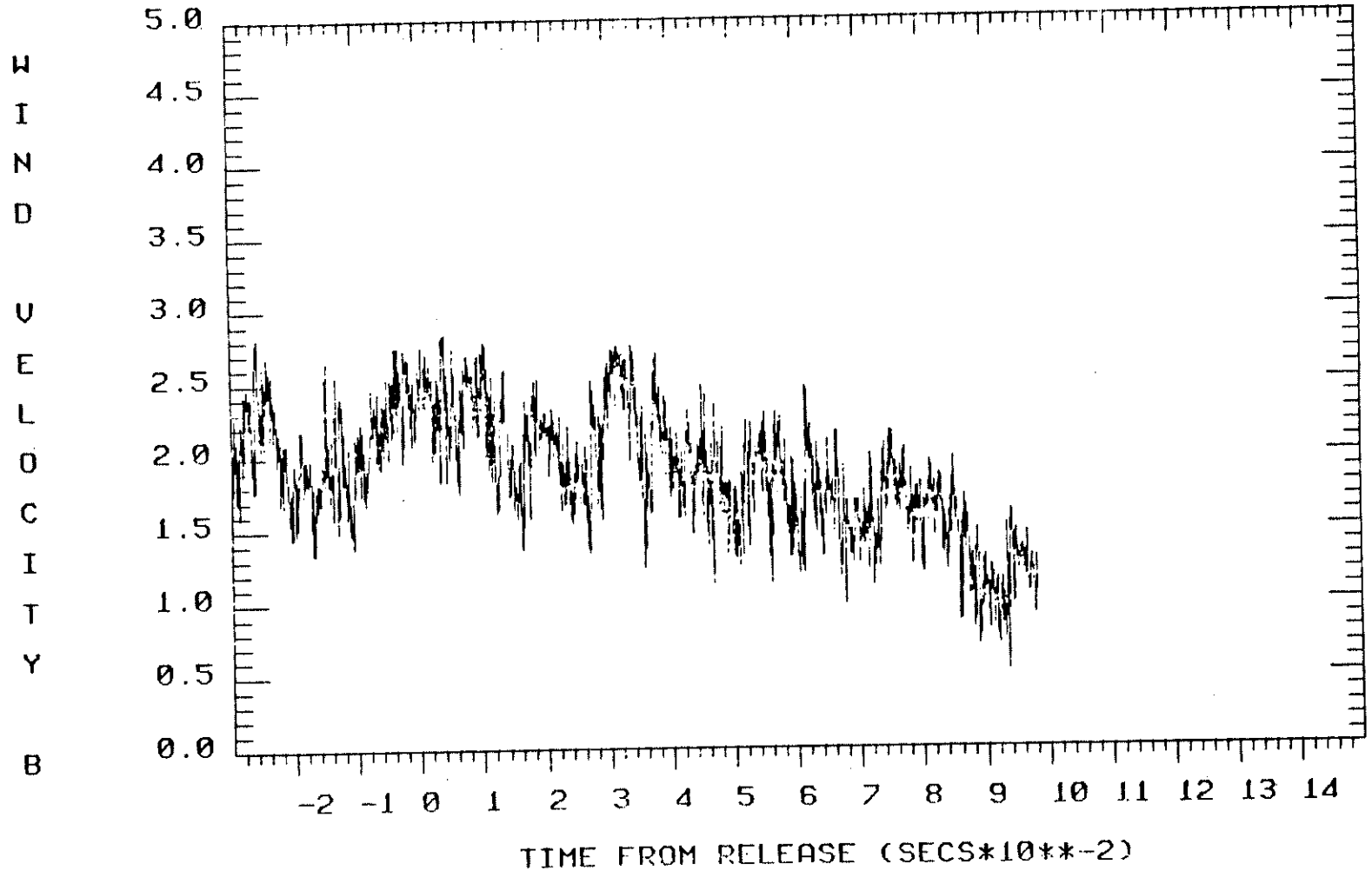


TRIAL: 037 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 0.58 MEAN OF RUN DOWN: 0.82

E06

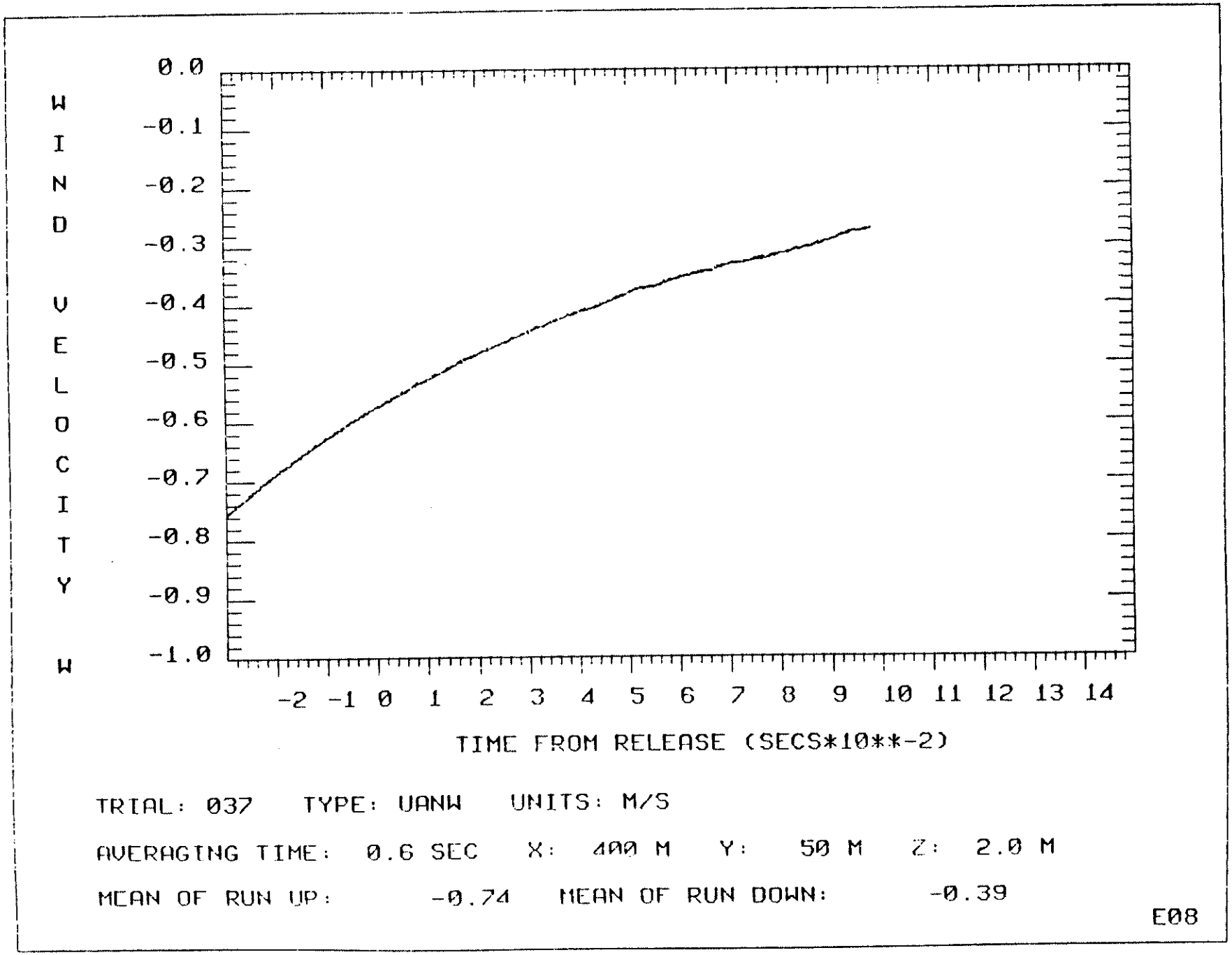


TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 2.41 MEAN OF RUN DOWN: 1.58

E07

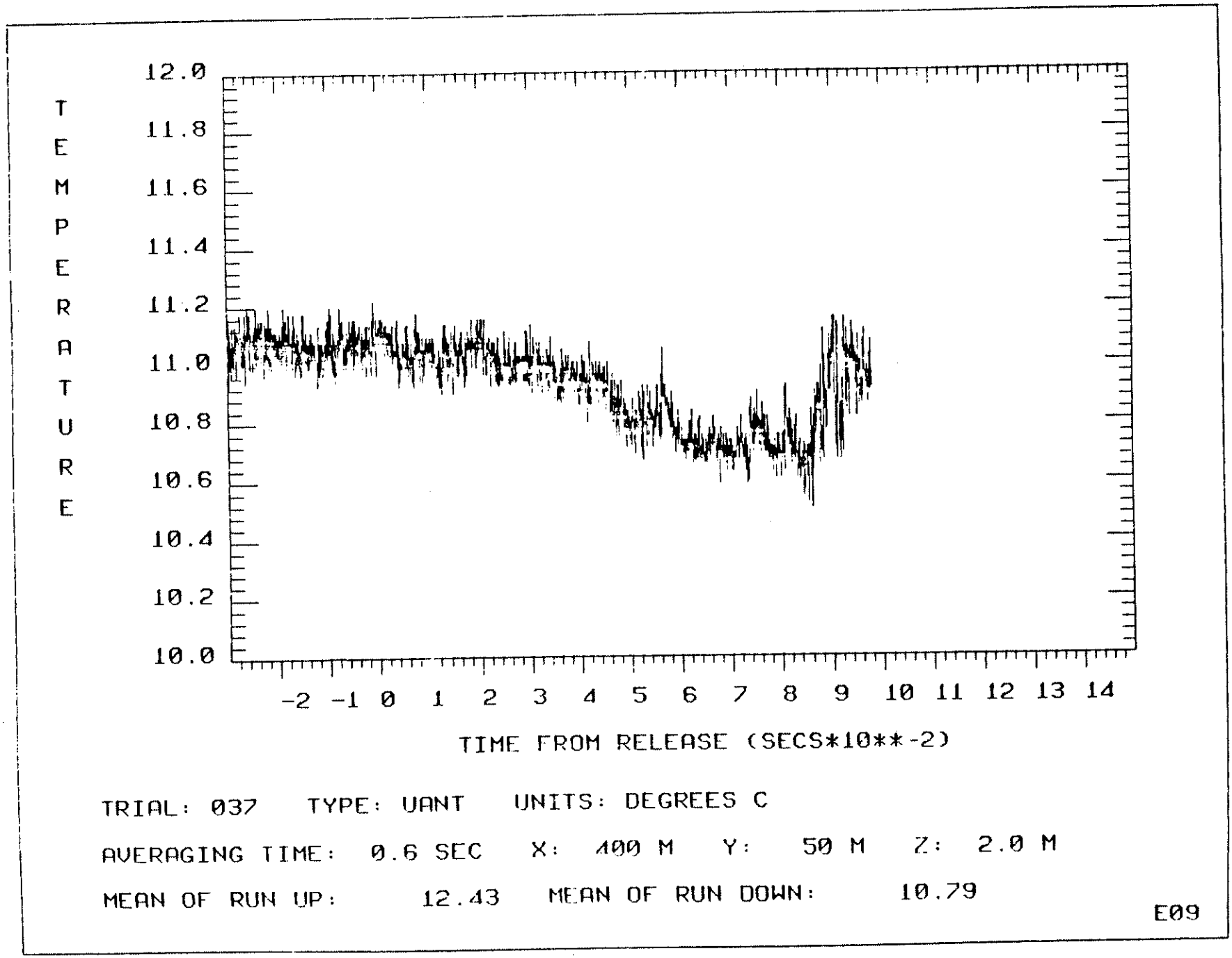


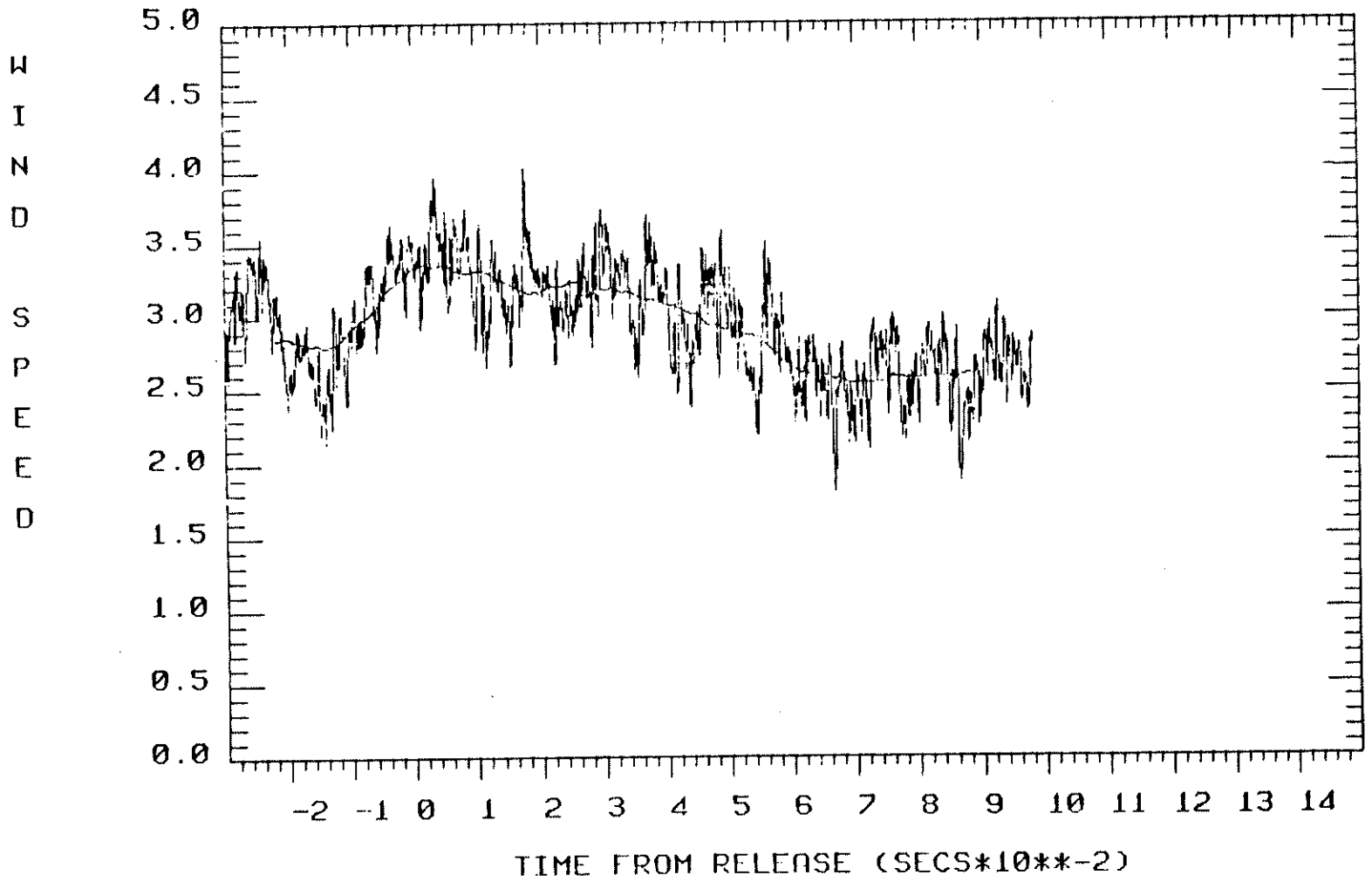
TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: -0.74 MEAN OF RUN DOWN: -0.39

E08


TEMPERATURE
12.0
11.8
11.6
11.4
11.2
11.0
10.8
10.6
10.4
10.2
10.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: UANT UNITS: DEGREES C
AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M
MEAN OF RUN UP: 12.43 MEAN OF RUN DOWN: 10.79
E09

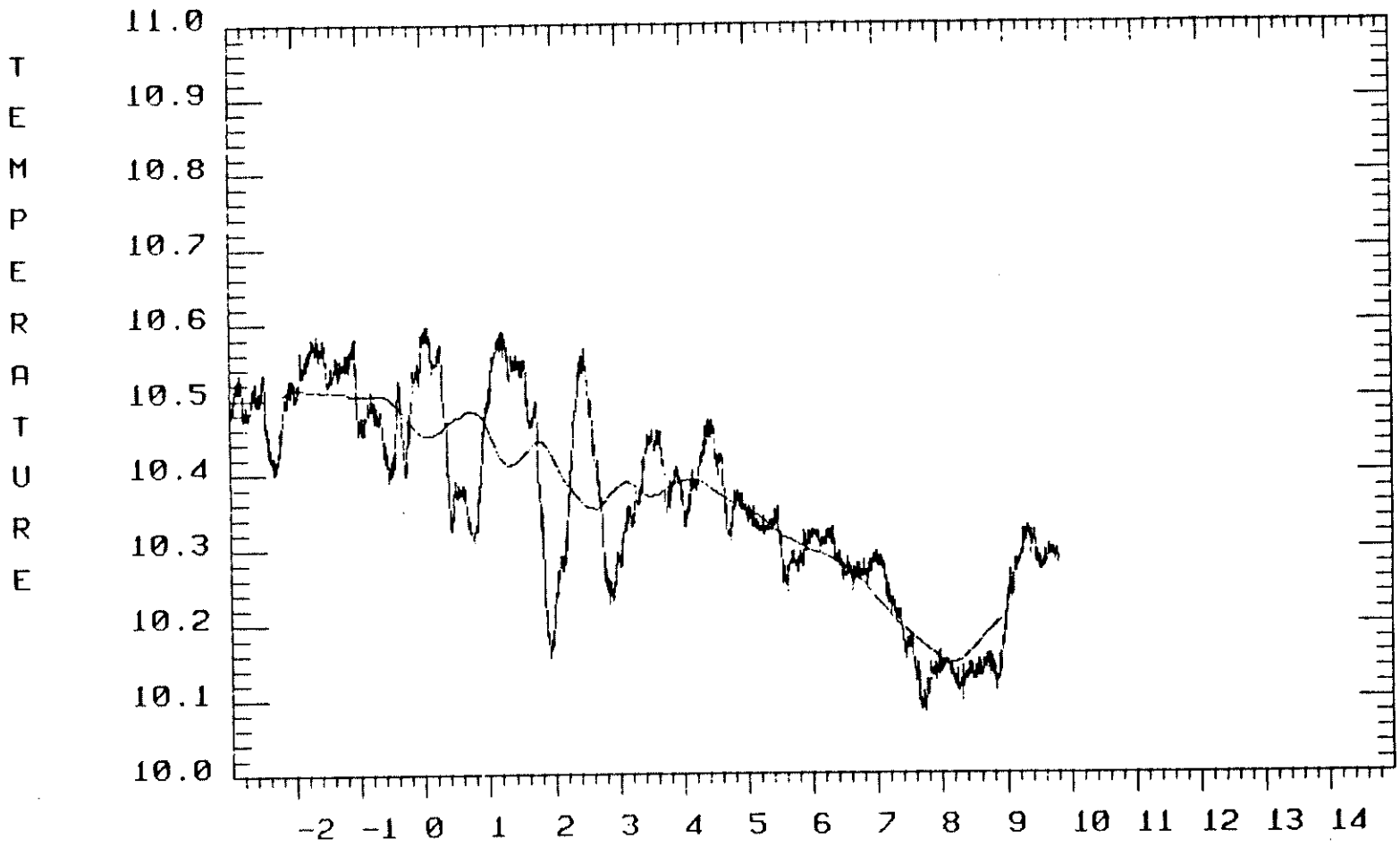


TRIAL: 037 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 4.5 M

MEAN OF RUN UP: 3.66 MEAN OF RUN DOWN: 2.75

E10

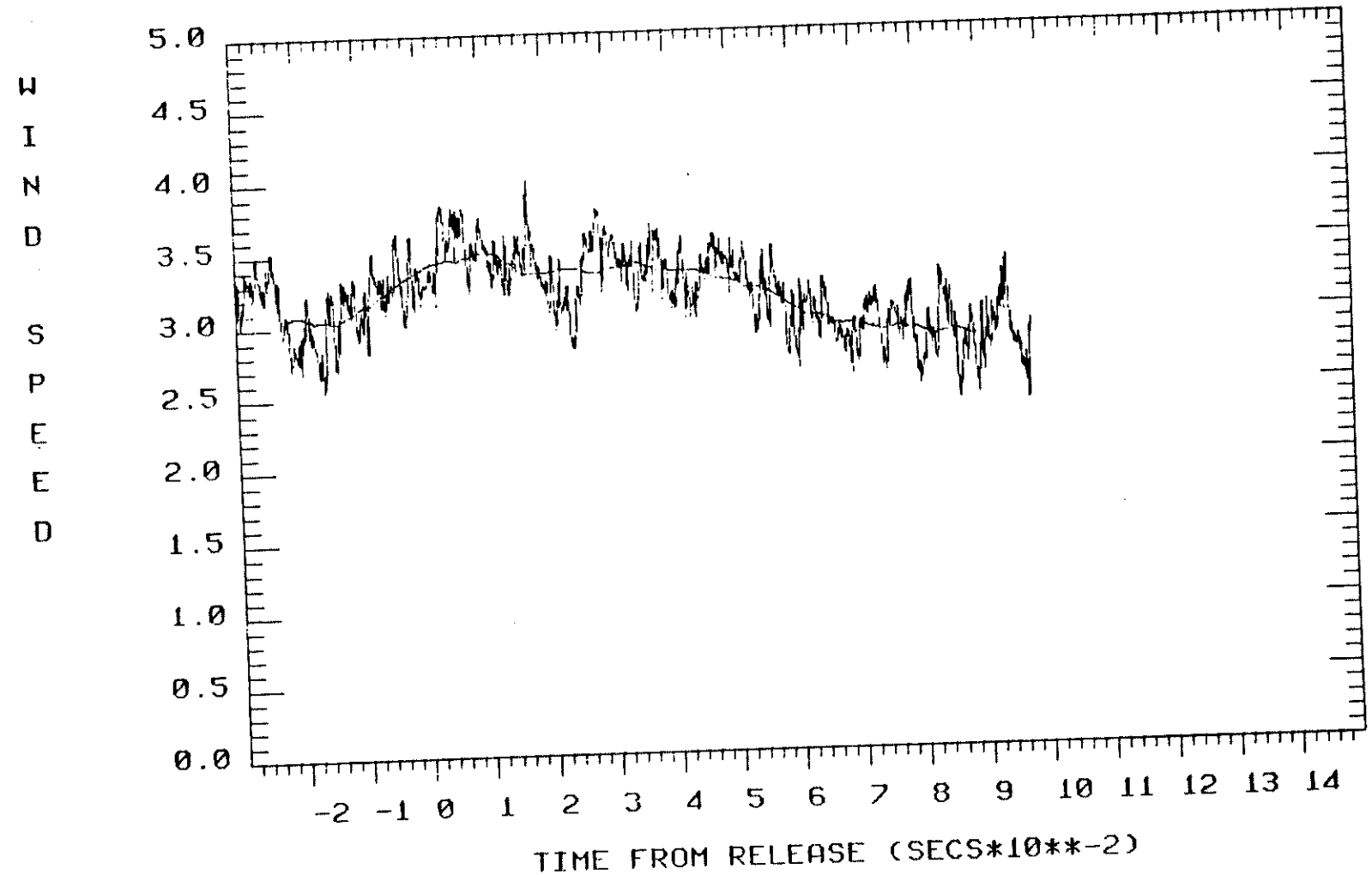


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 6.0 M

MEAN OF RUN UP: 11.74 MEAN OF RUN DOWN: 10.16

E11

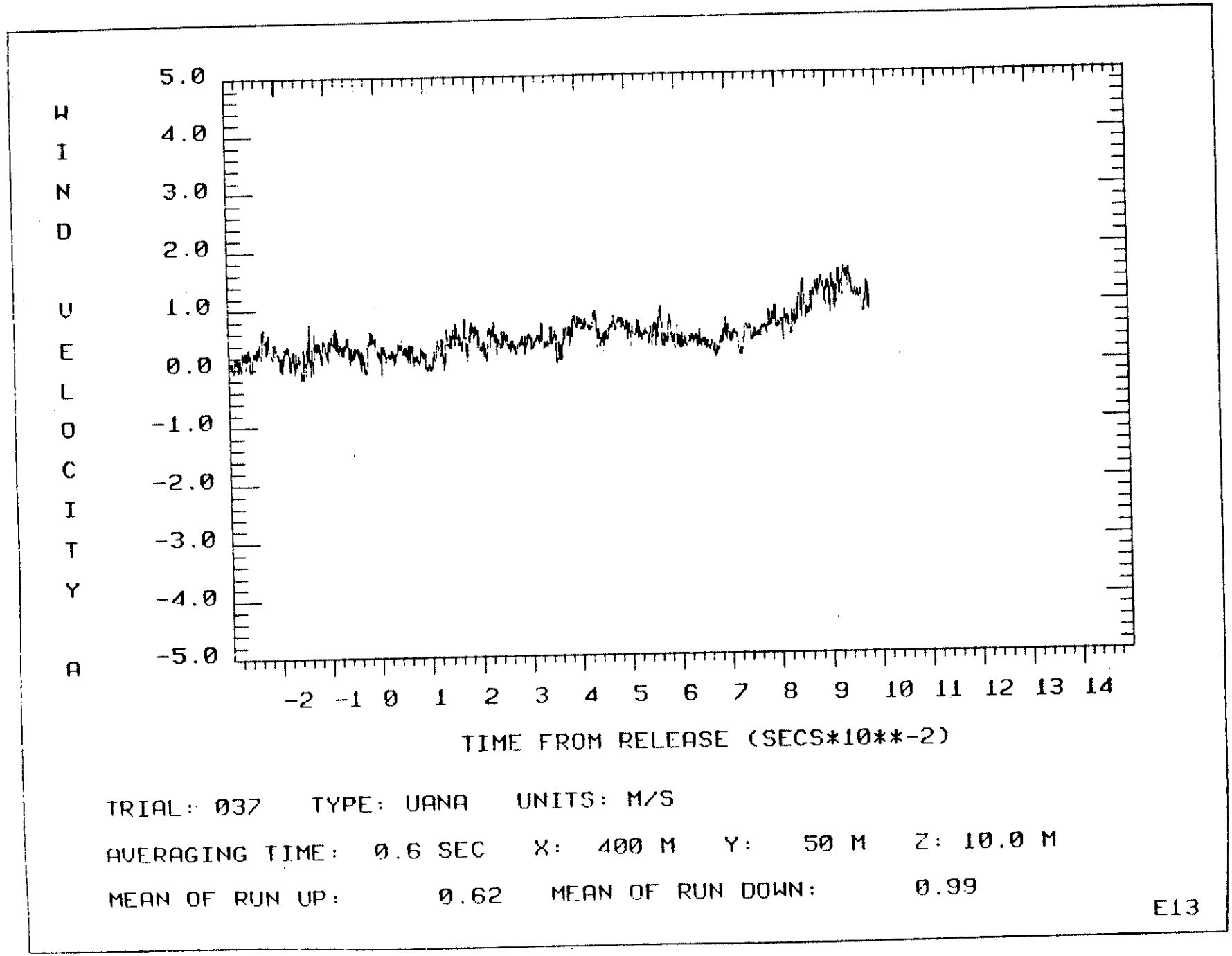


TRIAL: 037 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 3.71 MEAN OF RUN DOWN: 2.83

E12

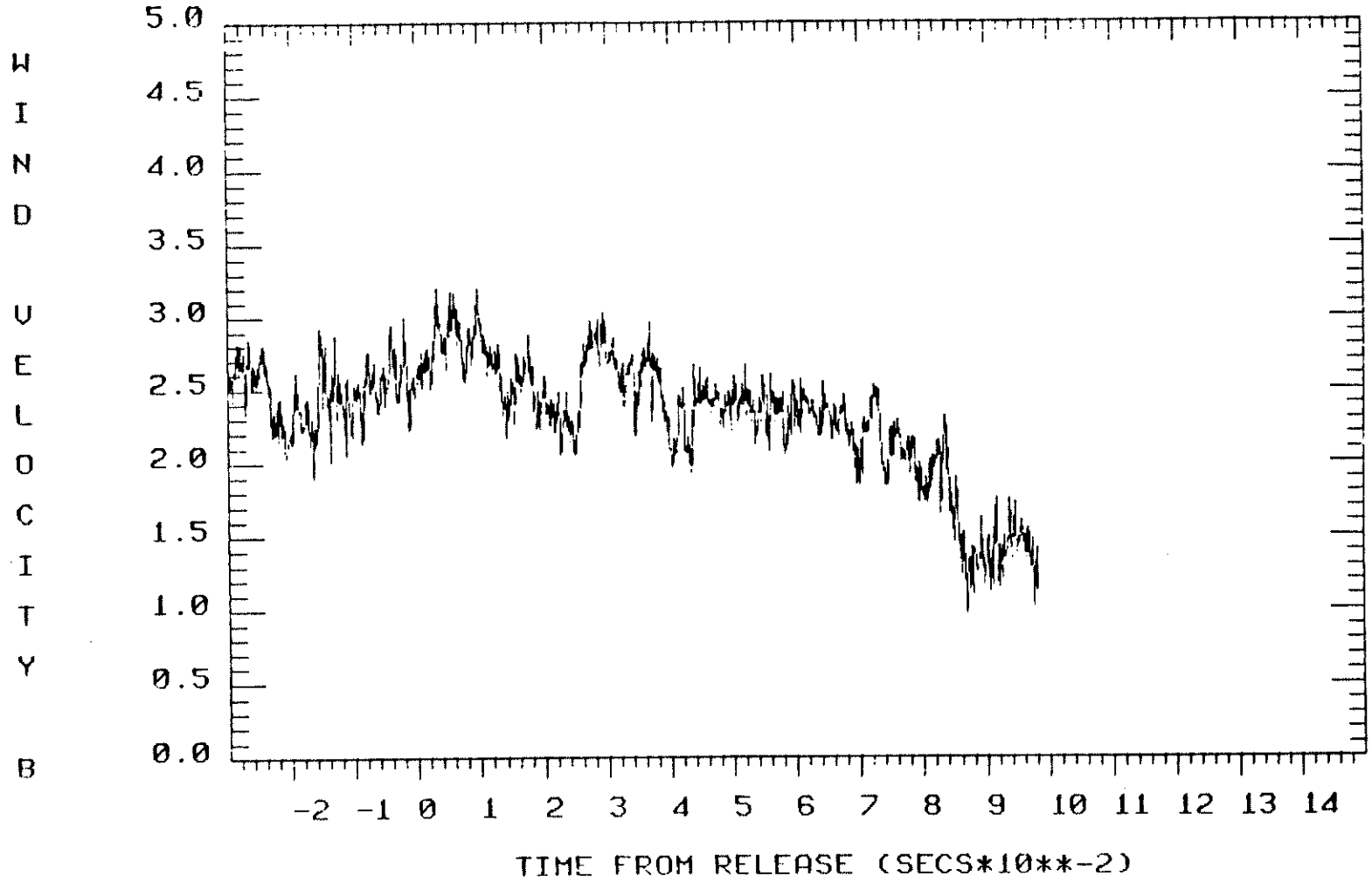


TRIAL: 037 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 0.62 MEAN OF RUN DOWN: 0.99

E13

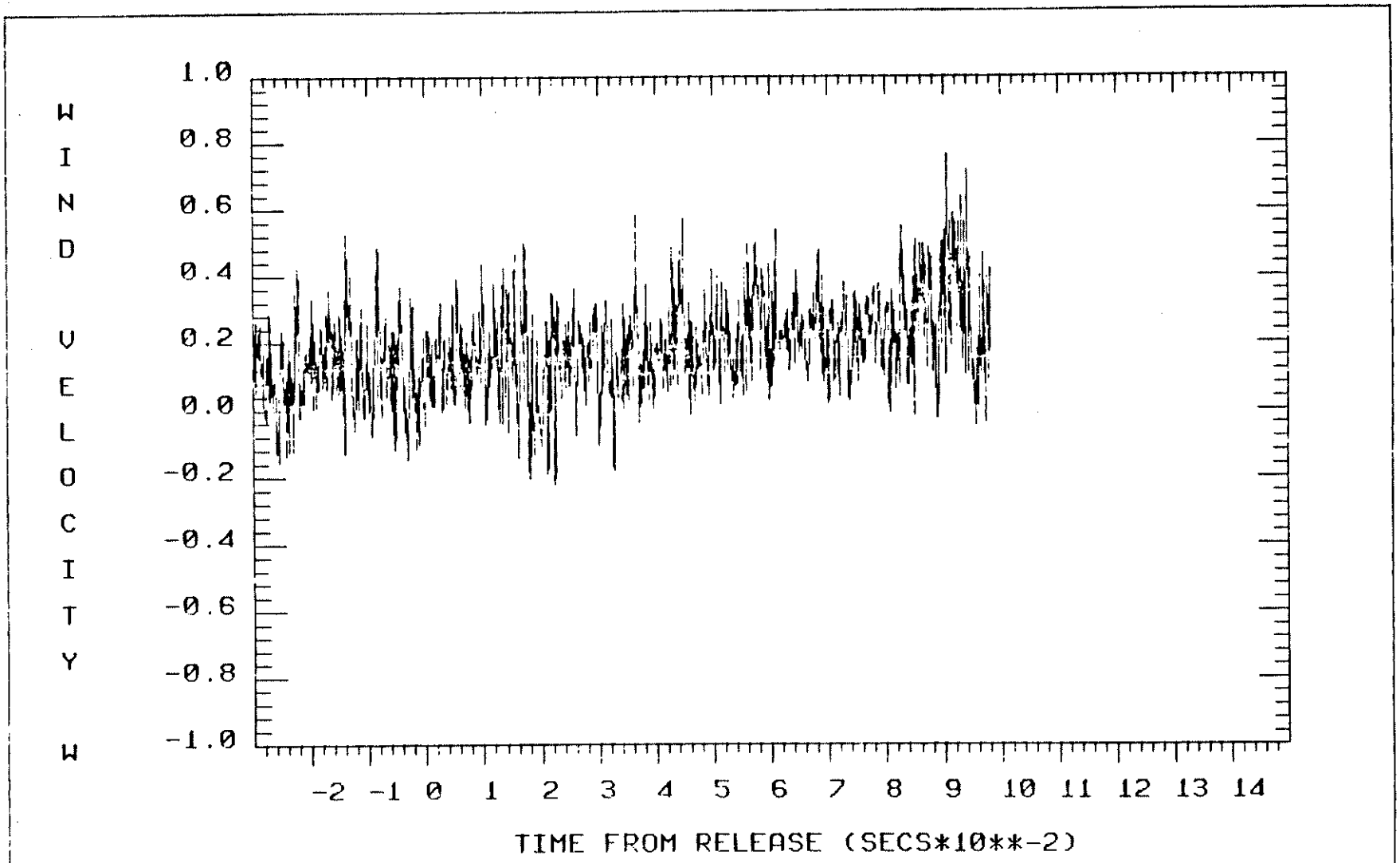


TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 2.68 MEAN OF RUN DOWN: 1.63

E14

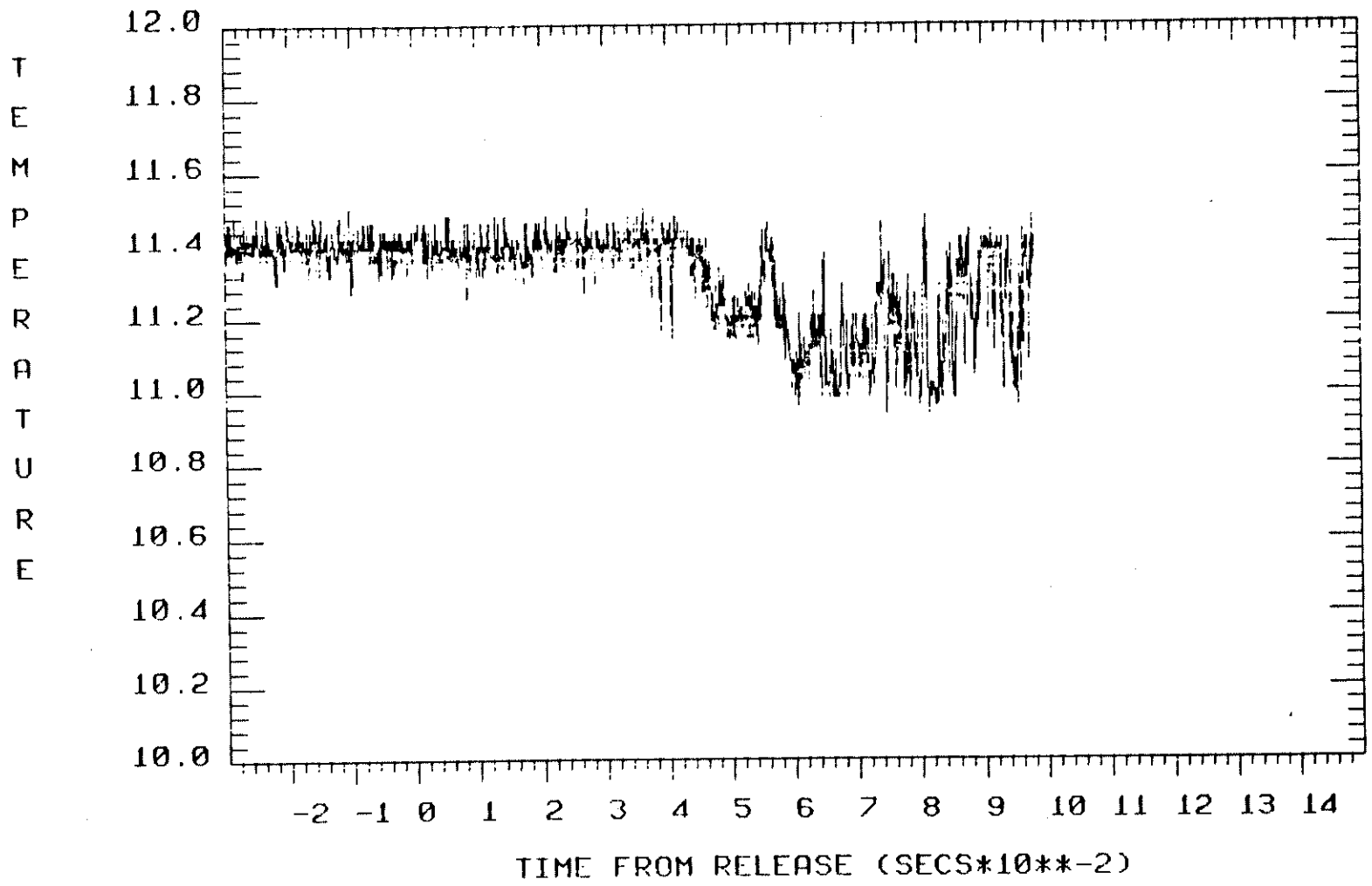


TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 0.15 MEAN OF RUN DOWN: 0.20

E15

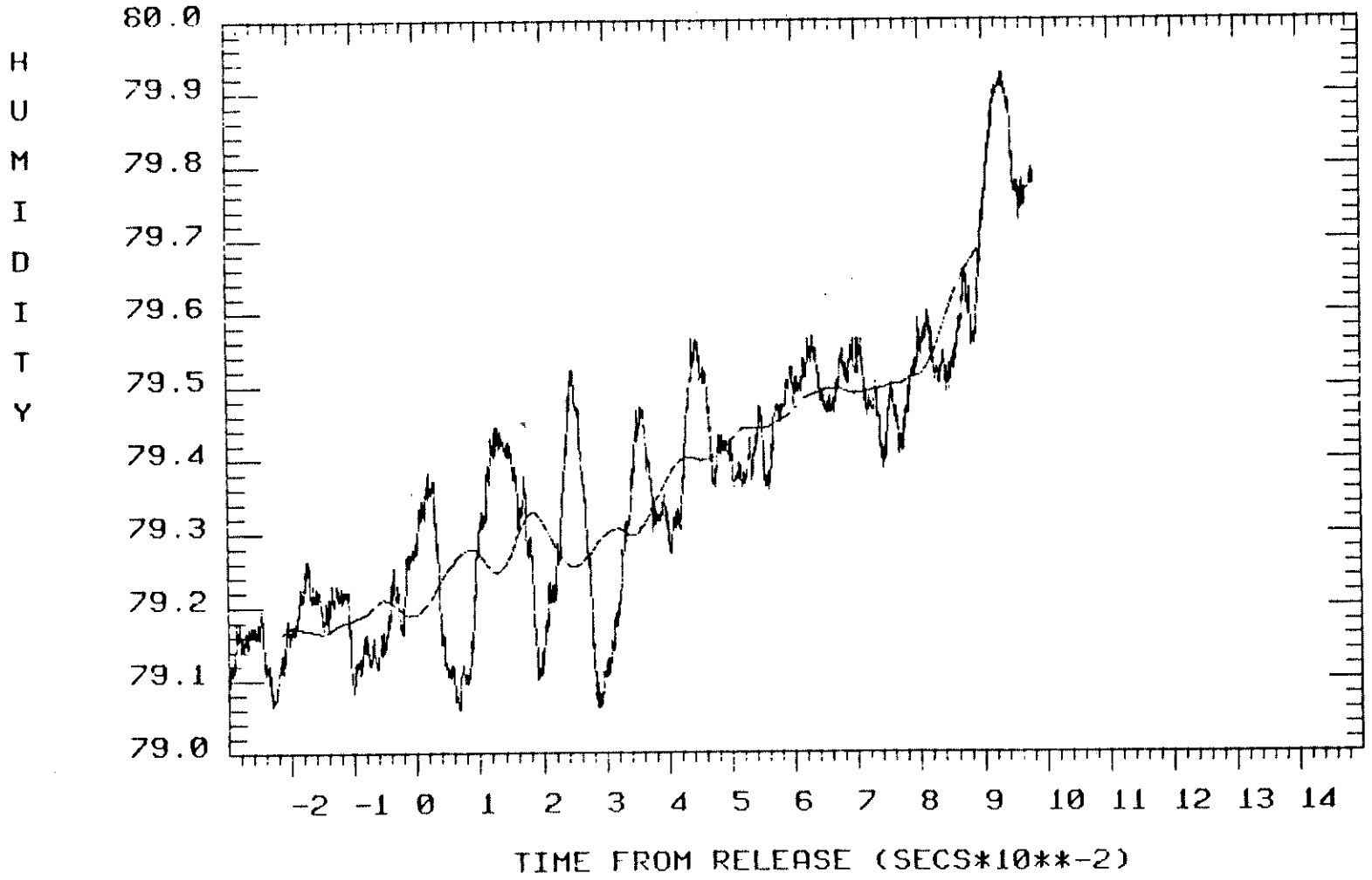


TRIAL: 037 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 12.51 MEAN OF RUN DOWN: 11.08

E16

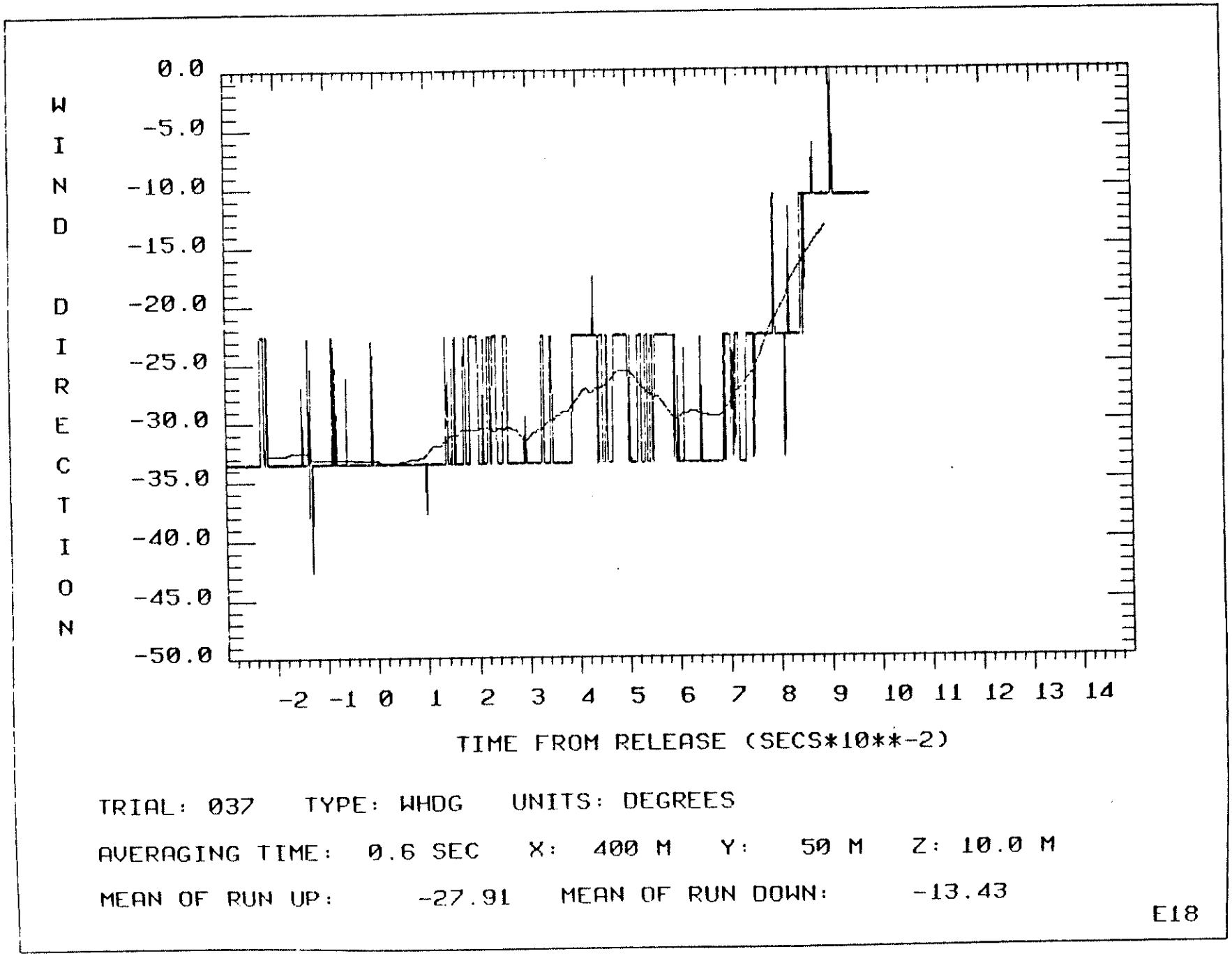


TRIAL: 037 TYPE: RHUM UNITS: PER CENT

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 78.38 MEAN OF RUN DOWN: 79.51

E17

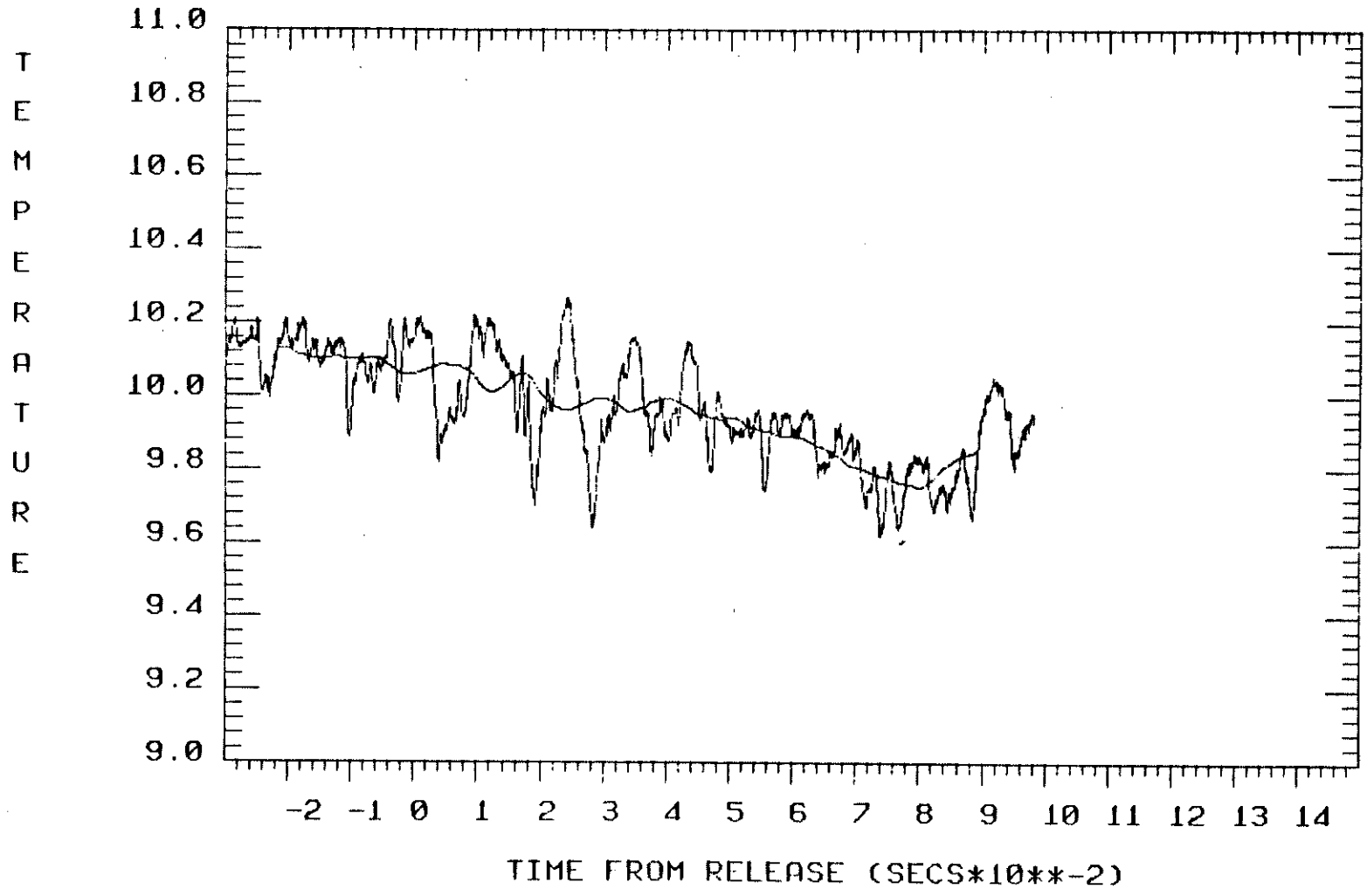


TRIAL: 037 TYPE: WHDG UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: -27.91 MEAN OF RUN DOWN: -13.43

E18

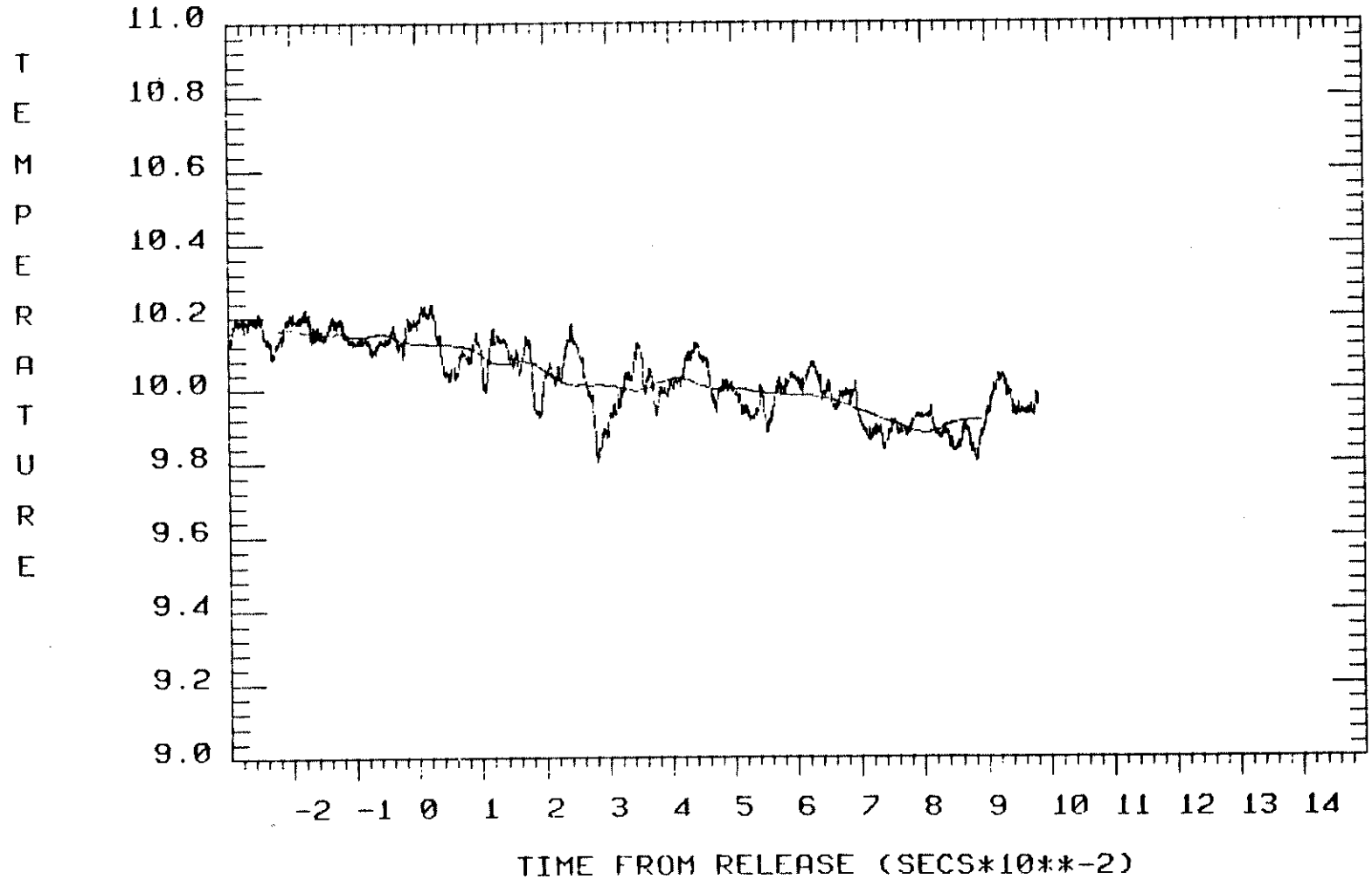


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 11.30 MEAN OF RUN DOWN: 9.74

E19

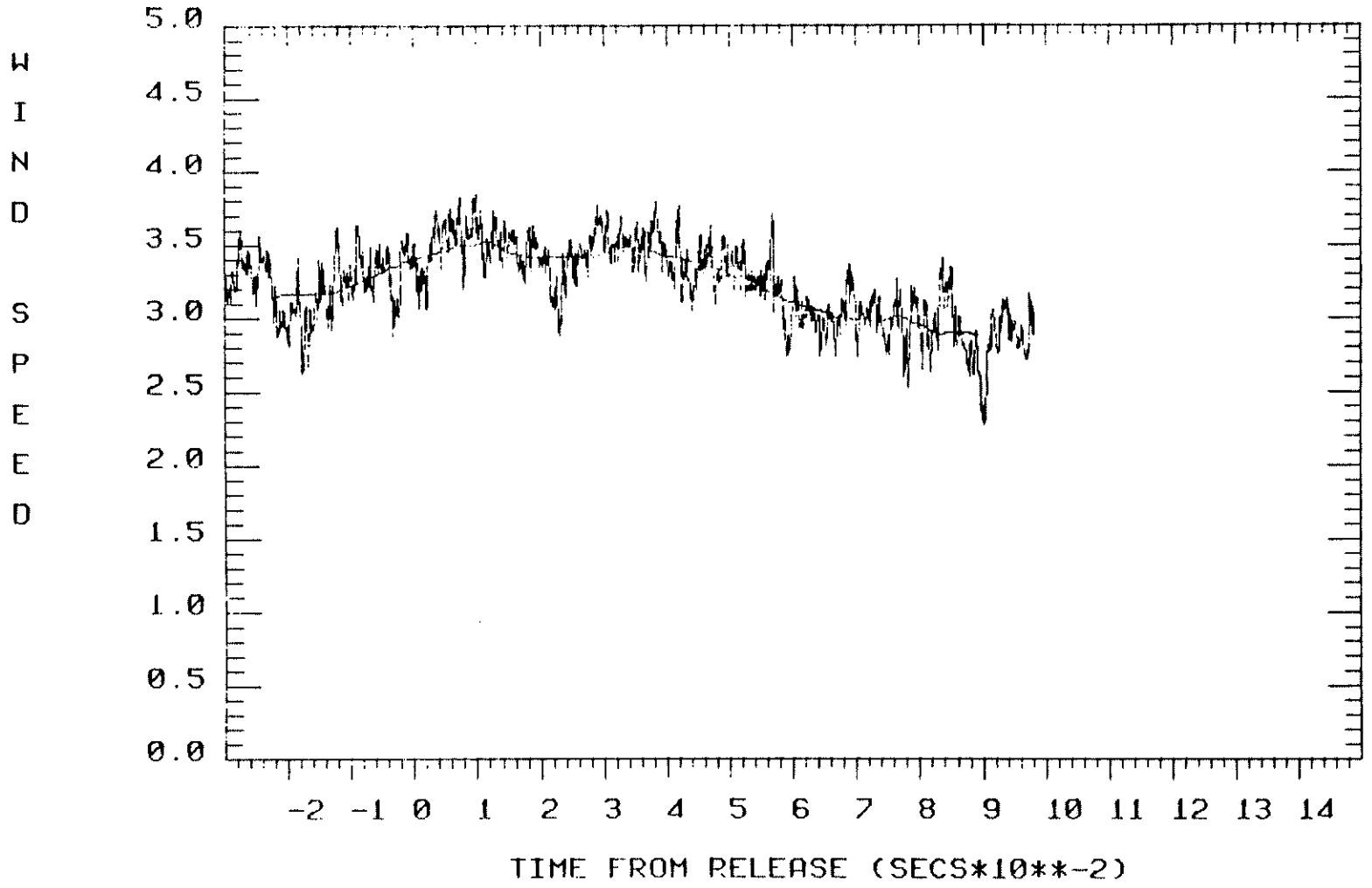


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 14.0 M

MEAN OF RUN UP: 11.27 MEAN OF RUN DOWN: 9.78

E20

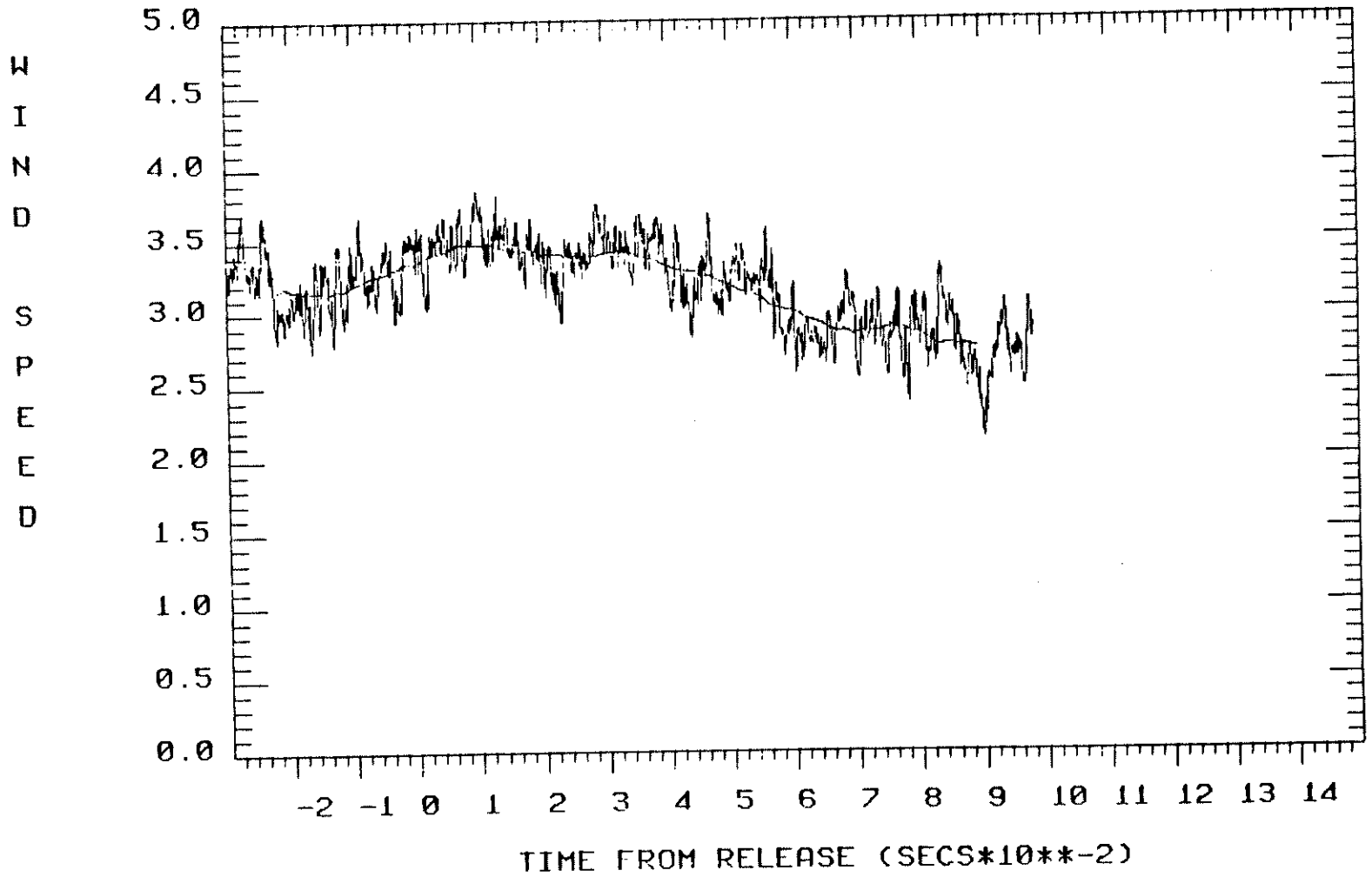


TRIAL: 037 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 17.3 M

MEAN OF RUN UP: 3.75 MEAN OF RUN DOWN: 2.86

E21

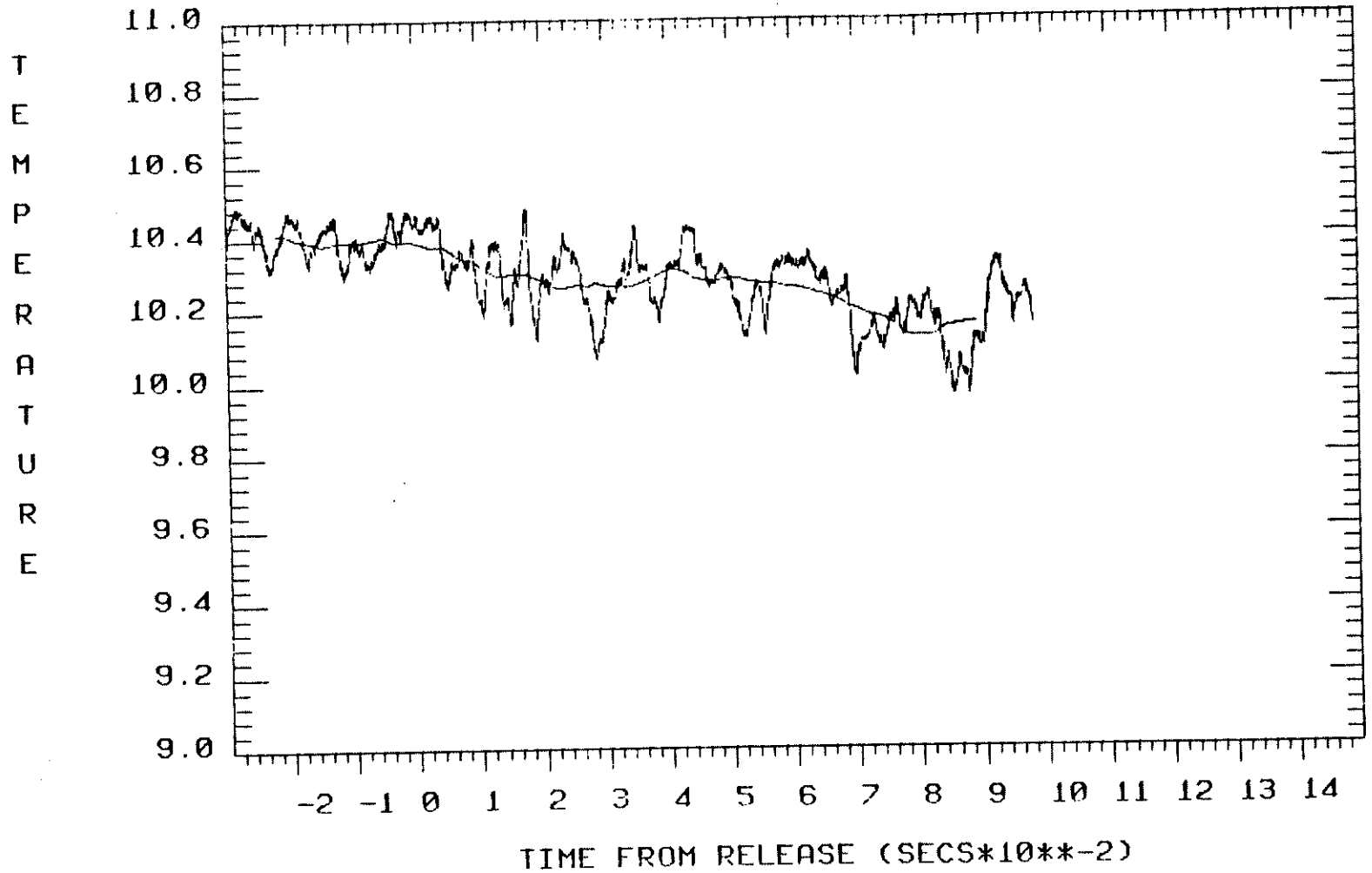


TRIAL: 037 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 20.0 M

MEAN OF RUN UP: 3.69 MEAN OF RUN DOWN: 2.71

E22

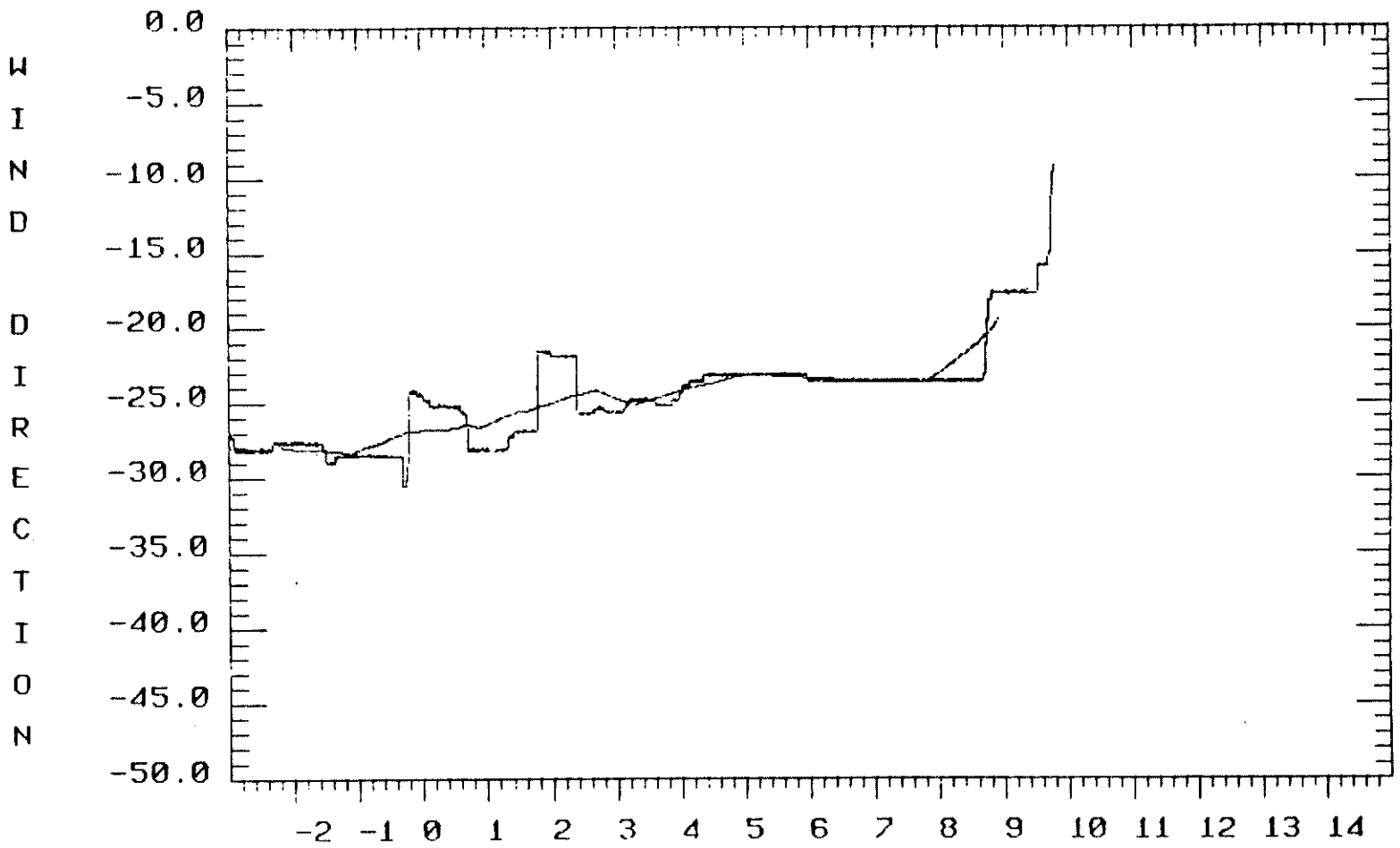


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 20.0 M

MEAN OF RUN UP: 11.45 MEAN OF RUN DOWN: 10.06

E23

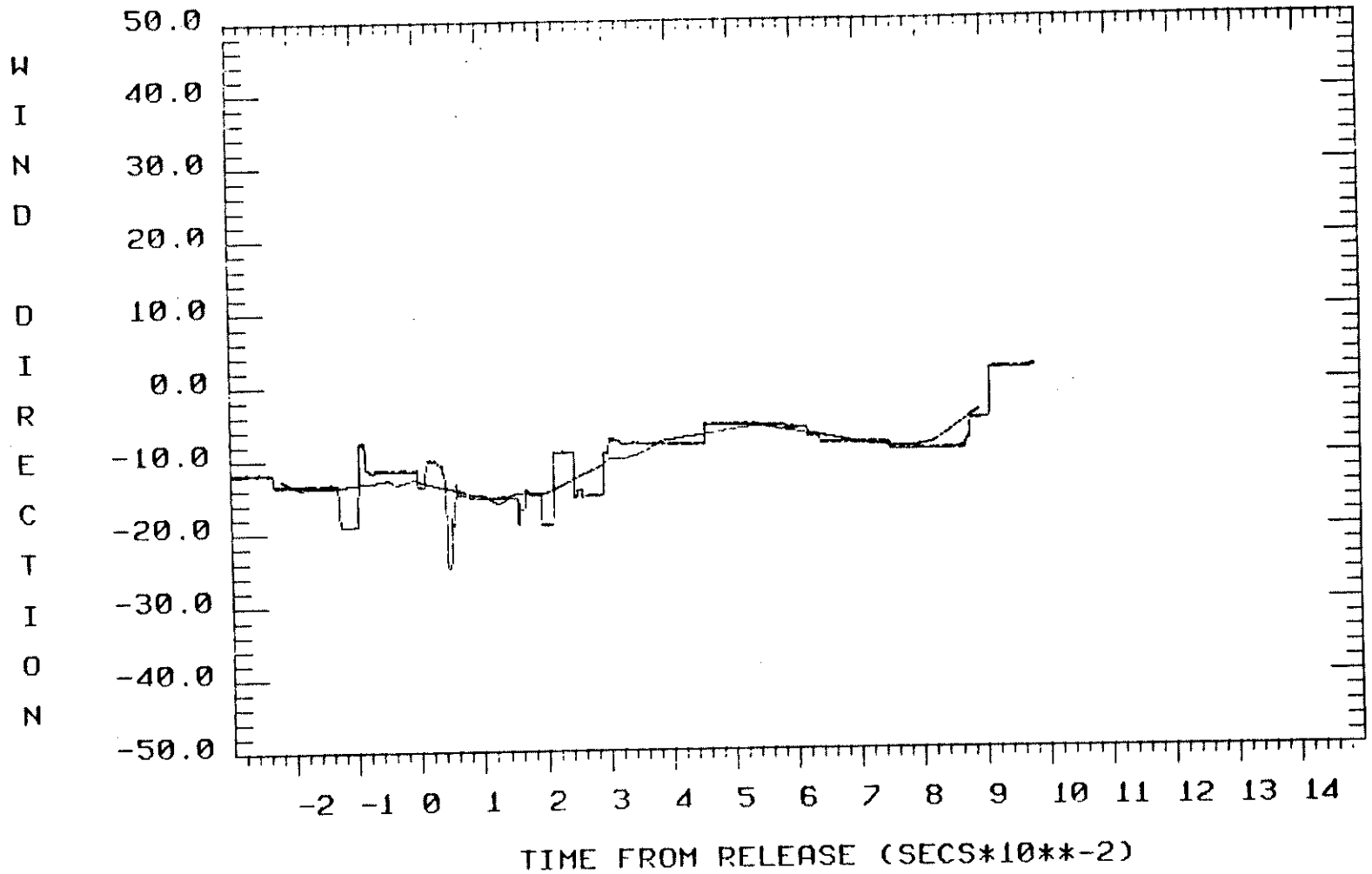


TRIAL: 037 TYPE: WHDG UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 420 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: -22.09 MEAN OF RUN DOWN: -9.04

E24

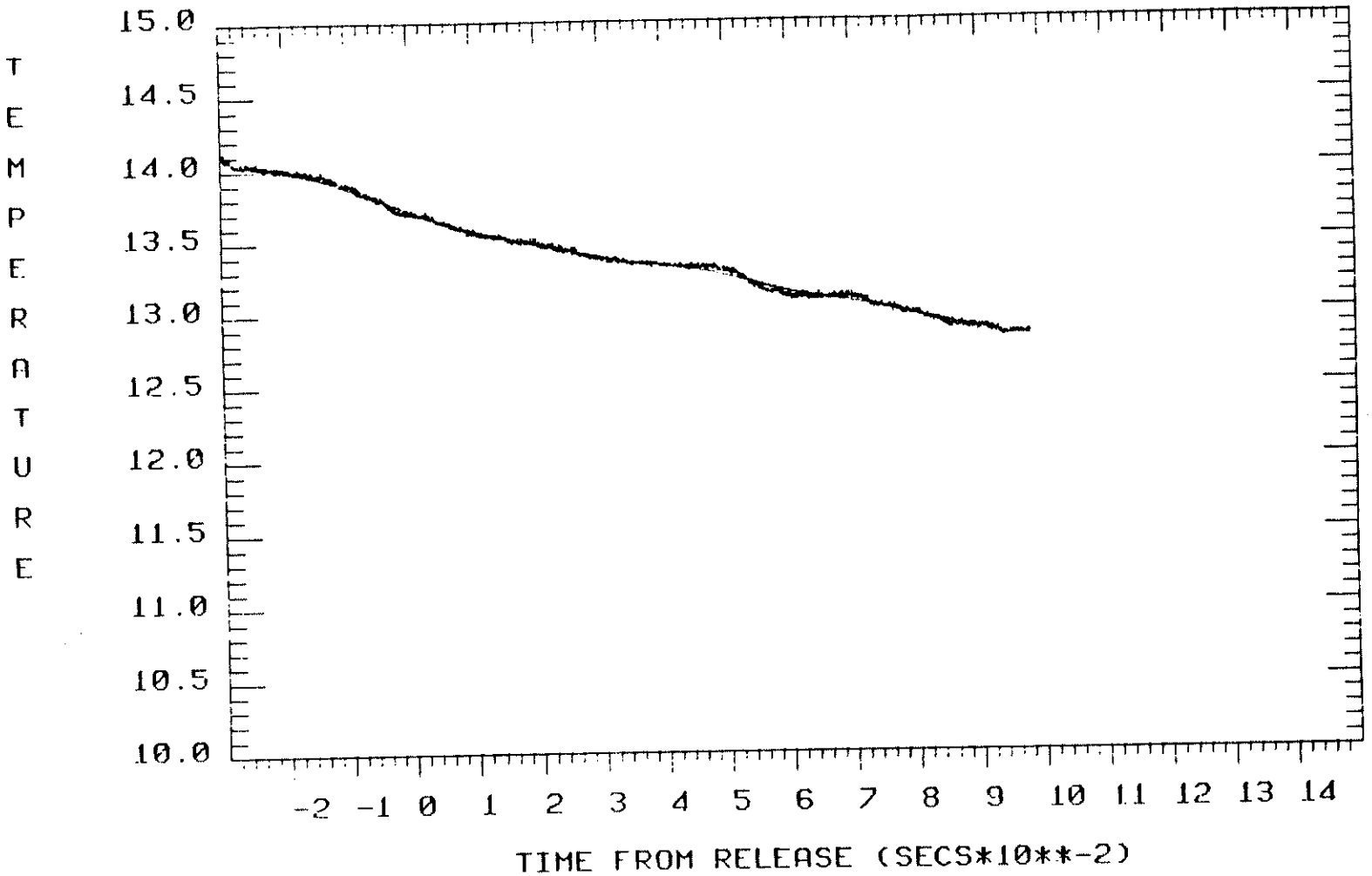


TRIAL: 037 TYPE: WHDG UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 400 M Y: 150 M Z: 10.0 M

MEAN OF RUN UP: -9.68 MEAN OF RUN DOWN: 5.77

E25

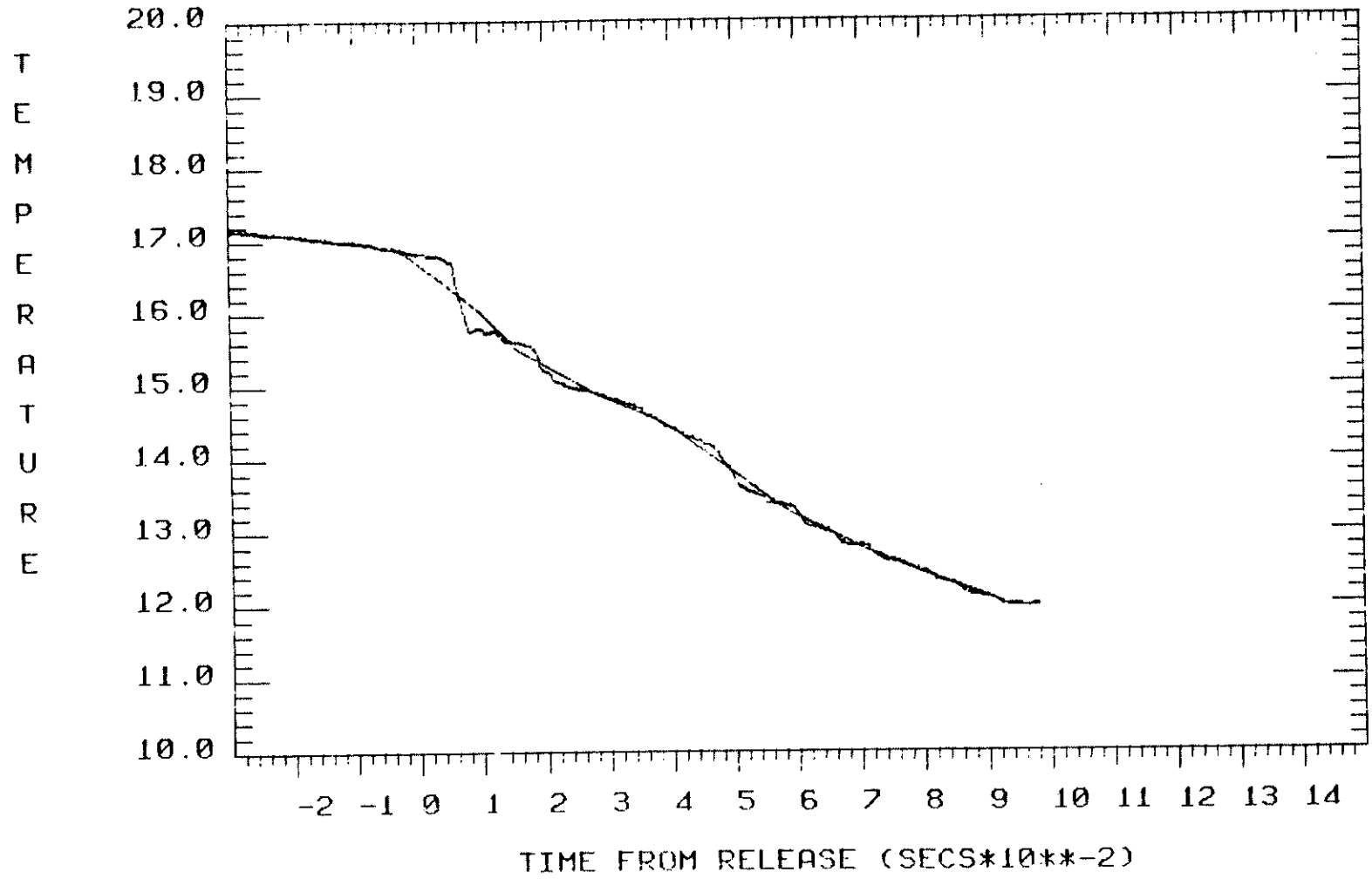


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 200 M Z: 0.4 M

MEAN OF RUN UP: 17.52 MEAN OF RUN DOWN: 12.20

E26

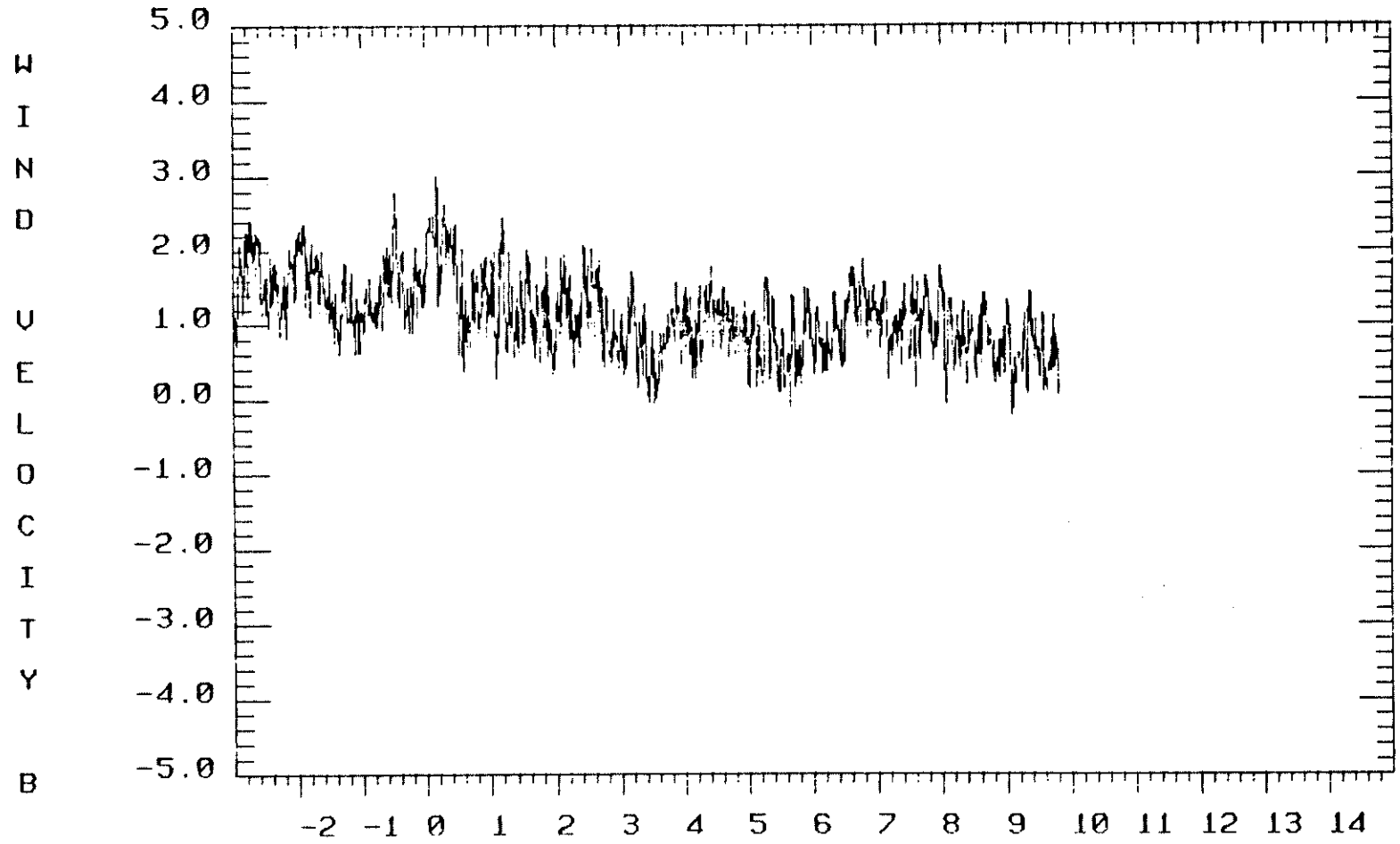


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 200 M Z: 12.0 M

MEAN OF RUN UP: 20.24 MEAN OF RUN DOWN: 11.29

E27

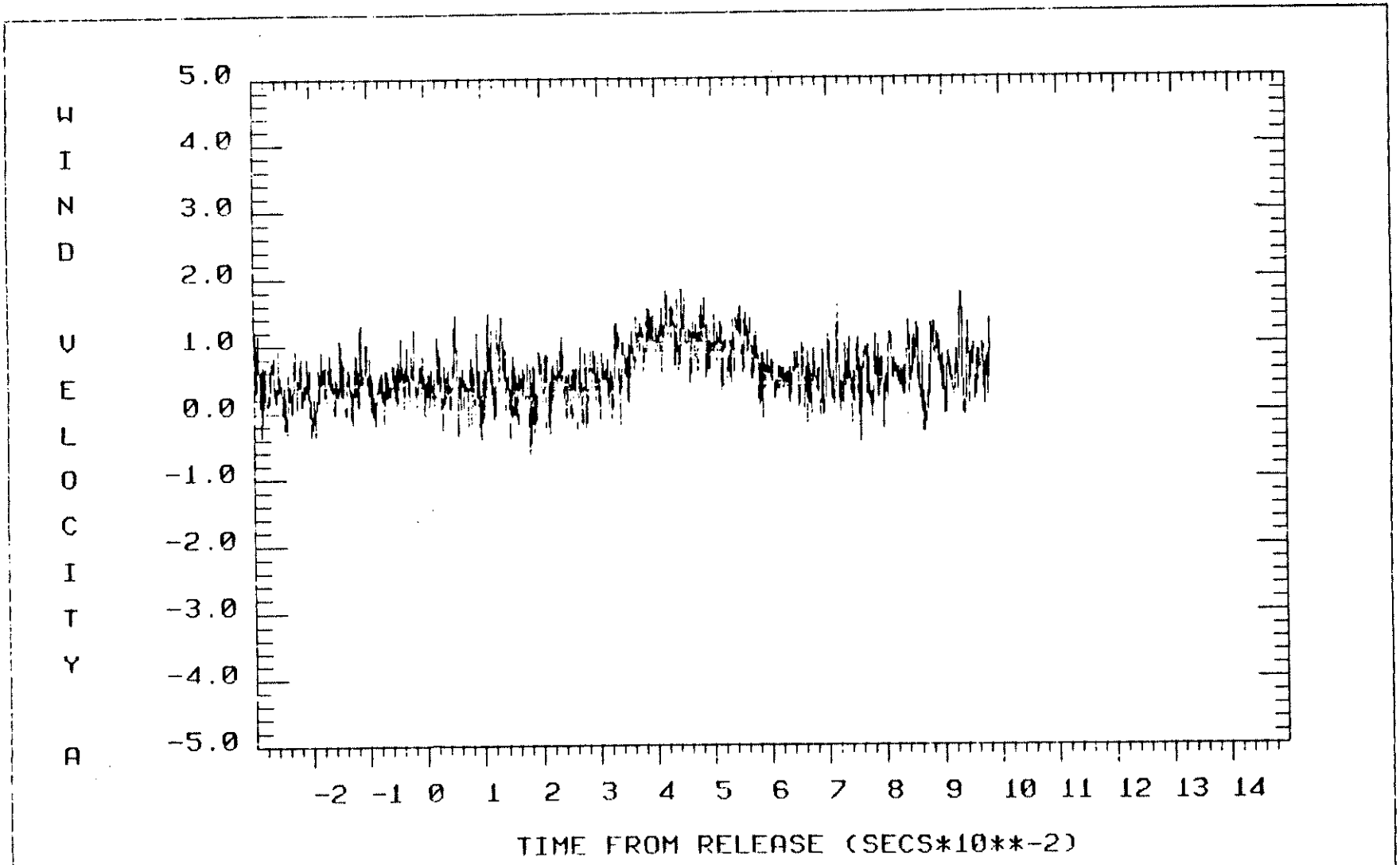


TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: **1.0** M

MEAN OF RUN UP: 1.90 MEAN OF RUN DOWN: 0.81

E28

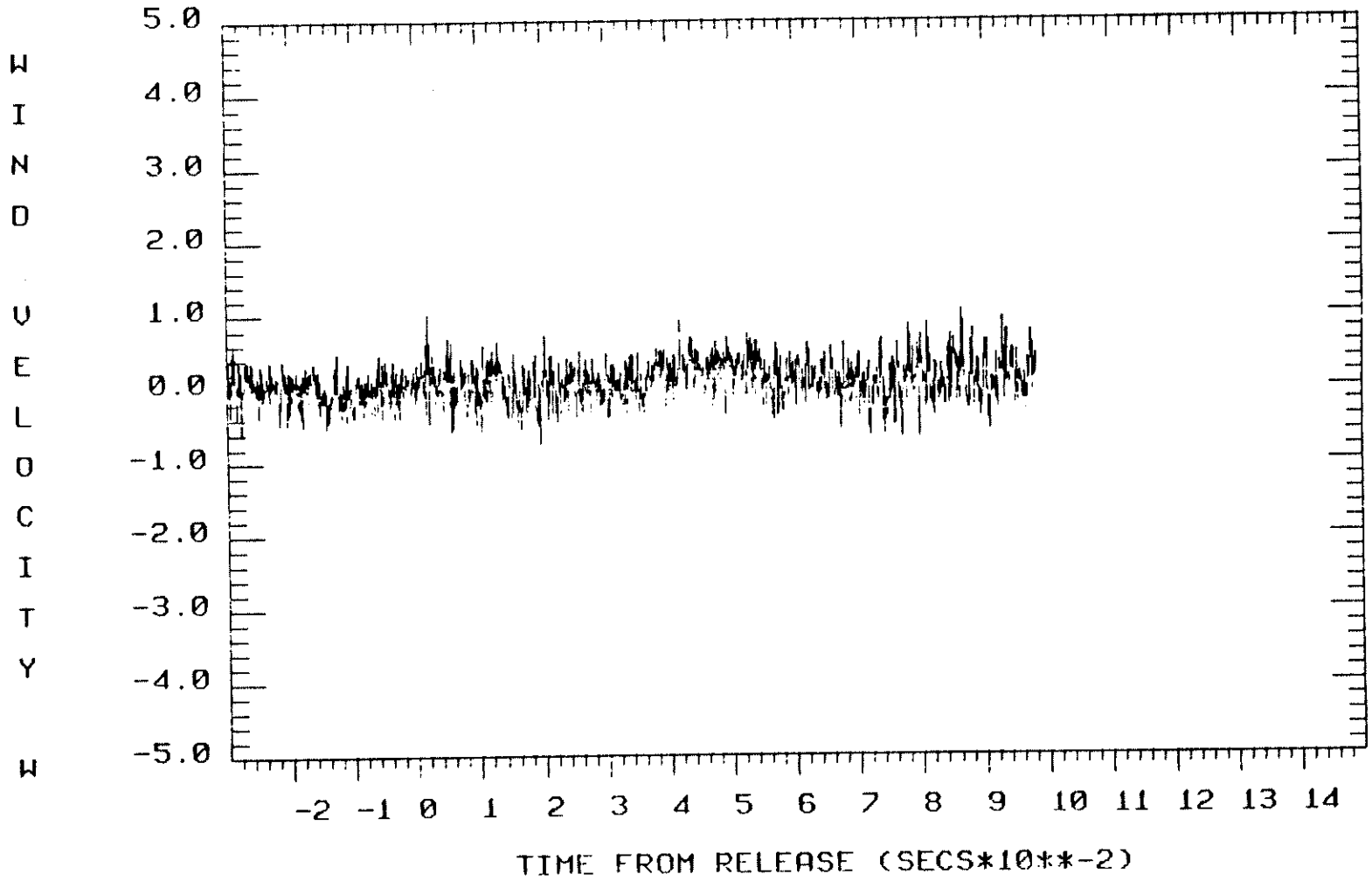


TRIAL: 037 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: **1.0** M

MEAN OF RUN UP: 0.46 MEAN OF RUN DOWN: 0.67

E29

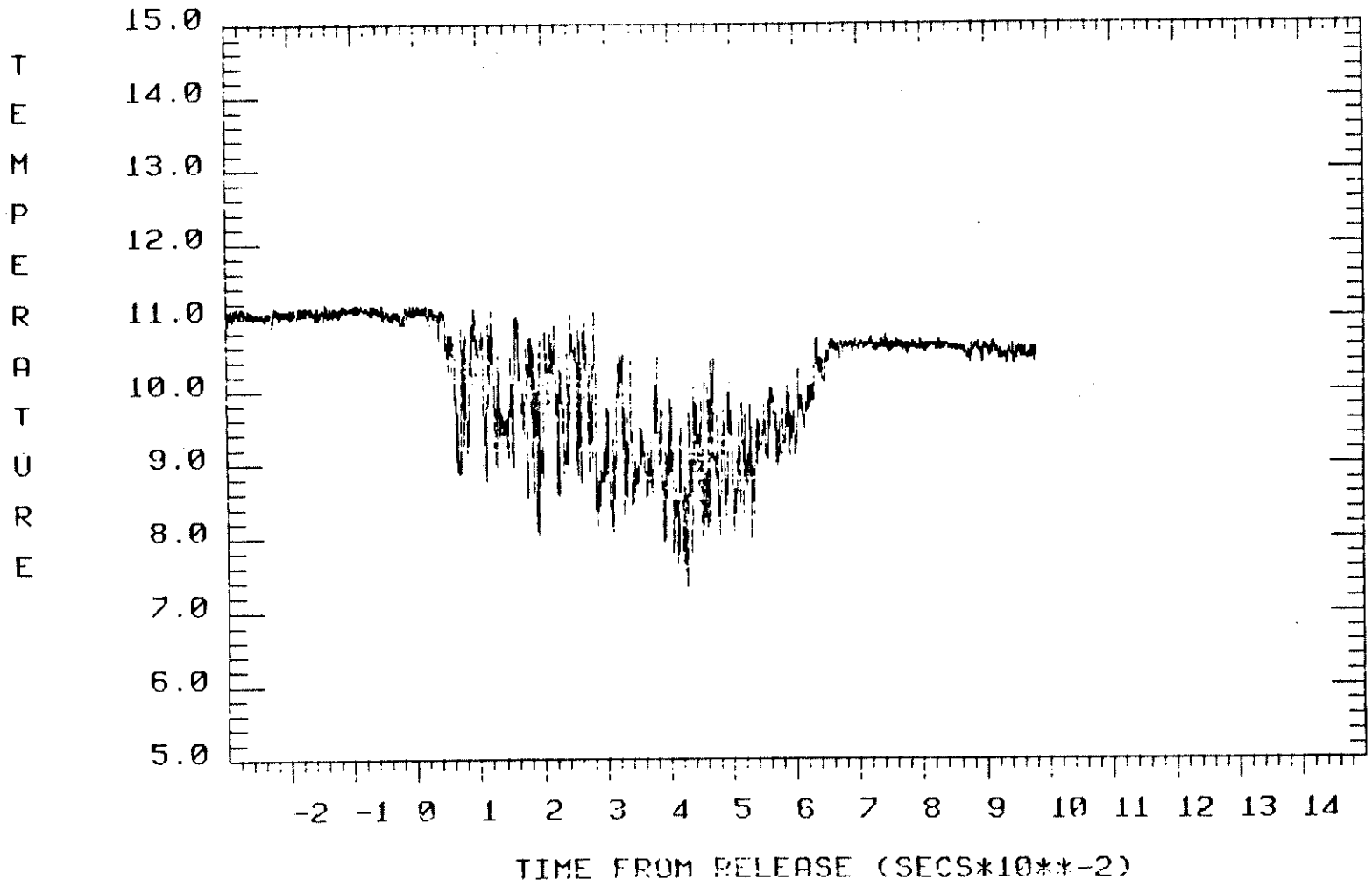


TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: **1.0** M

MEAN OF RUN UP: 0.00 MEAN OF RUN DOWN: 0.05

E30

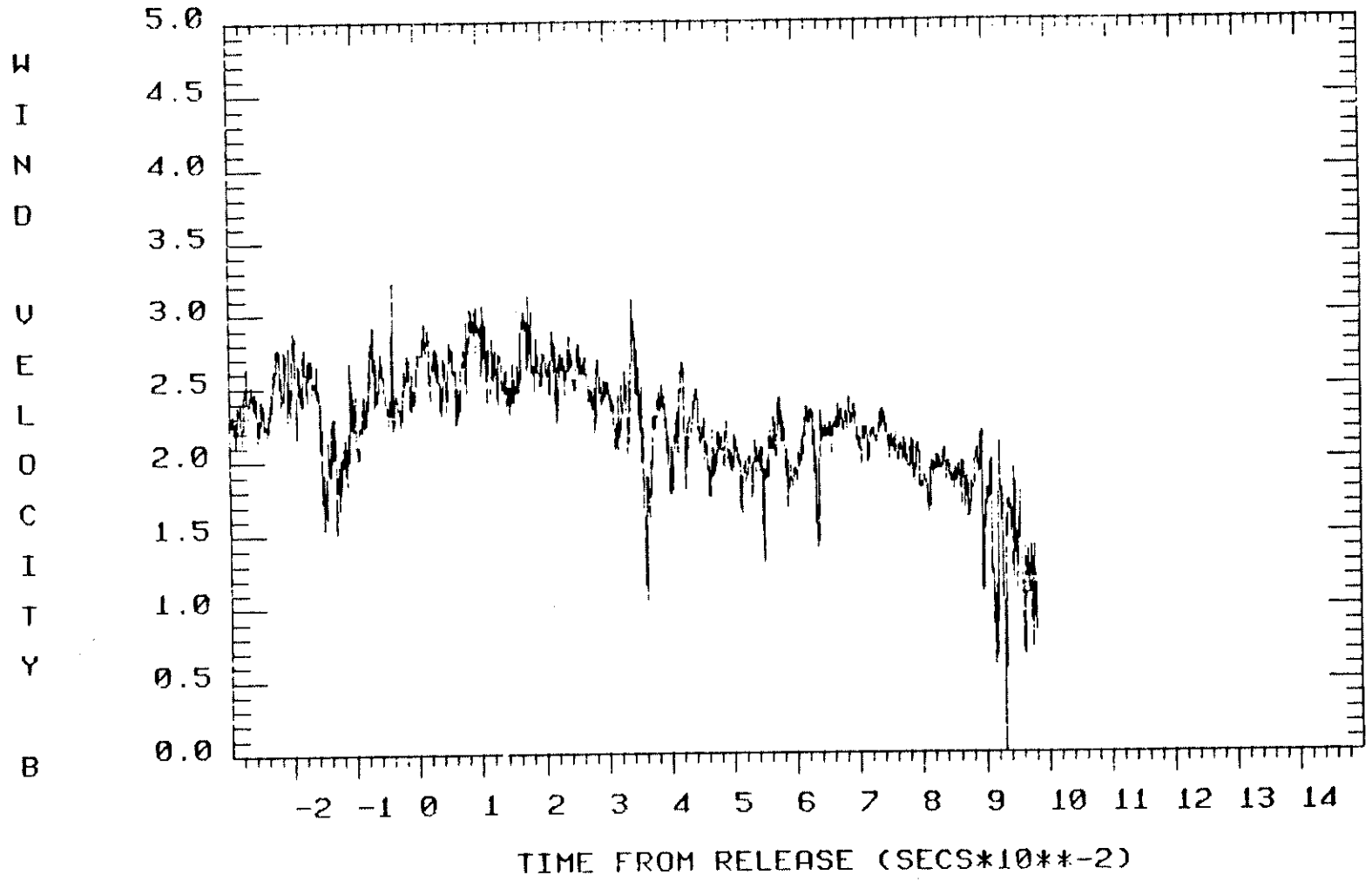


TRIAL: 037 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: **1.0** M

MEAN OF RUN UP: 13.05 MEAN OF RUN DOWN: 10.49

E31

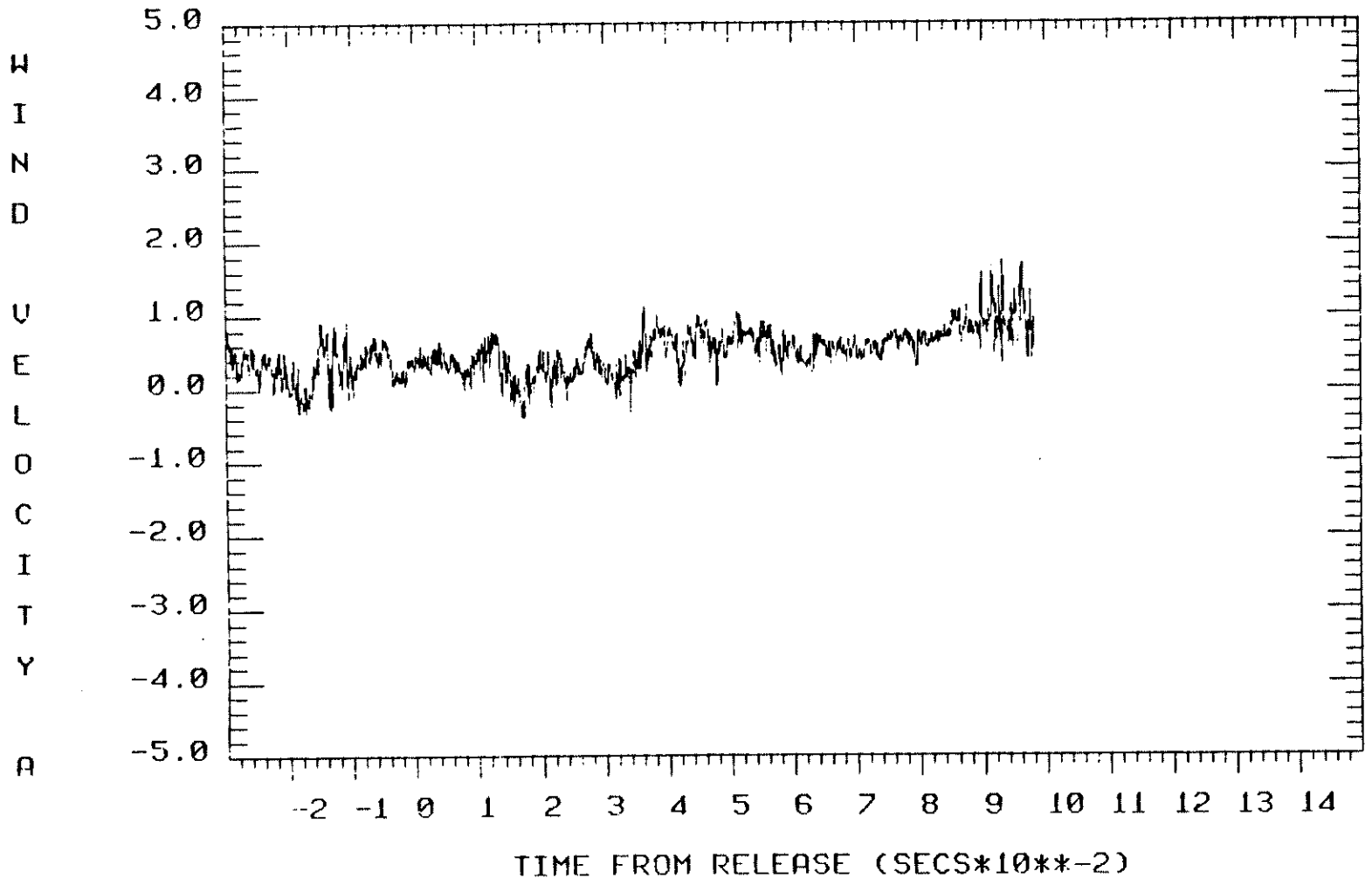


TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 2.68 MEAN OF RUN DOWN: 1.61

E32

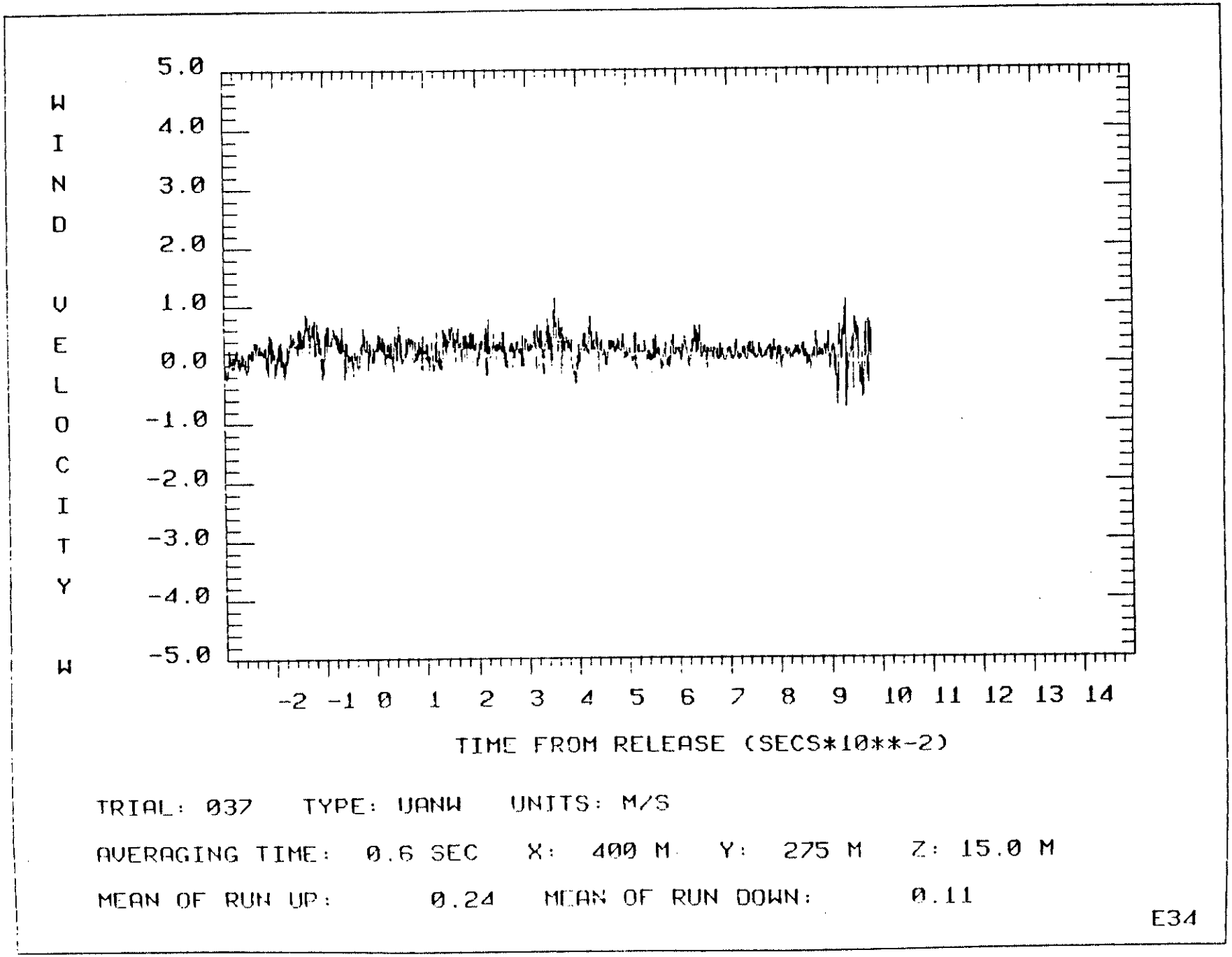


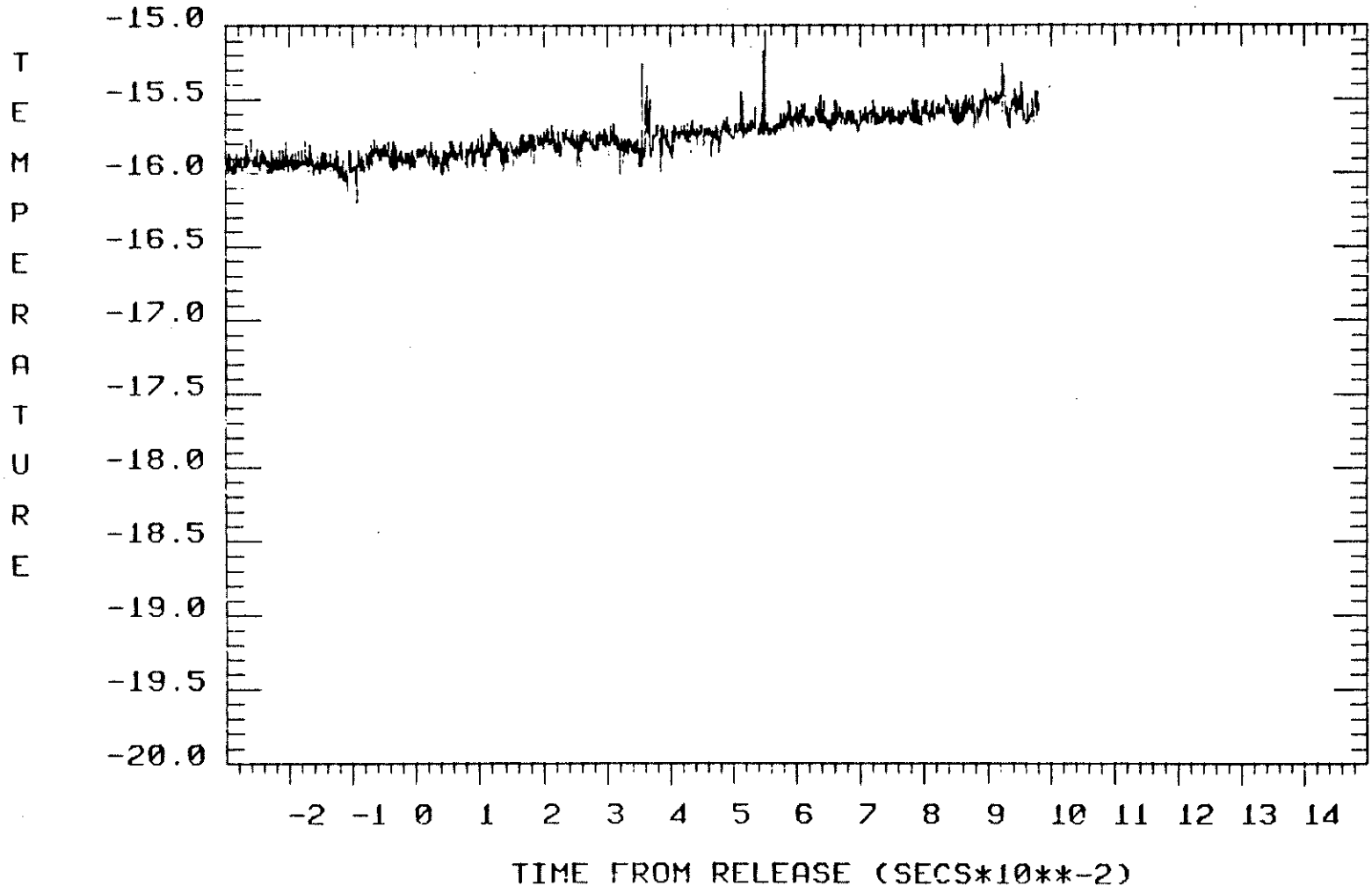
TRIAL: 037 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 0.50 MEAN OF RUN DOWN: 0.92

E33


WIND VELOCITY W
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: UANW UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 400 M Y: 275 M Z: 15.0 M
MEAN OF RUN UP: 0.24 MEAN OF RUN DOWN: 0.11
E34

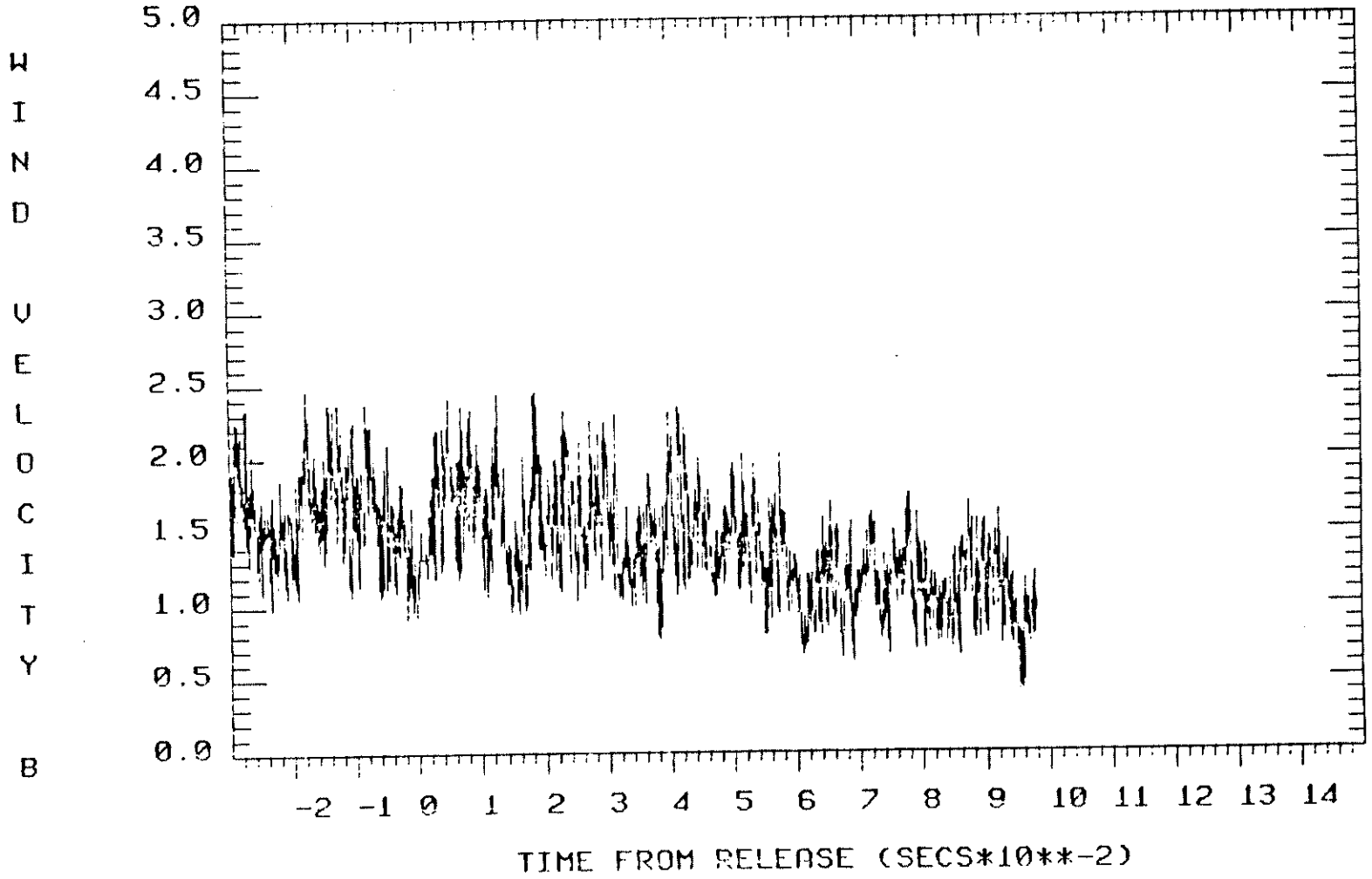


TRIAL: 037 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 255 M Z: 15.0 M

MEAN OF RUN UP: -17.19 MEAN OF RUN DOWN: -15.48

E35

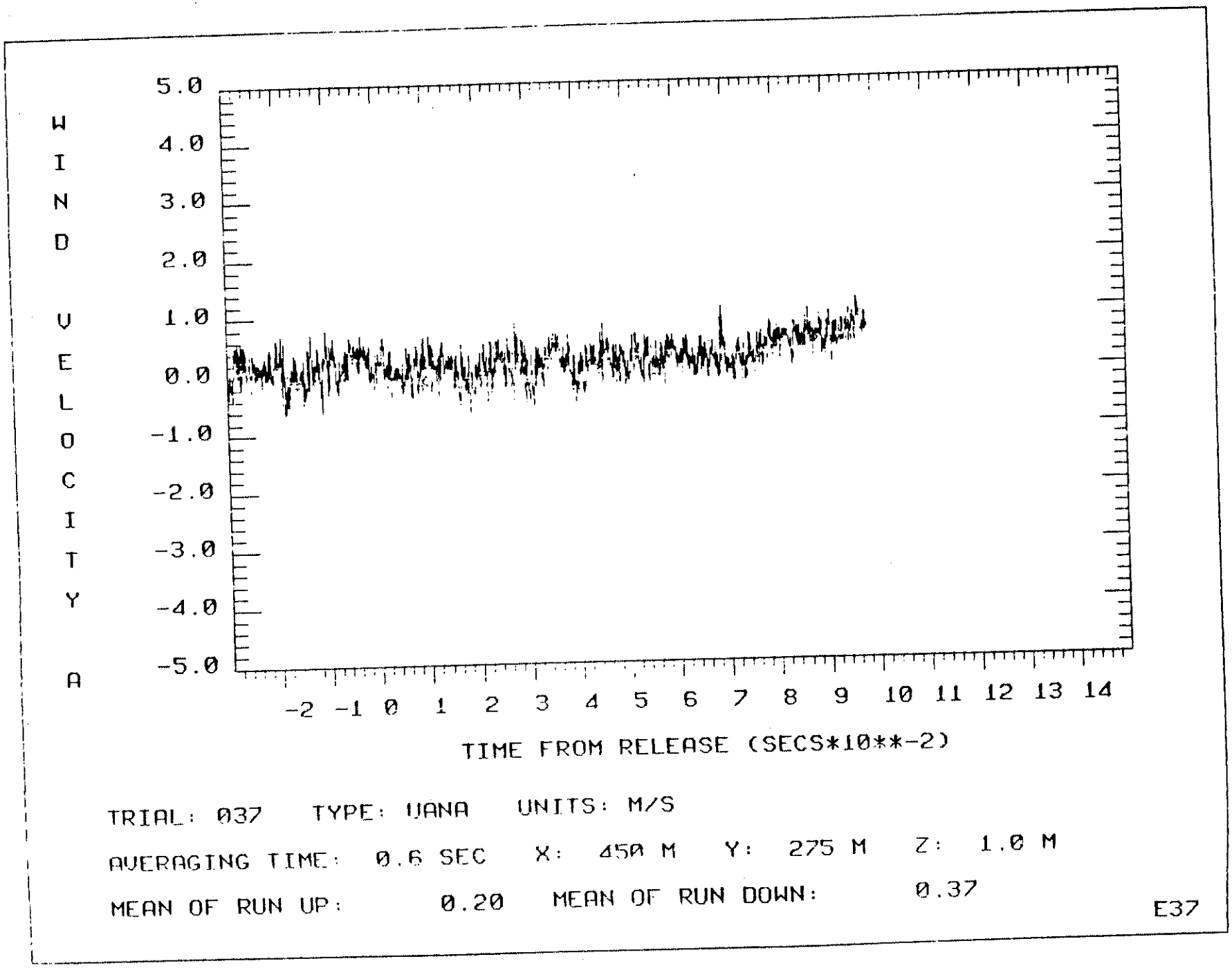


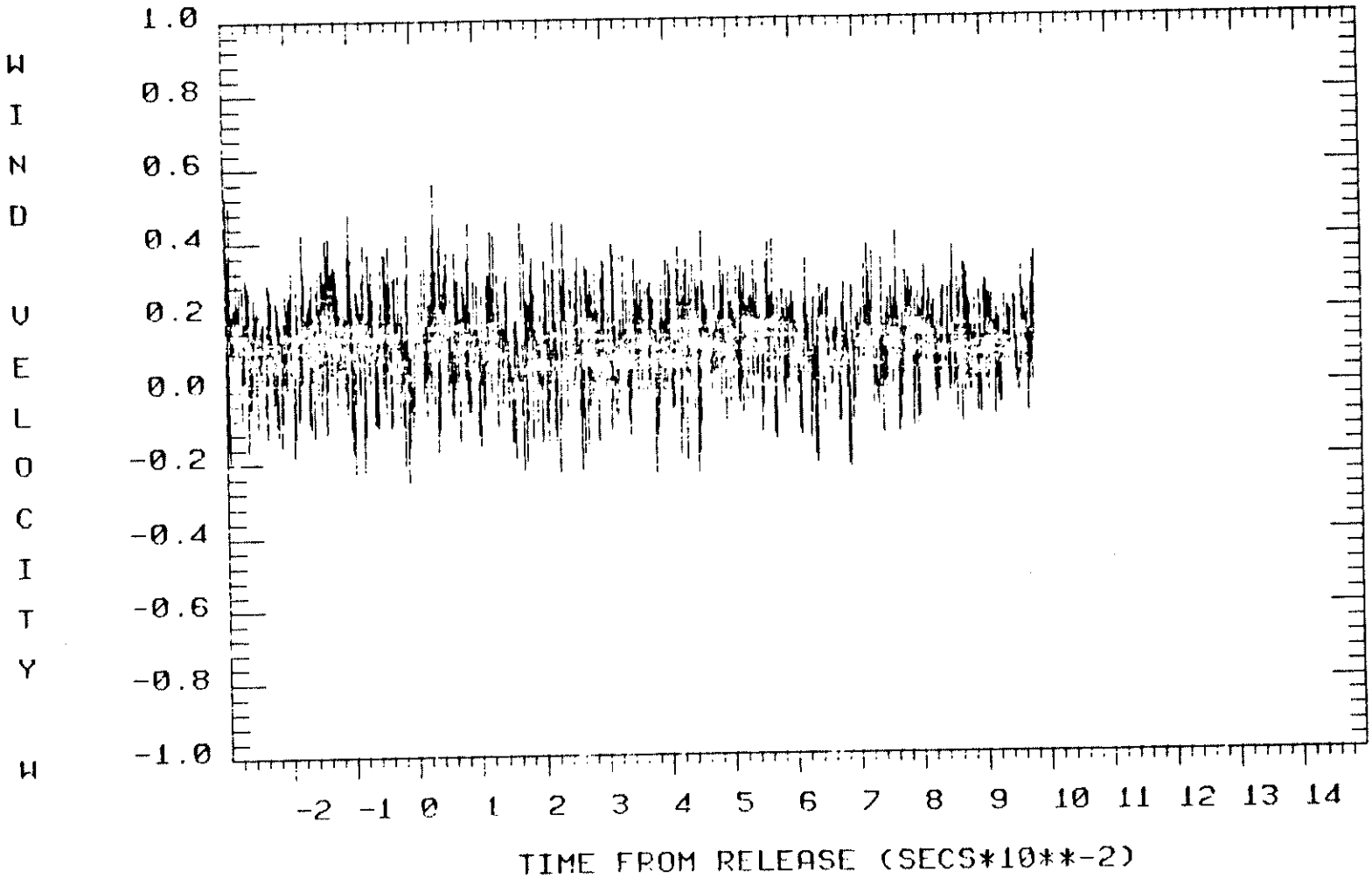
TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP: 1.95 MEAN OF RUN DOWN: 1.18

E36

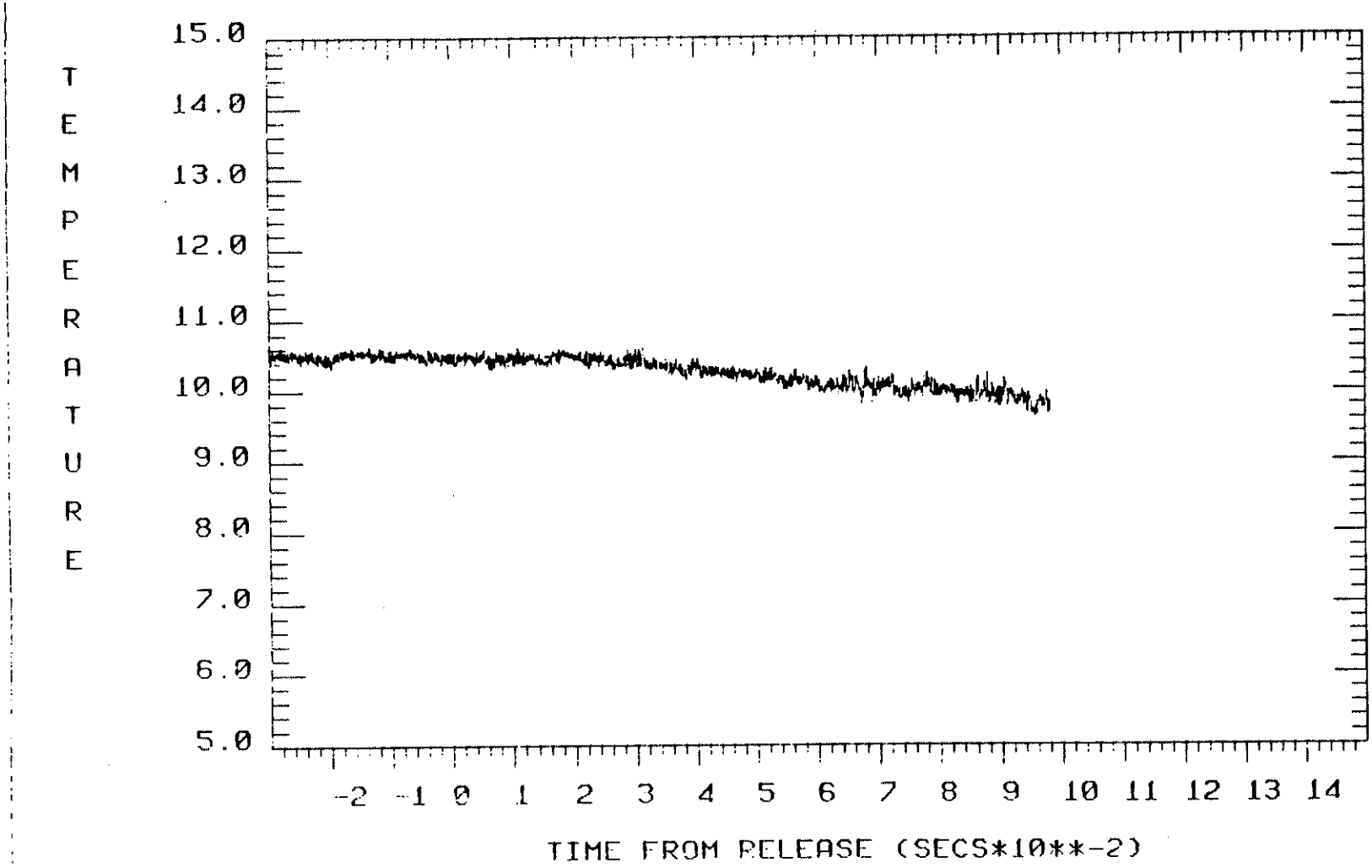

WIND VELOCITY A
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: UANA UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 1.0 M
MEAN OF RUN UP: 0.20 MEAN OF RUN DOWN: 0.37
E37



TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP: 0.10 MEAN OF RUN DOWN: 0.10

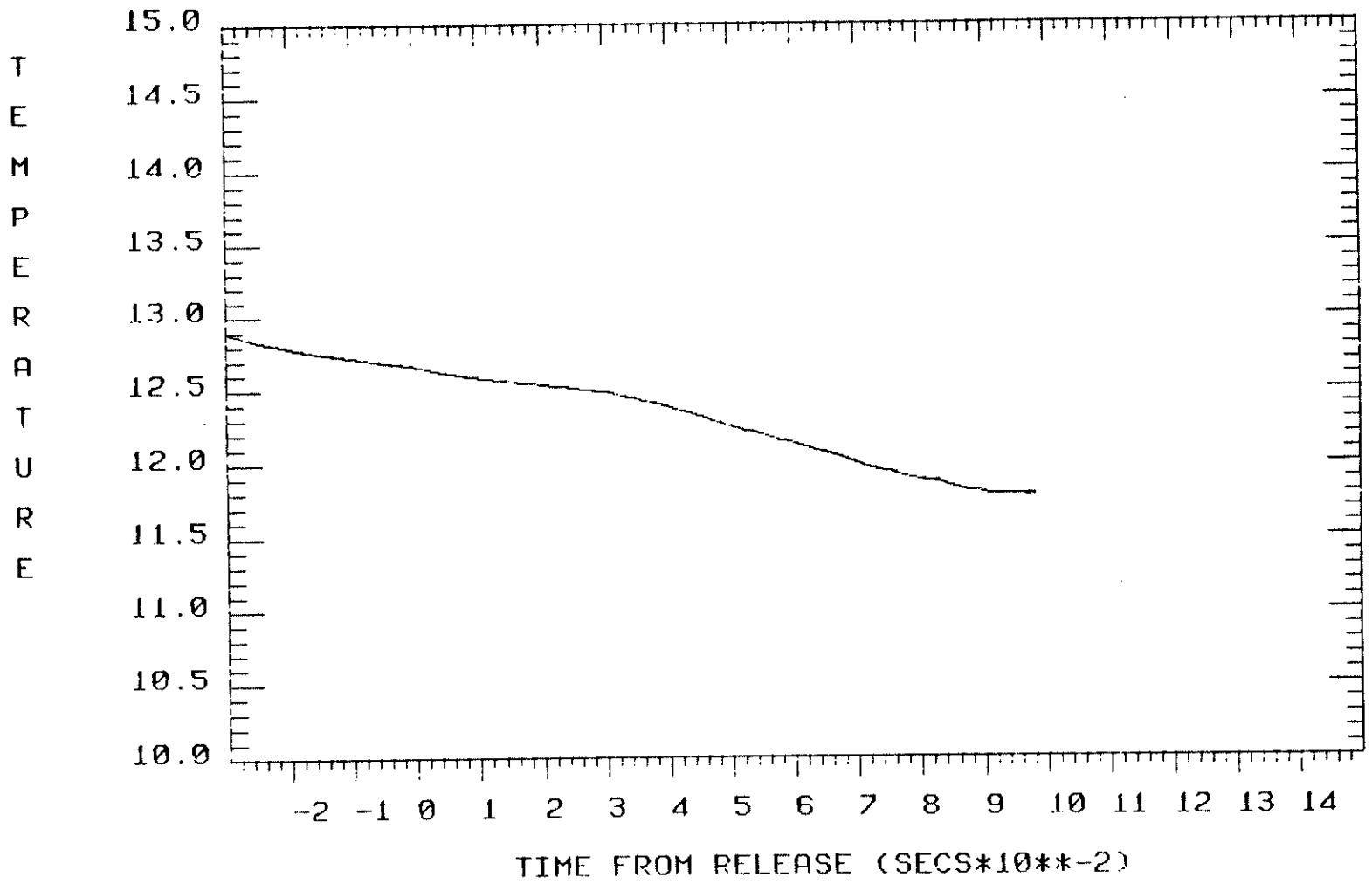


TRIAL: 037 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP: 12.98 MEAN OF RUN DOWN: 9.83

E39

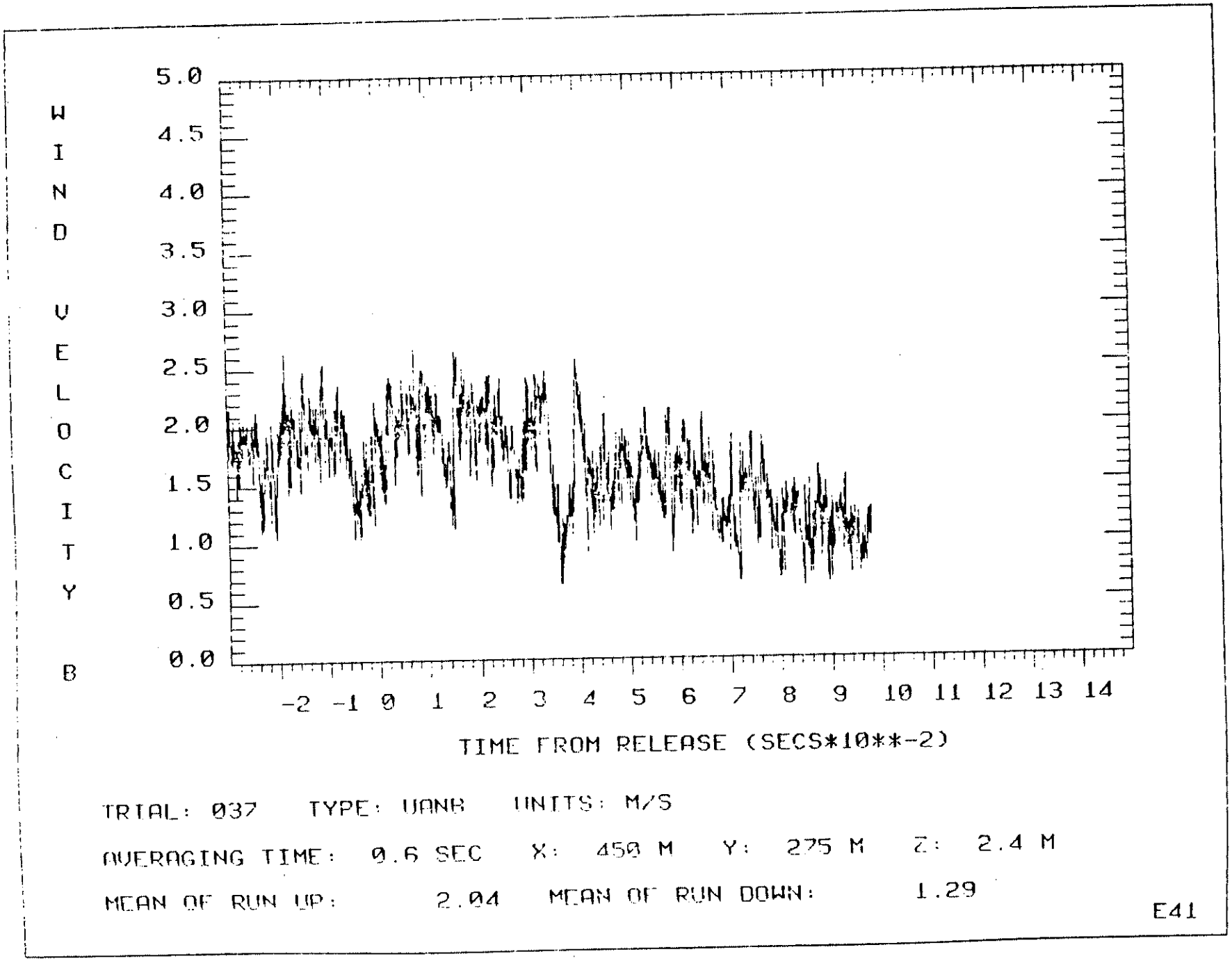


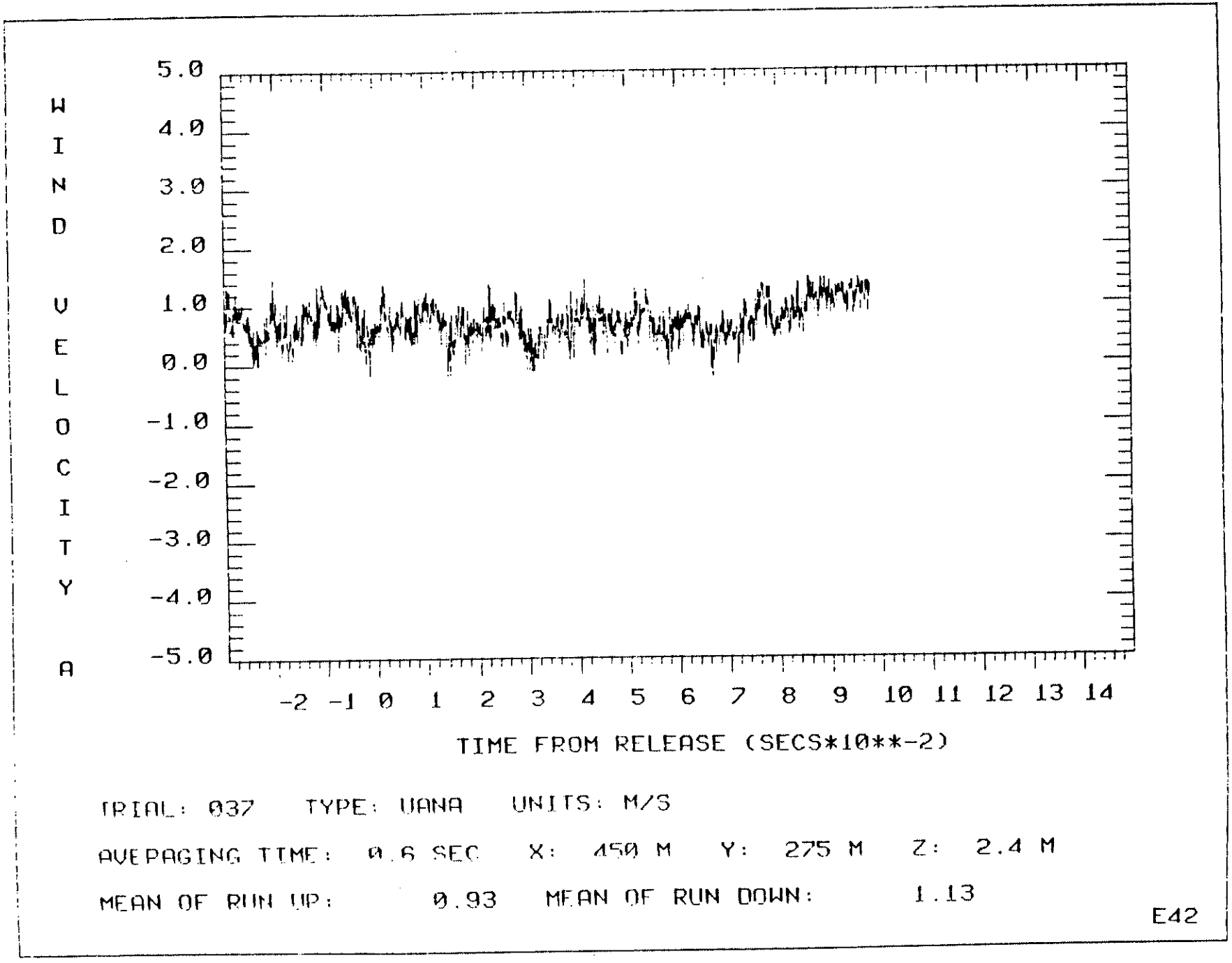
TRIAL: 037 TYPE: TEMP UNITS: DEGREES C

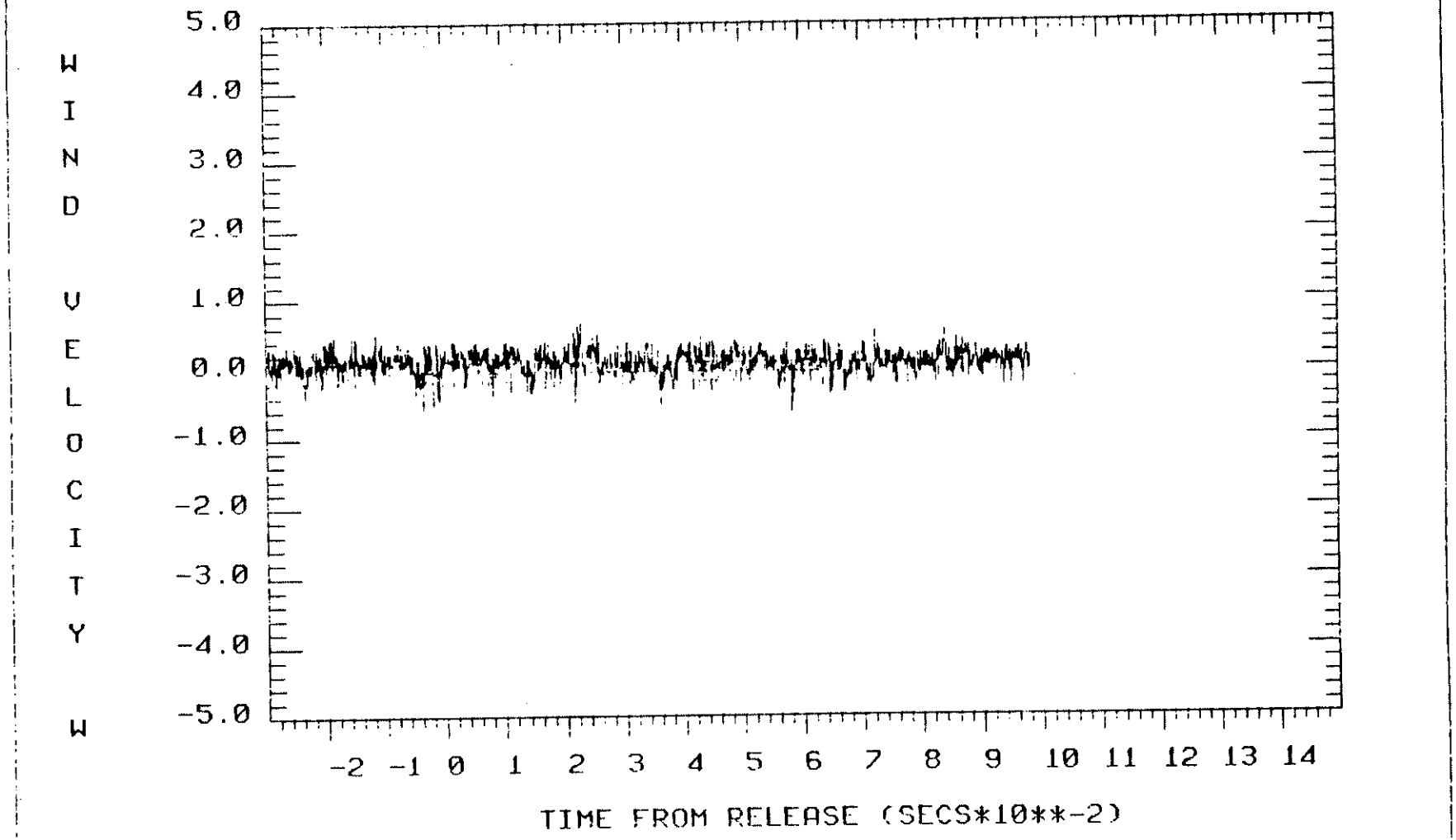
AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP. 22.19 MEAN OF RUN DOWN: 13.06

E40


WIND VELOCITY B
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: UANB UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 2.4 M
MEAN OF RUN UP: 2.04 MEAN OF RUN DOWN: 1.29
E41


WIND VELOCITY
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: UANA UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 2.4 M
MEAN OF RUN UP: 0.93 MEAN OF RUN DOWN: 1.13
E42

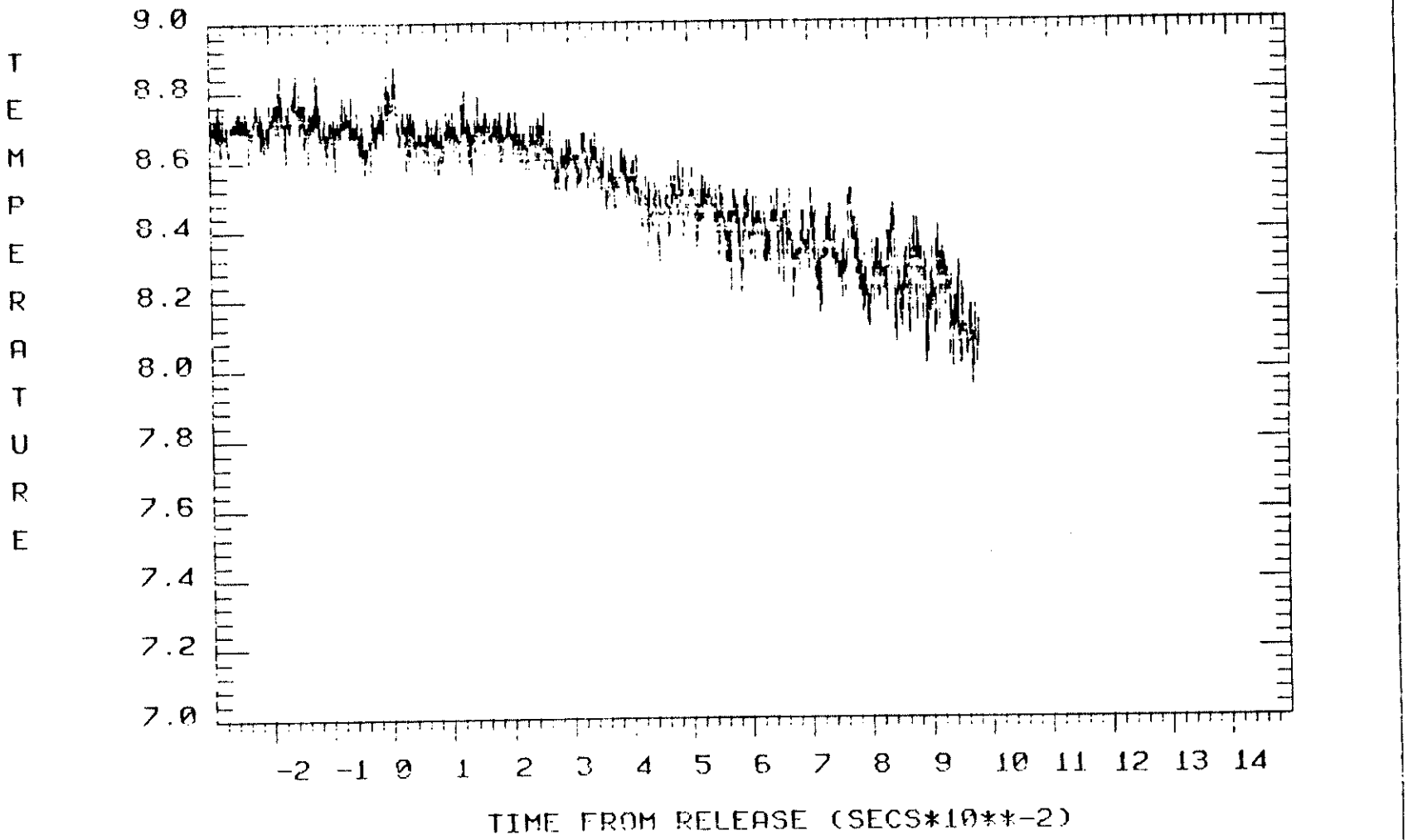


TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 2.4 M

MEAN OF RUN UP: 0.06 MEAN OF RUN DOWN: 0.10

E43

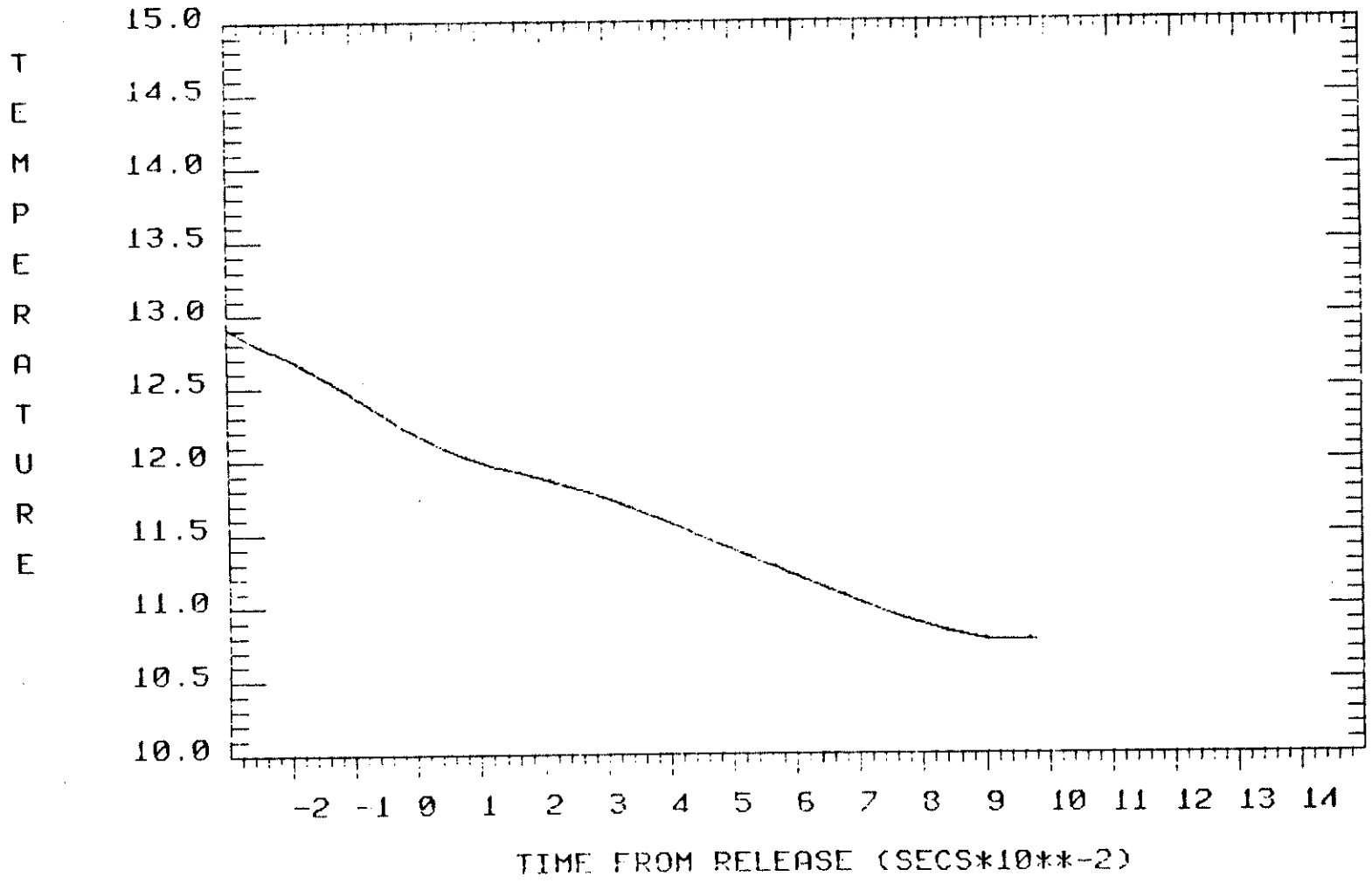


TRIAL: 037 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 2.4 M

MEAN OF RUN UP: 10.37 MEAN OF RUN DOWN: 8.13

E44

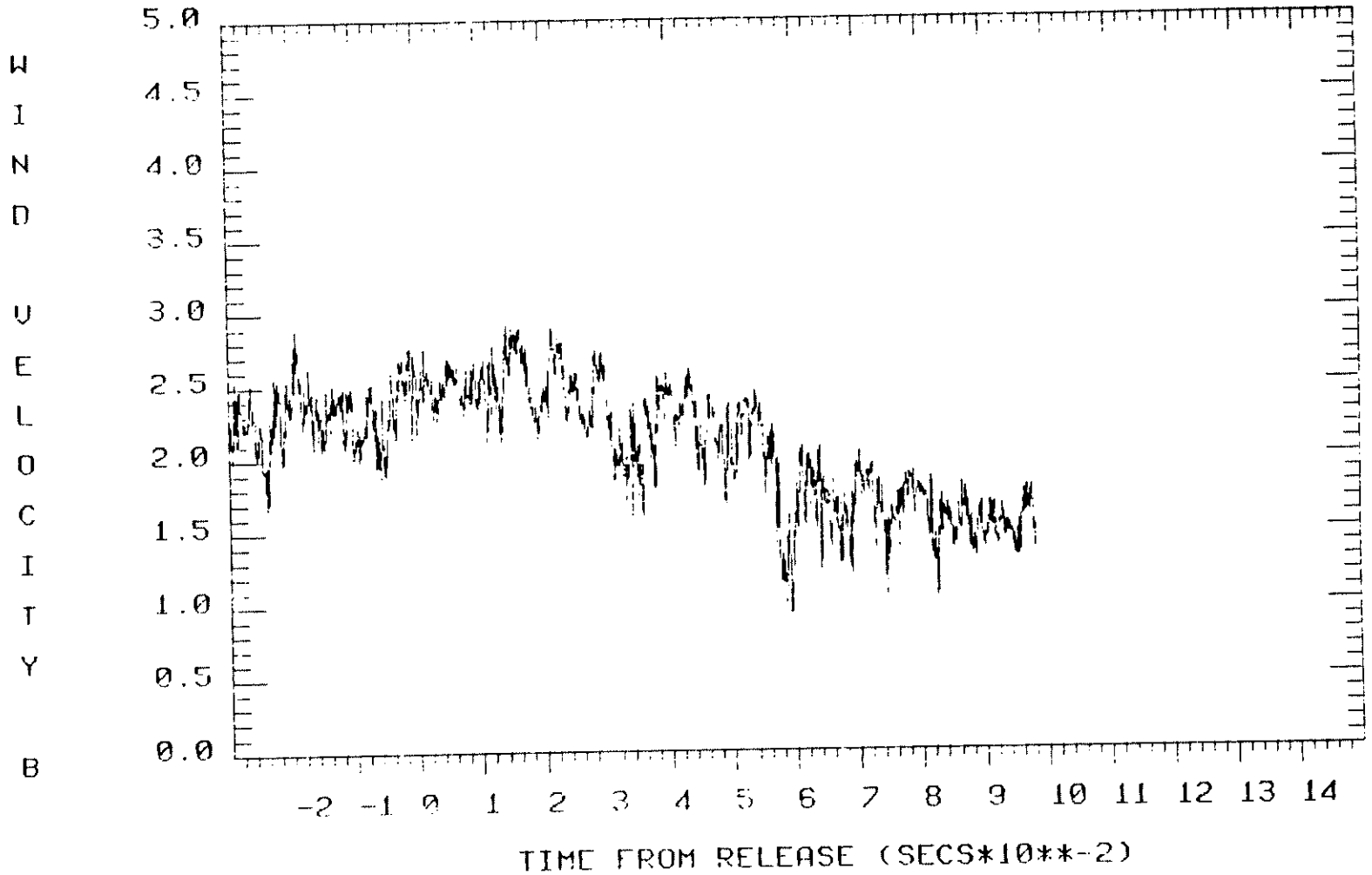


TRIAL: 037 TYPE: TEMP UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 2.4 M

MEAN OF RUN UP: 24.43 MEAN OF RUN DOWN: 13.06

E45

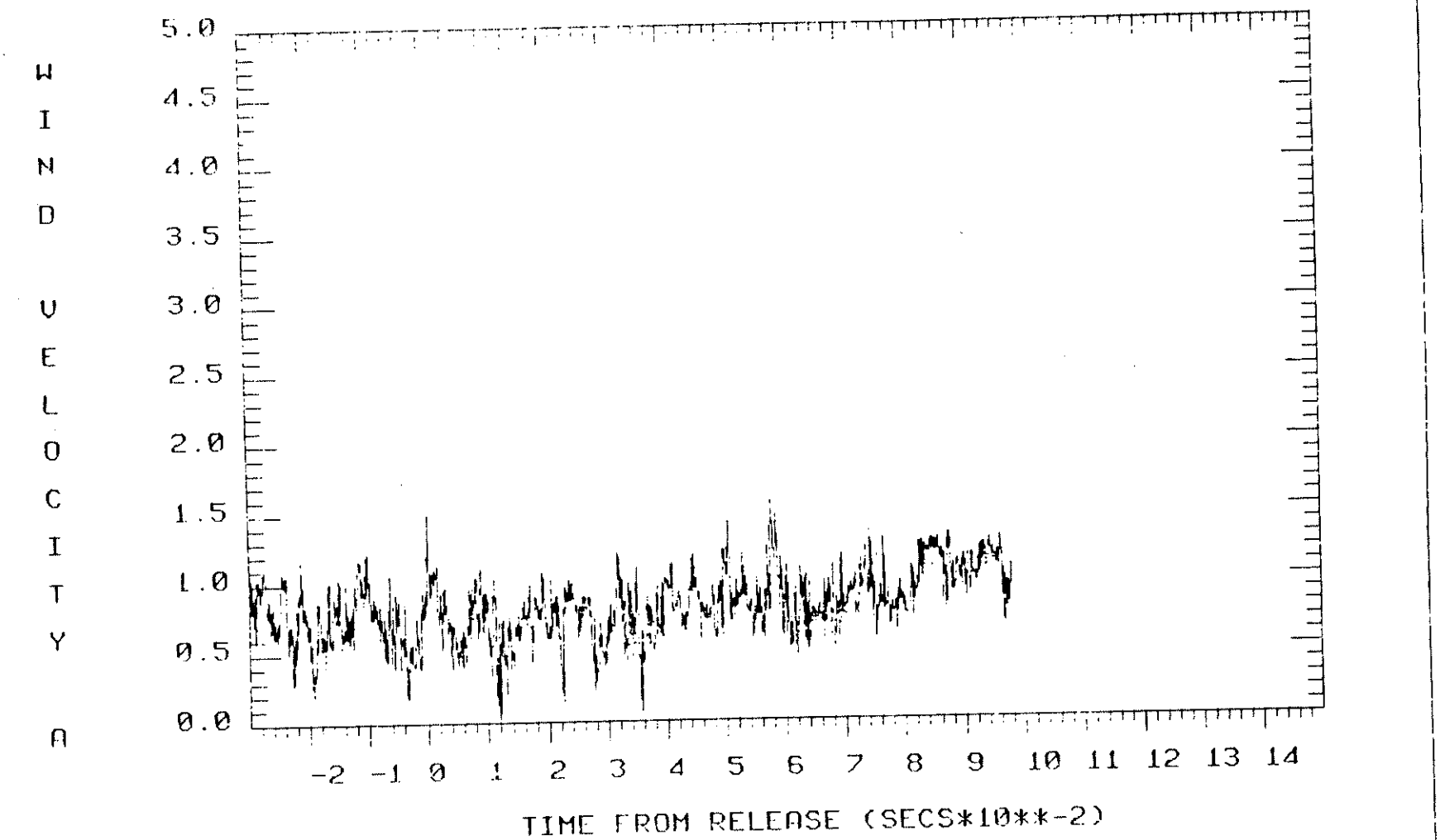


TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 2.48 MEAN OF RUN DOWN: 1.49

E46

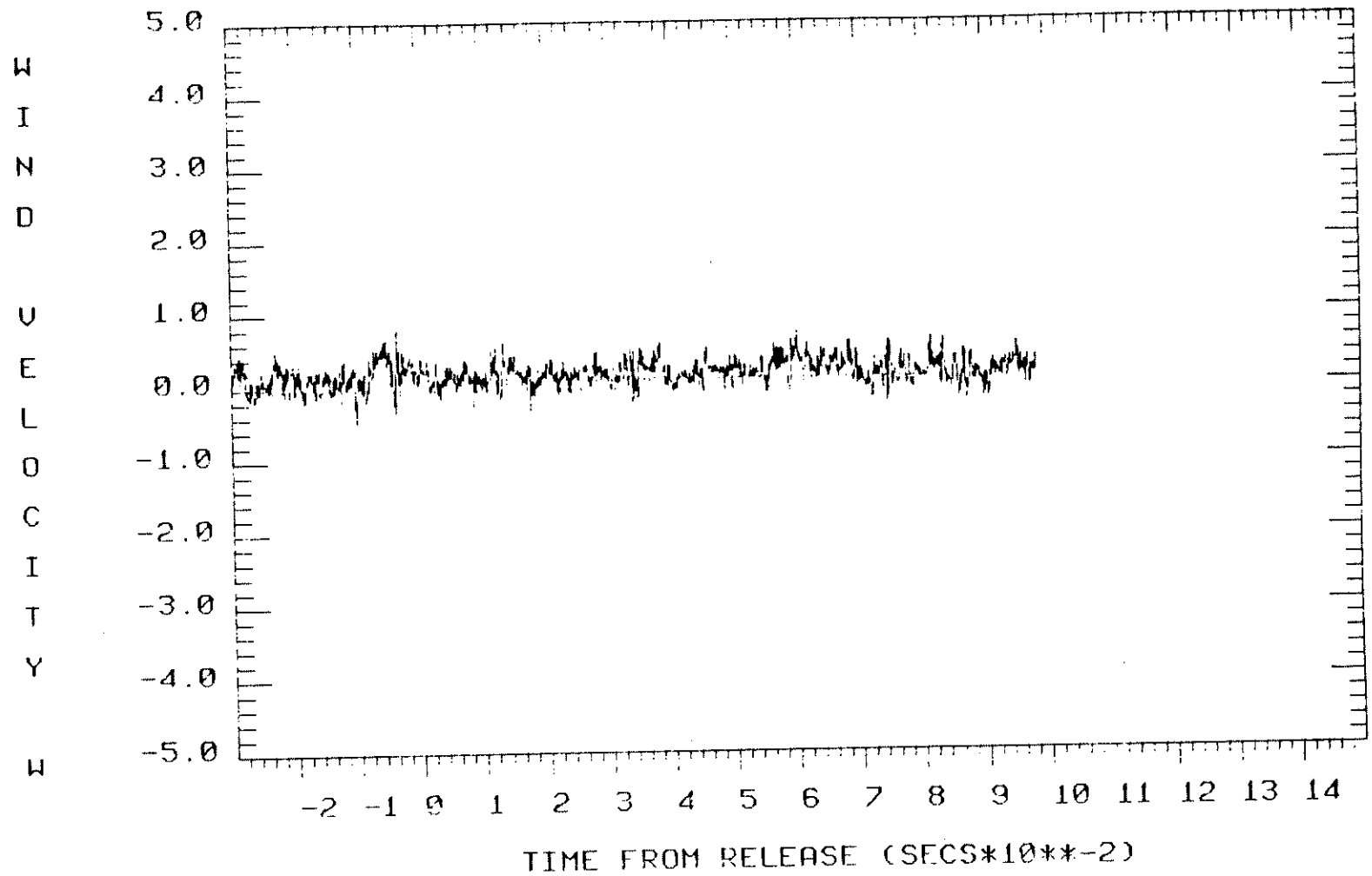


TRIAL: 037 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 0.91 MEAN OF RUN DOWN: 1.28

E47

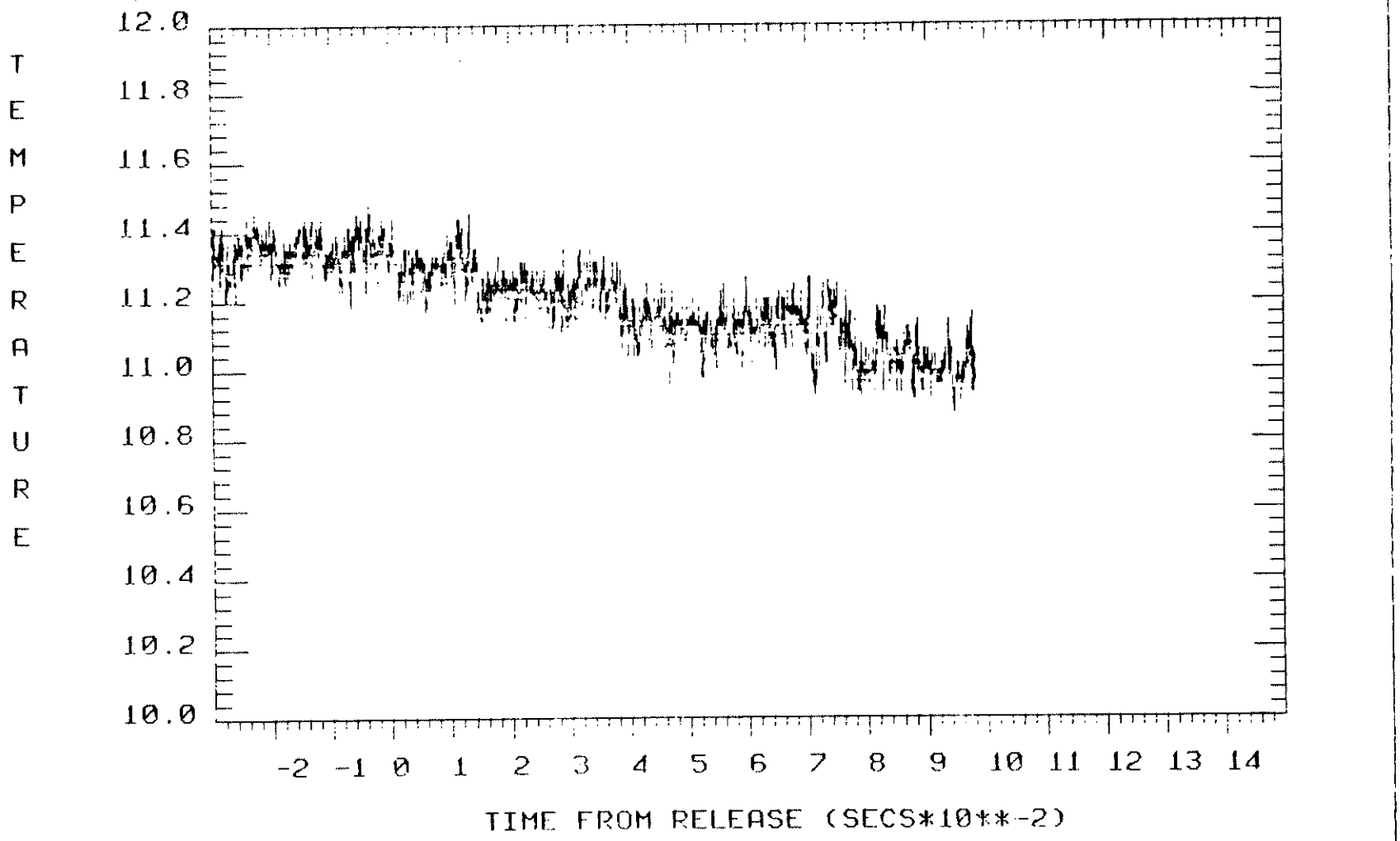


TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 0.08 MEAN OF RUN DOWN: 0.11

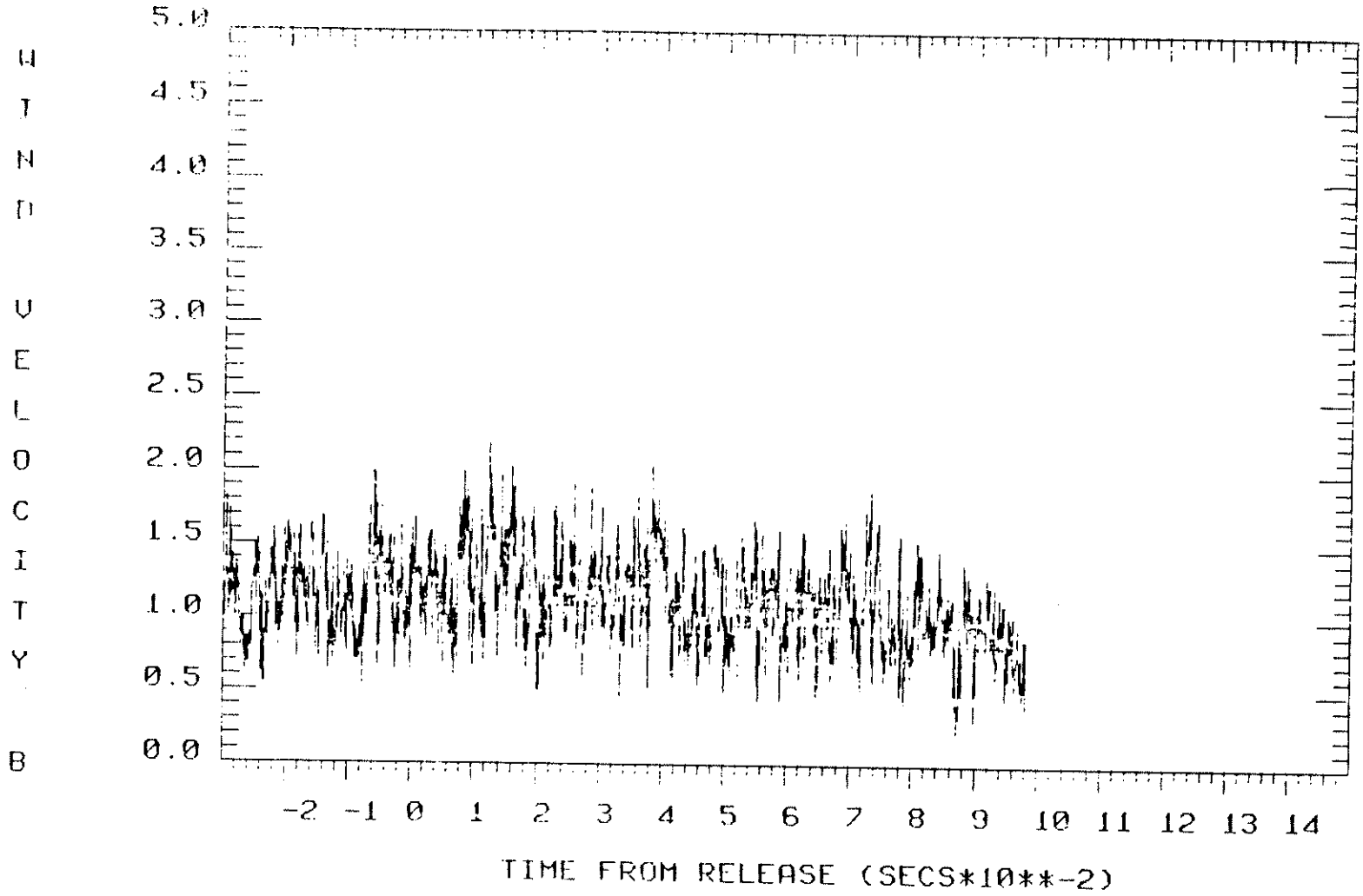
E48



TRIAL: 037 TYPE: UANT UNITS. DEGREES C

AVERAGING TIME: 0.6 SEC X: 450 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 12.33 MEAN OF RUN DOWN: 10.32

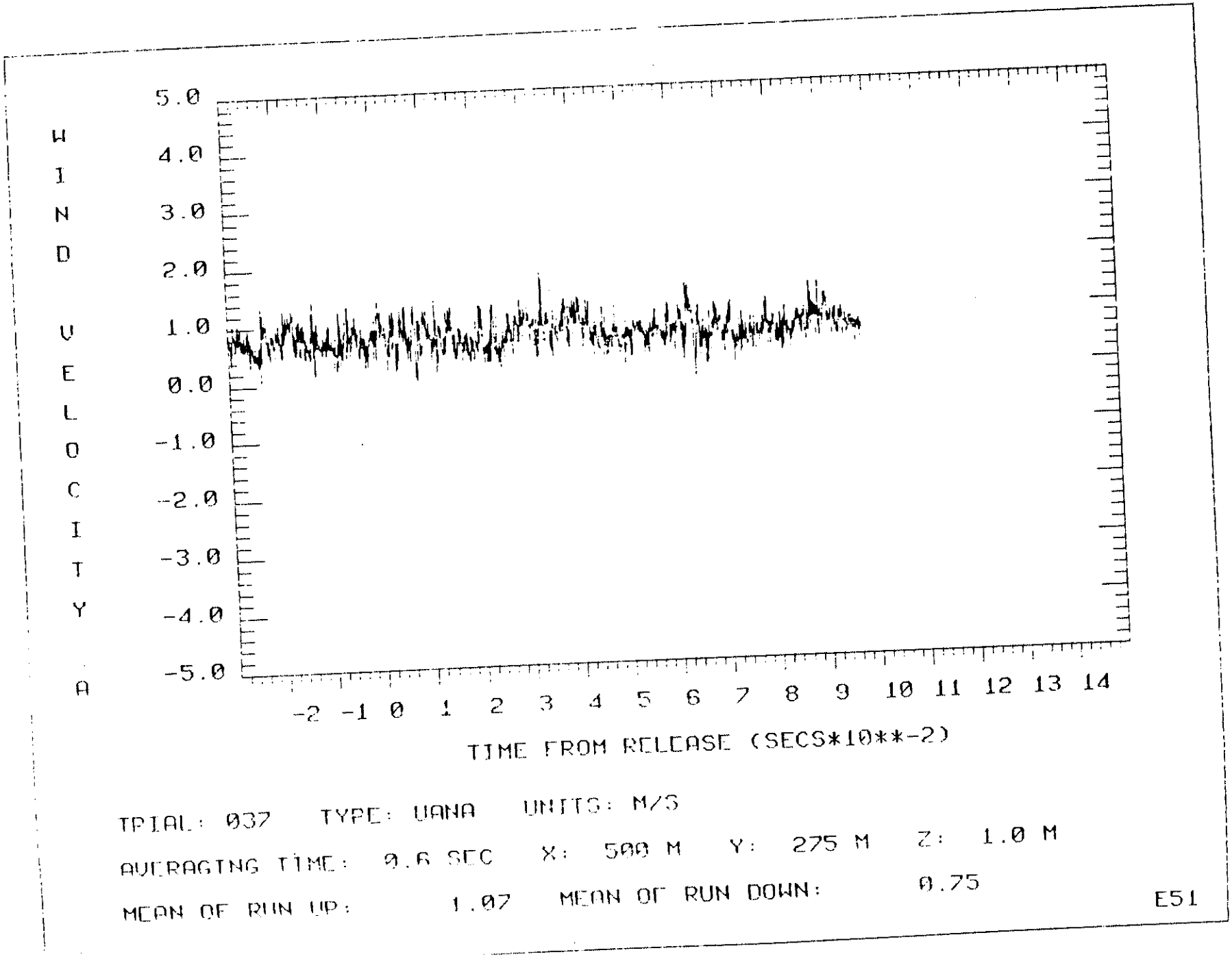


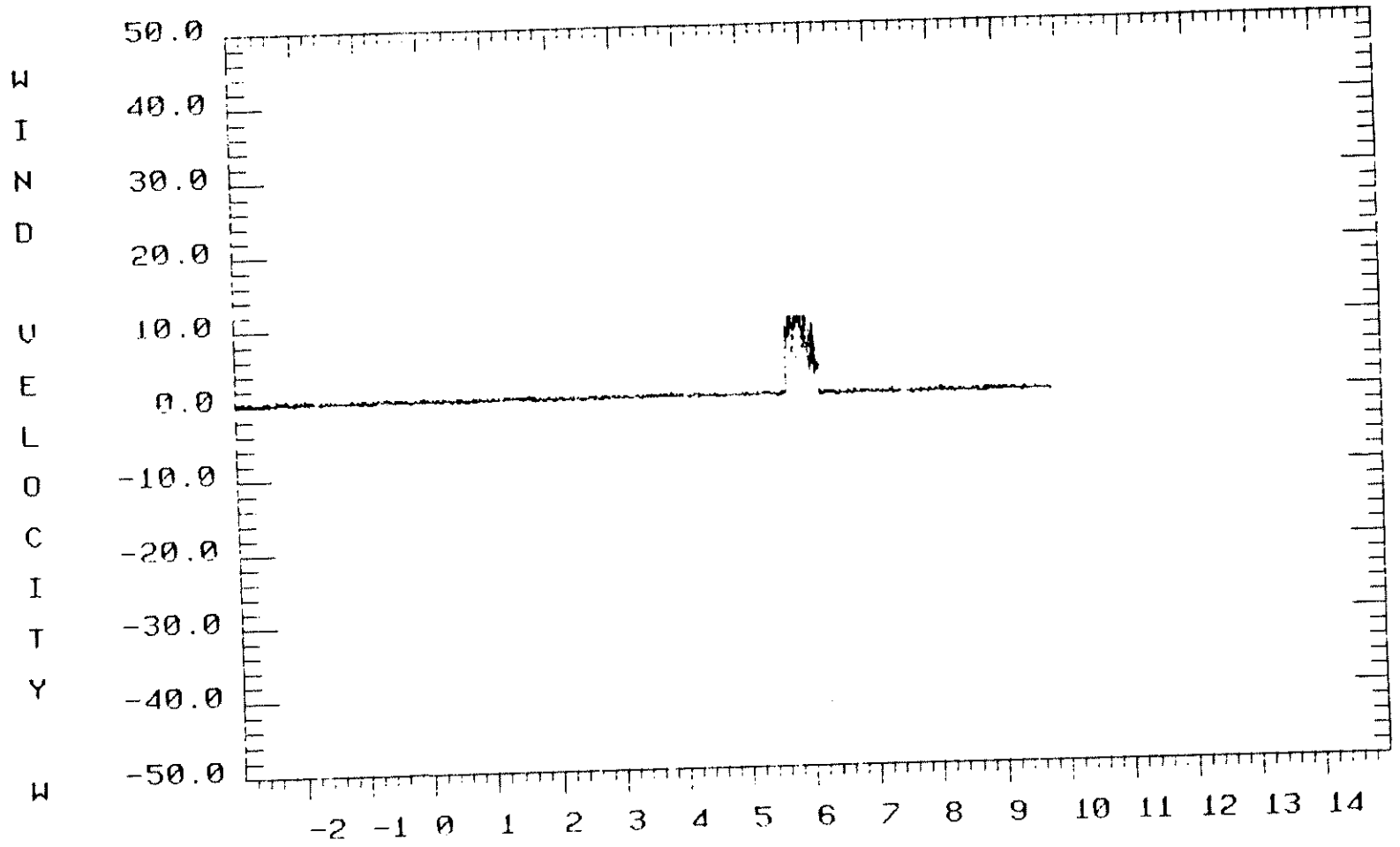
TRIAL: 037 TYPE: UAND UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP: 1.24 MEAN OF RUN DOWN: 0.94

E50


WIND VELOCITY
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: UANA UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 1.0 M
MEAN OF RUN UP: 1.07 MEAN OF RUN DOWN: 0.75
E51

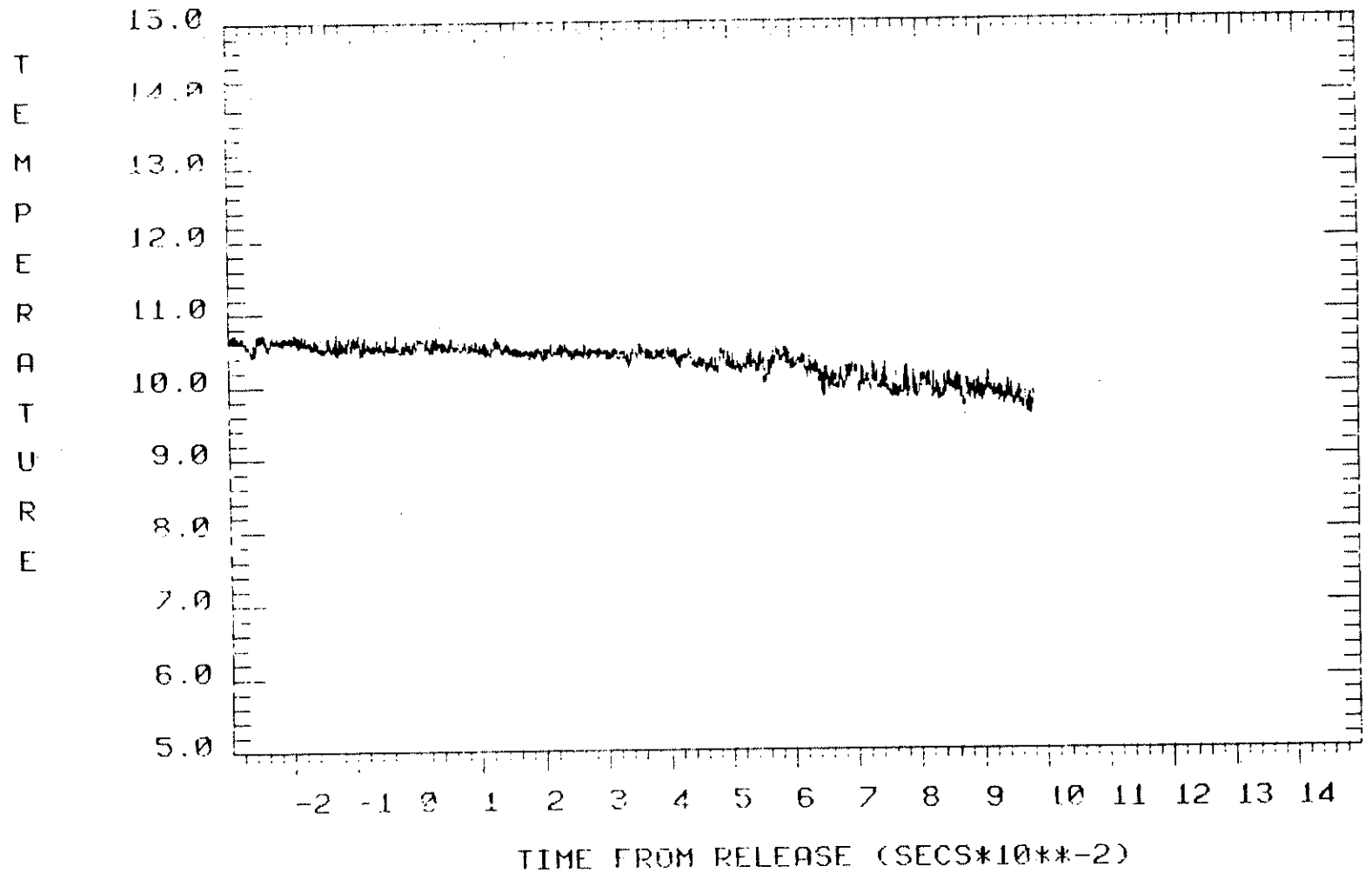


TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP: 0.18 MEAN OF RUN DOWN: 0.11

E52

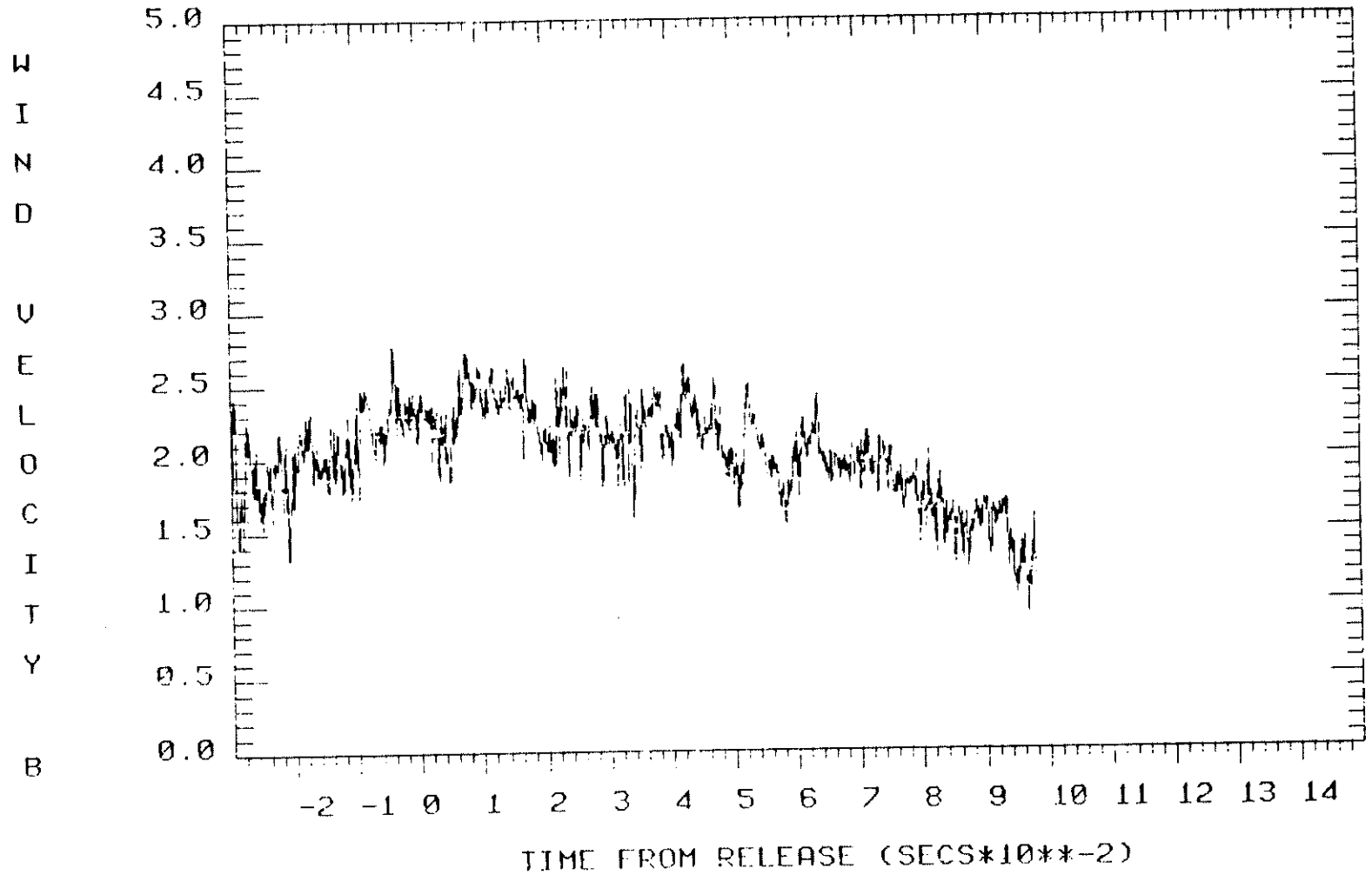


TRIAL: 037 TYPE: VANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 1.0 M

MEAN OF RUN UP: 13.29 MEAN OF RUN DOWN: 9.82

E53

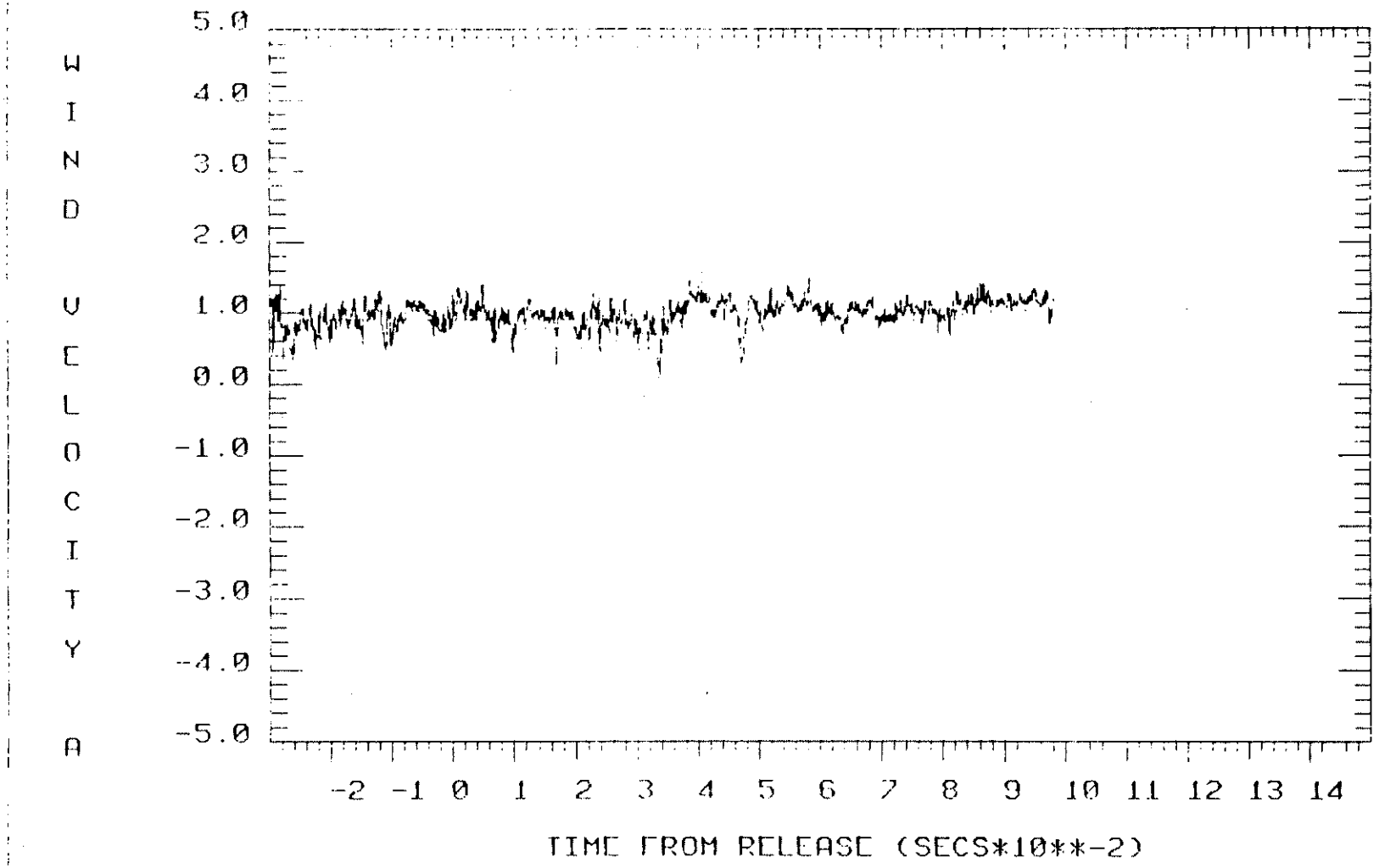


TRIAL: 037 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 2.38 MEAN OF RUN DOWN: 1.54

E54

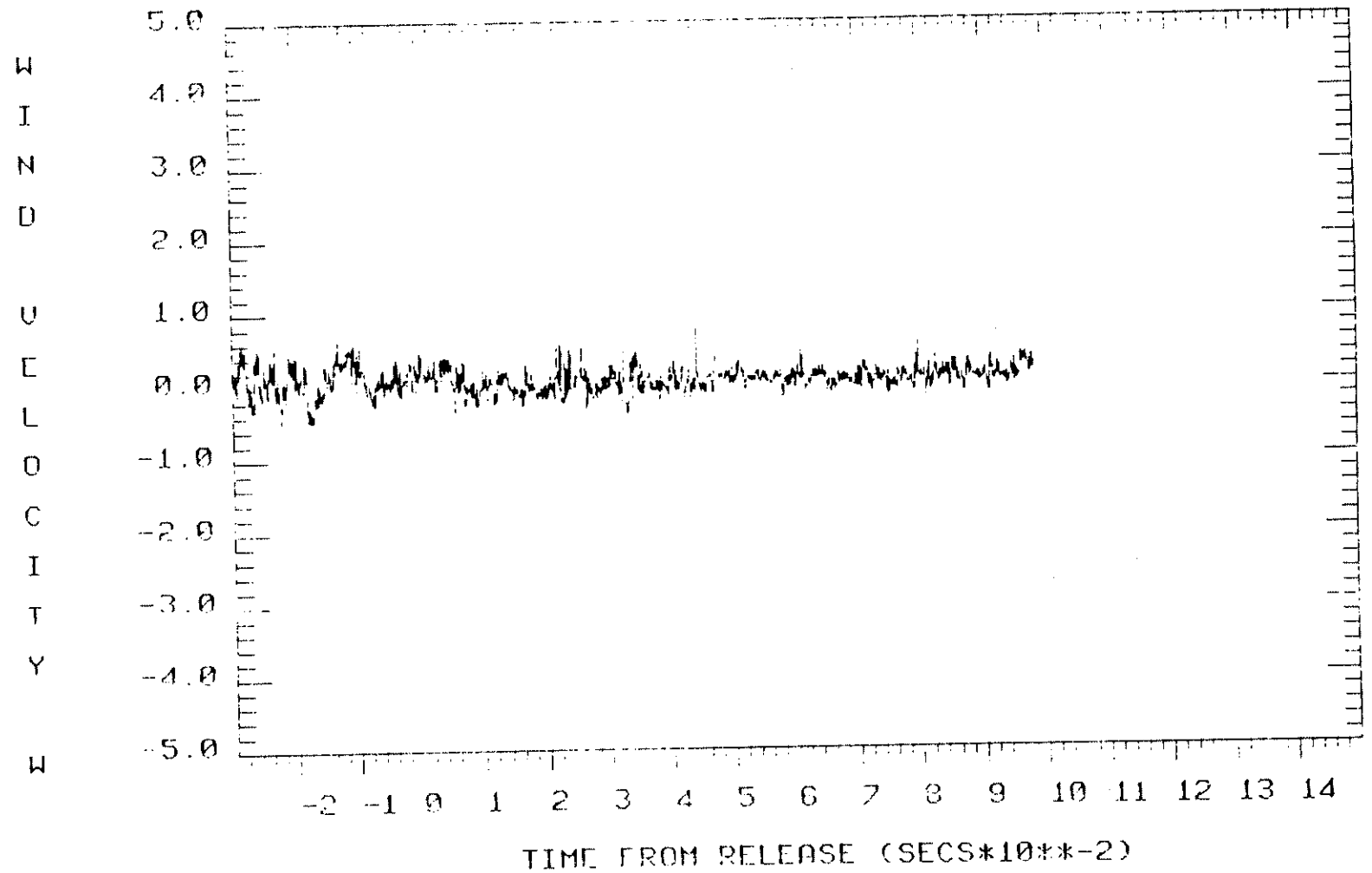


TRIAL: 037 TYPE: UANA UNITS. M/S

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 1.11 MEAN OF RUN DOWN: 1.37

E55

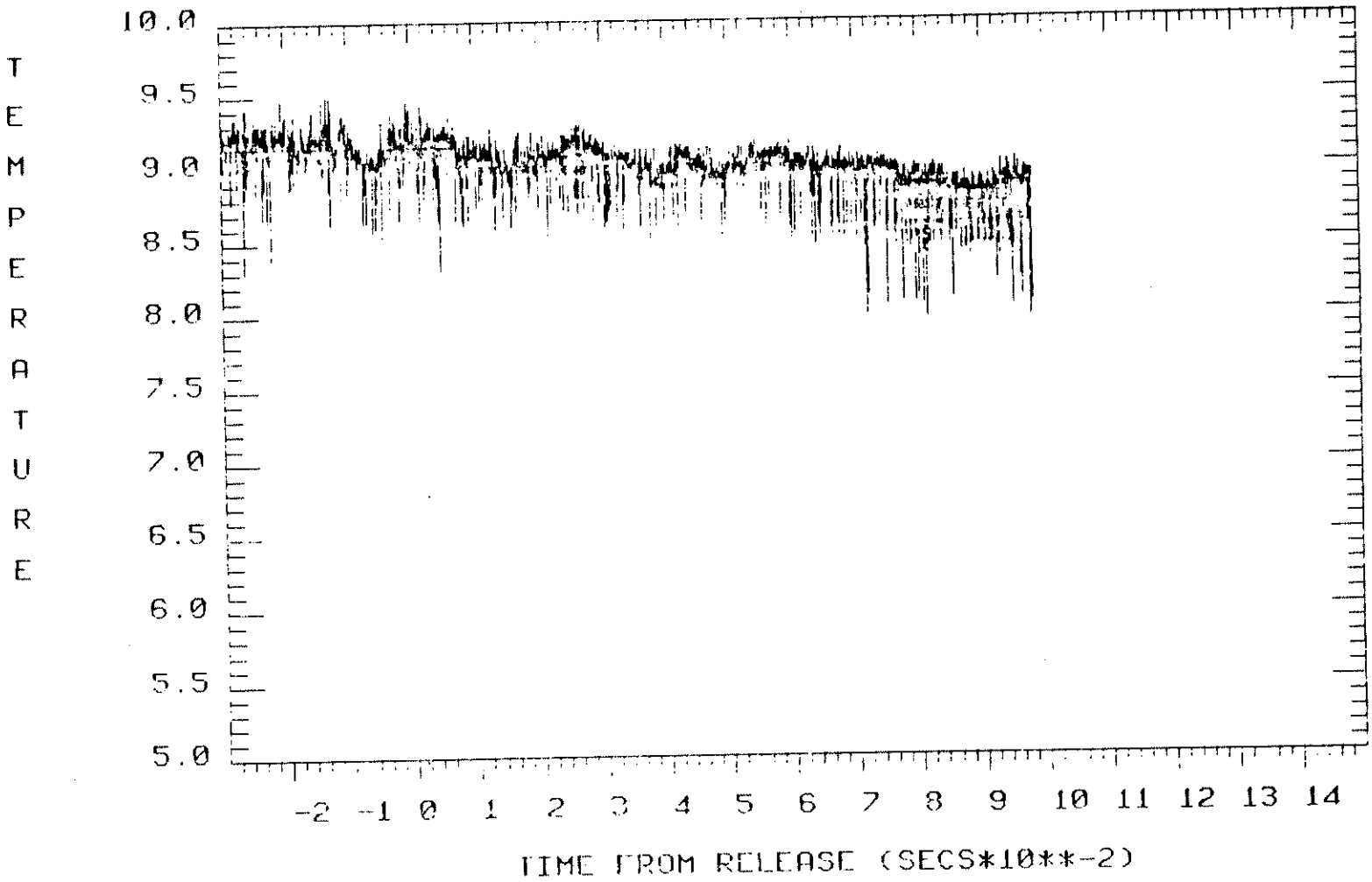


TRIAL: 037 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 0.05 MEAN OF RUN DOWN: 0.13

E56

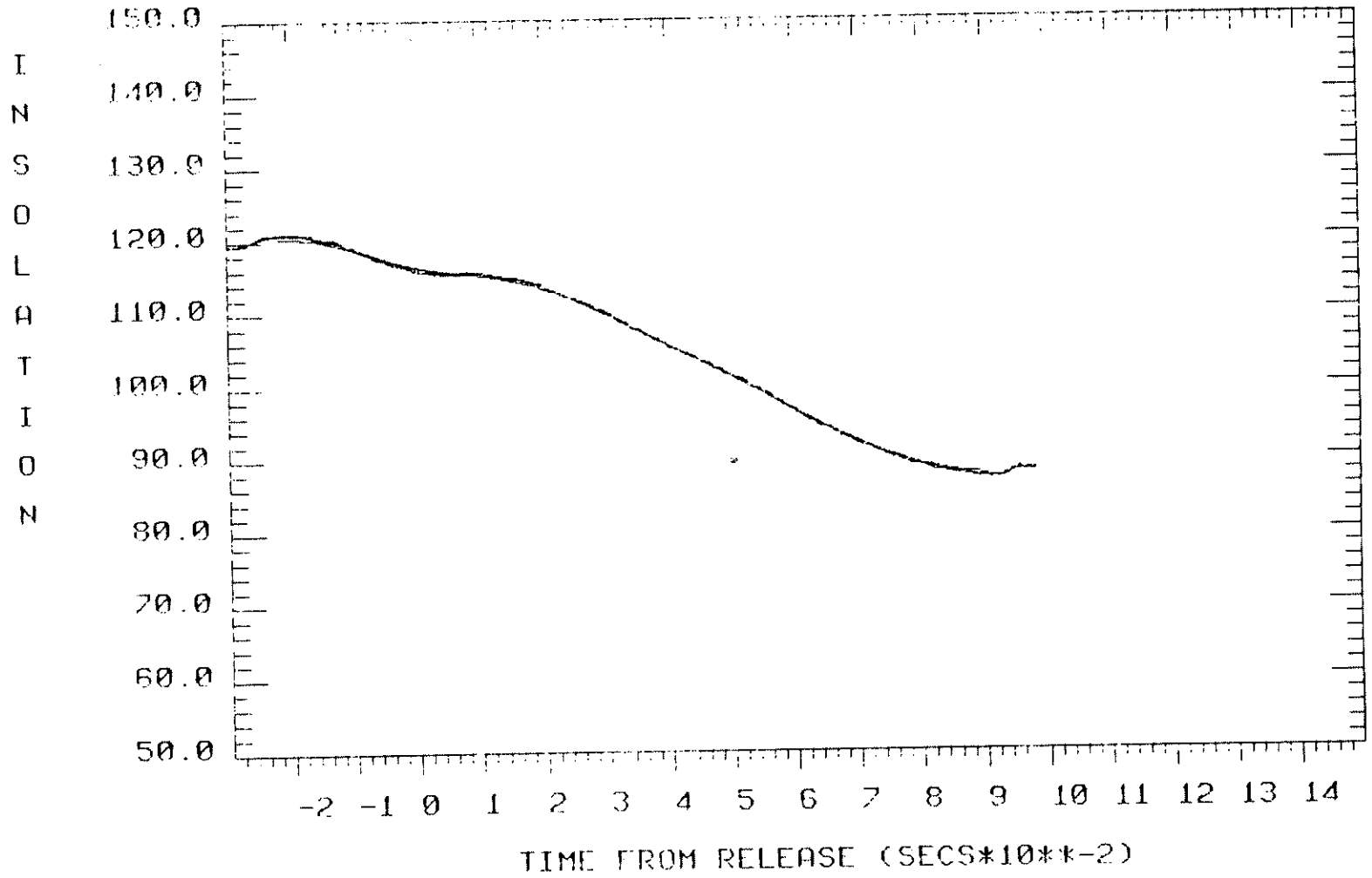


TRIAL: 032 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 500 M Y: 275 M Z: 15.0 M

MEAN OF RUN UP: 10.19 MEAN OF RUN DOWN: 8.65

E57

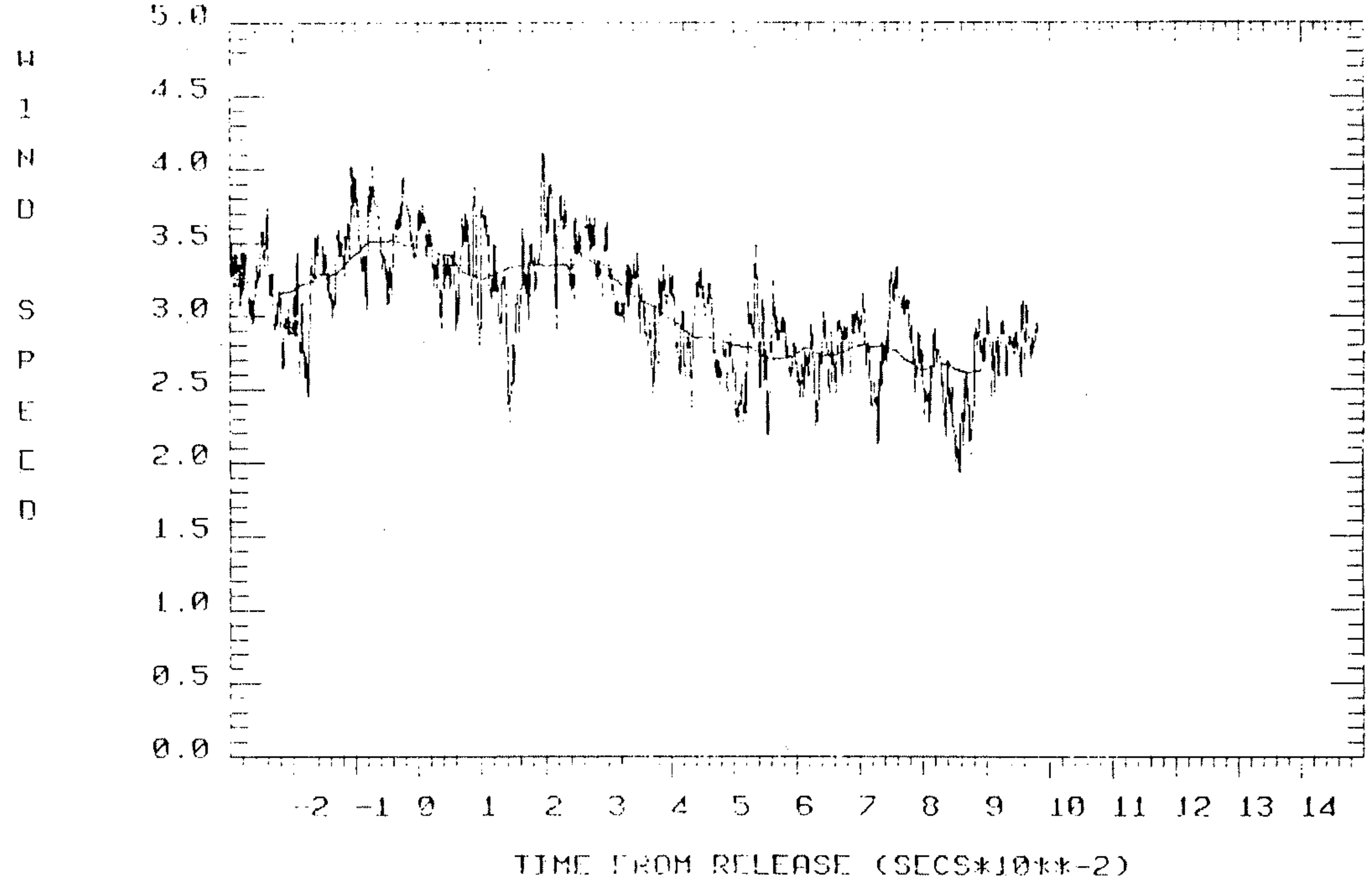


TRIAL: 037 TYPE: SOLA UNITS: W/M**2

AVERAGING TIME: 0.6 SEC X: 700 M Y: 500 M Z: 0.4 M

MEAN OF RUN UP: 404.51 MEAN OF RUN DOWN: 98.65

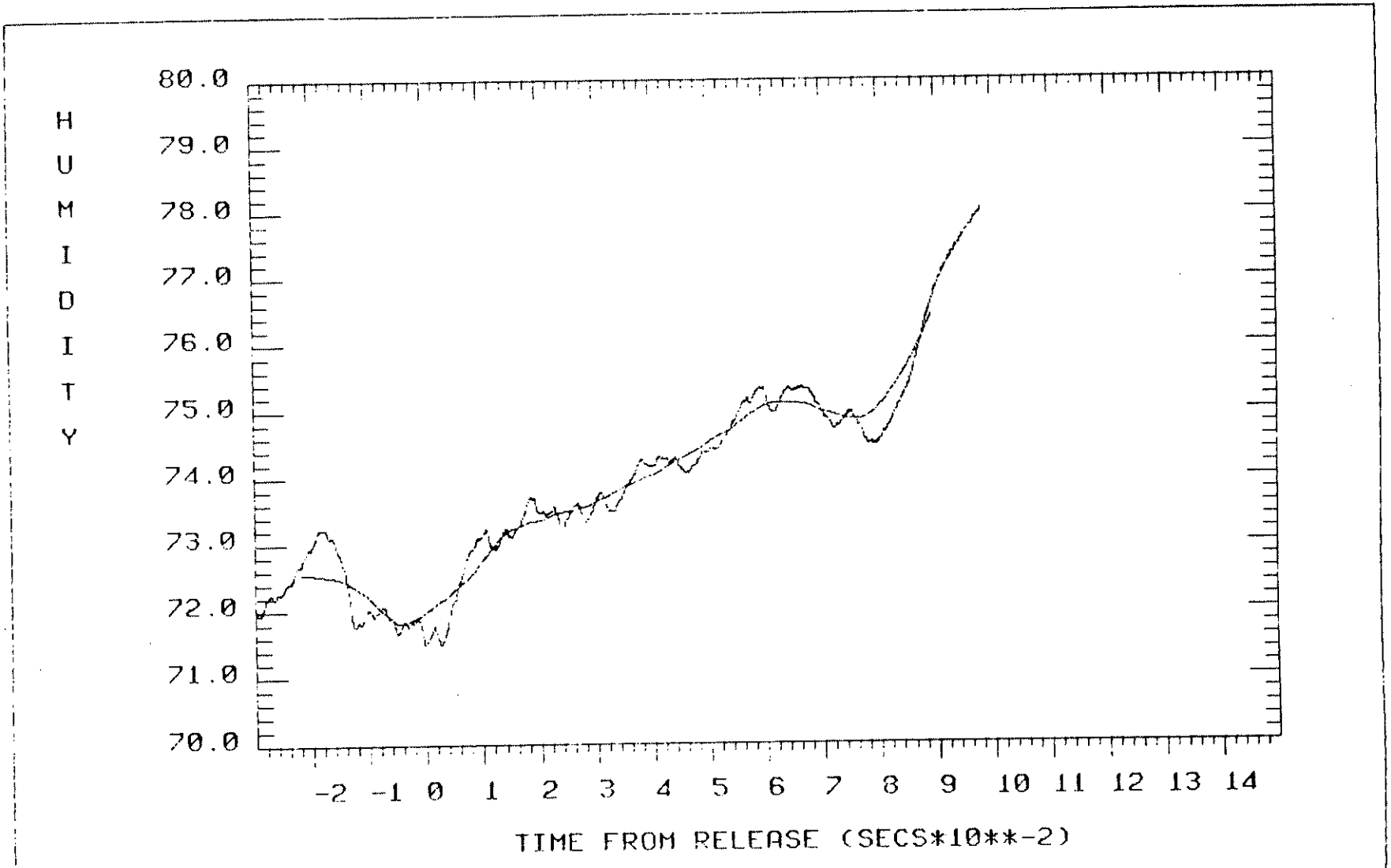
E58



TRIAL: 037 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: 3.49 MEAN OF RUN DOWN: 2.89

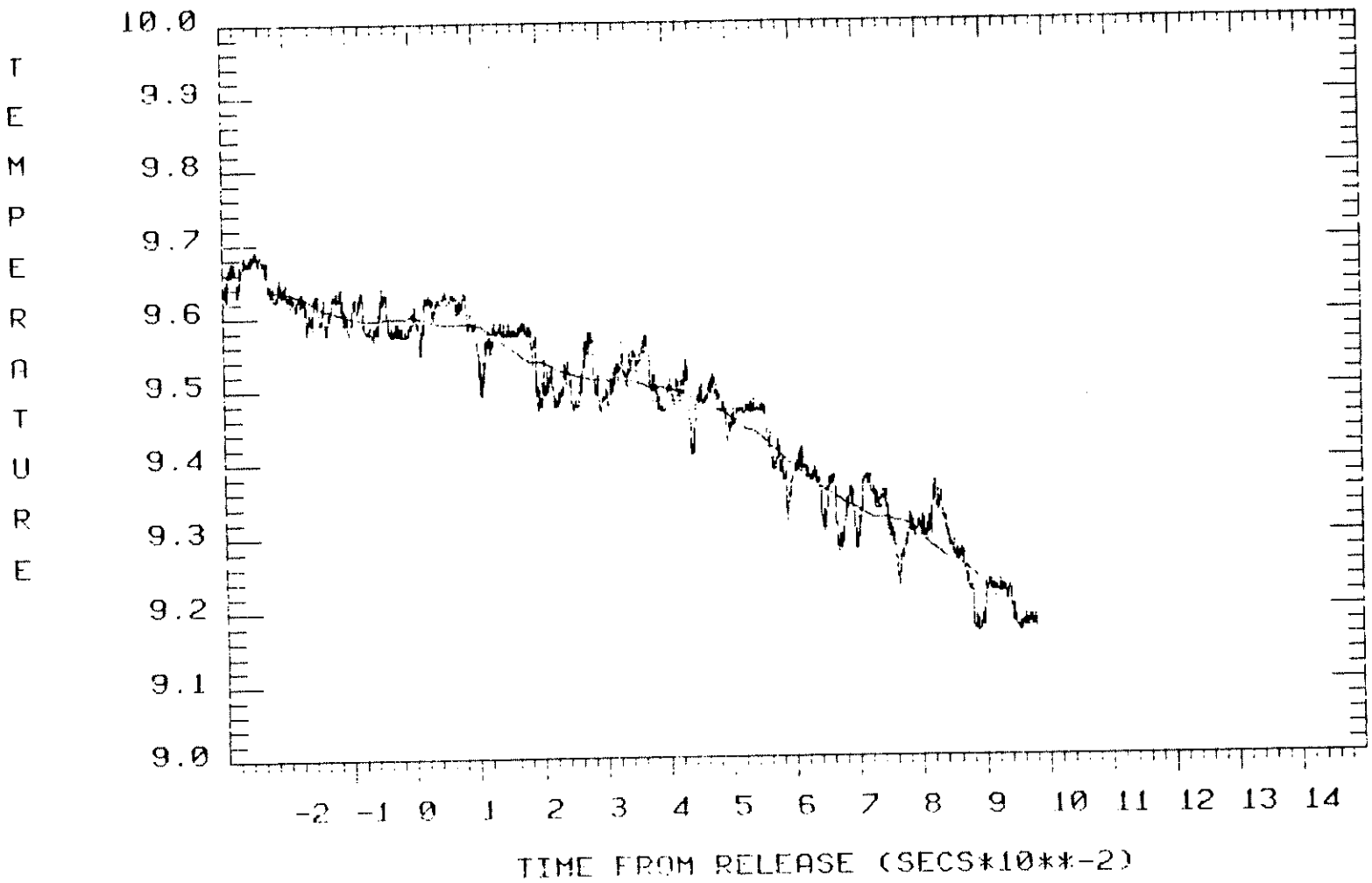


TRIAL: 037 TYPE: PHUM UNITS: PER CENT

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: 60.57 MEAN OF RUN DOWN: 81.25

E60

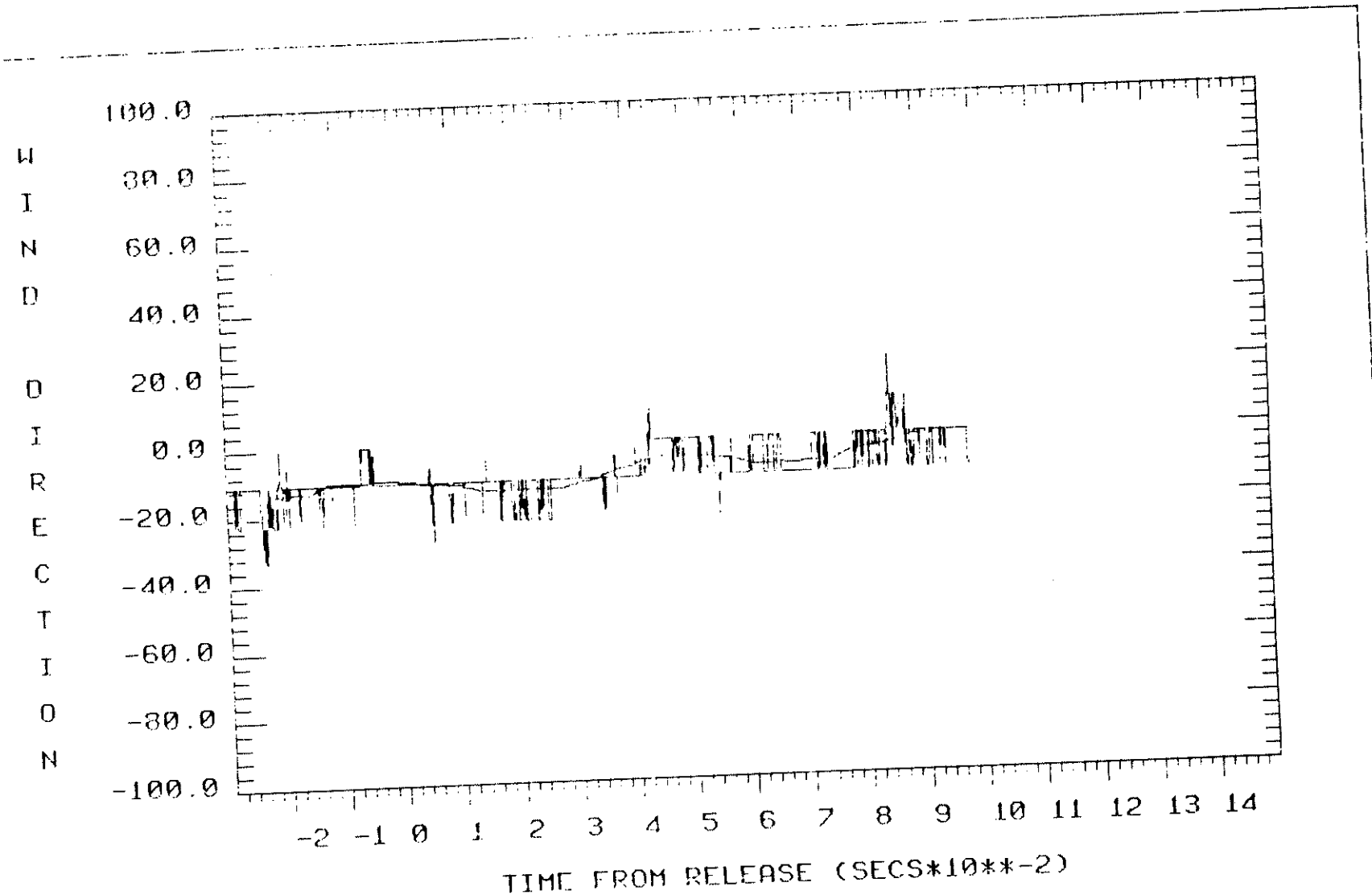


TRIAL: 037 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: 11.03 MEAN OF RUN DOWN: 9.06

E61

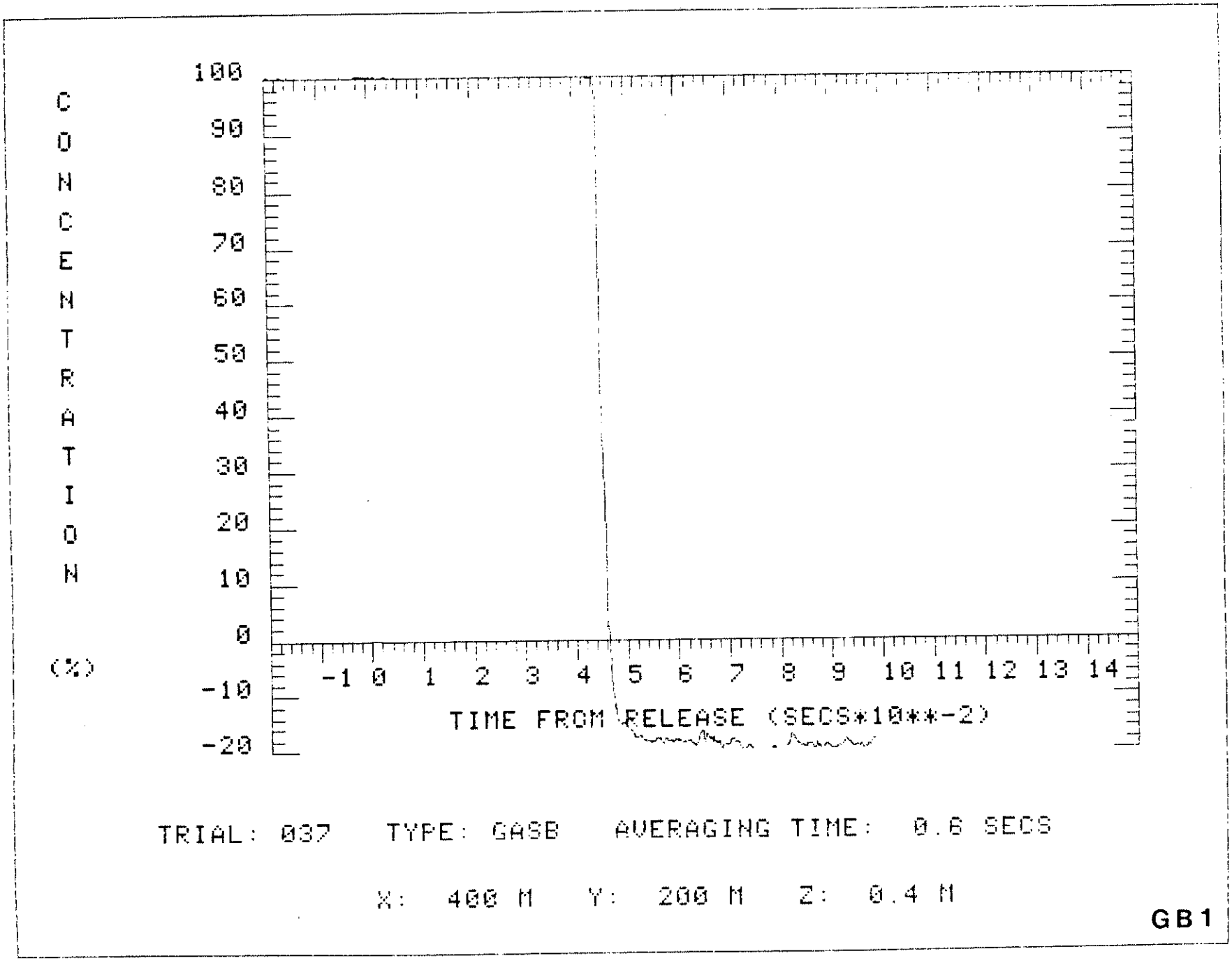


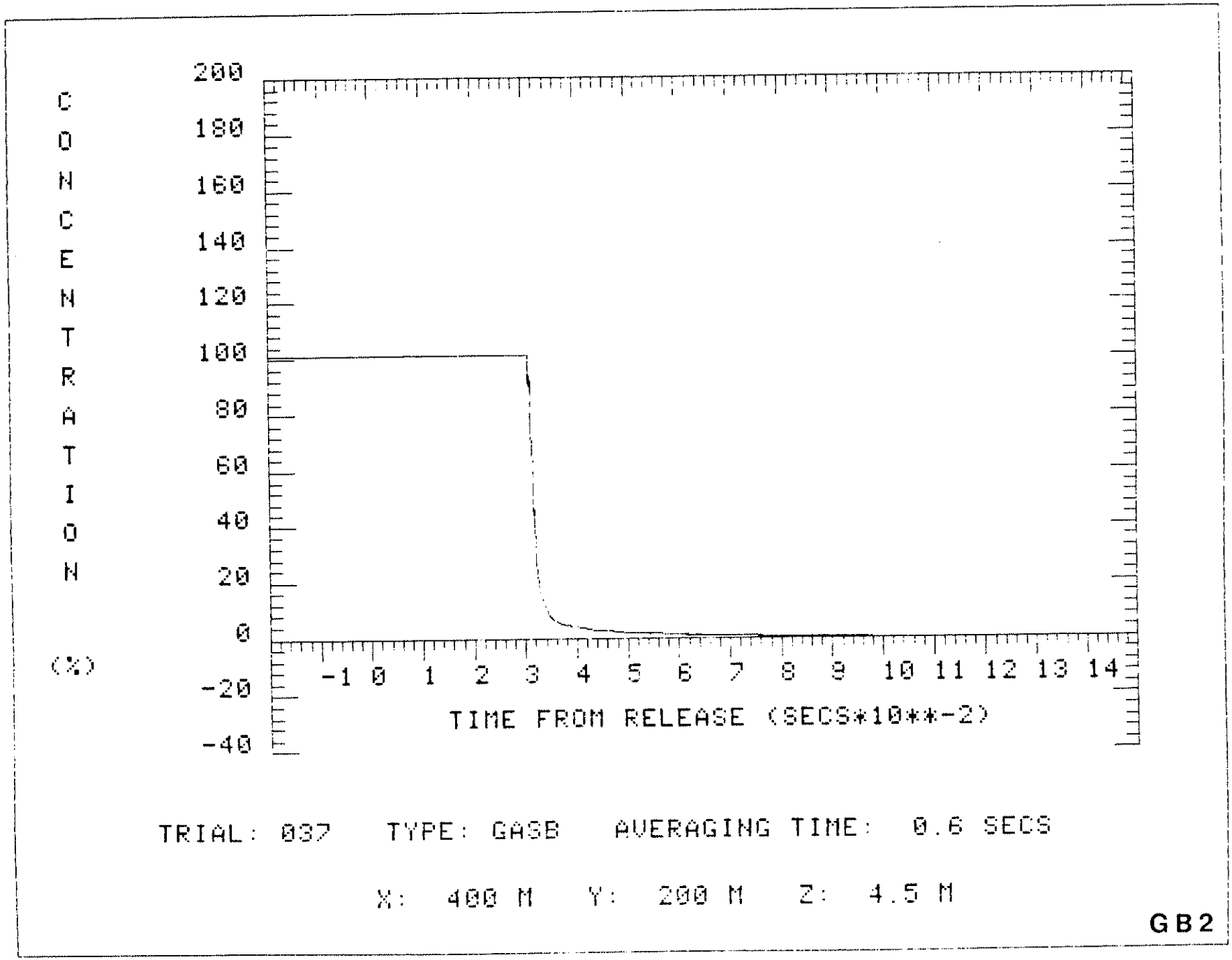
TRIAL: 037 TYPE: WHDG UNITS: DEGREES

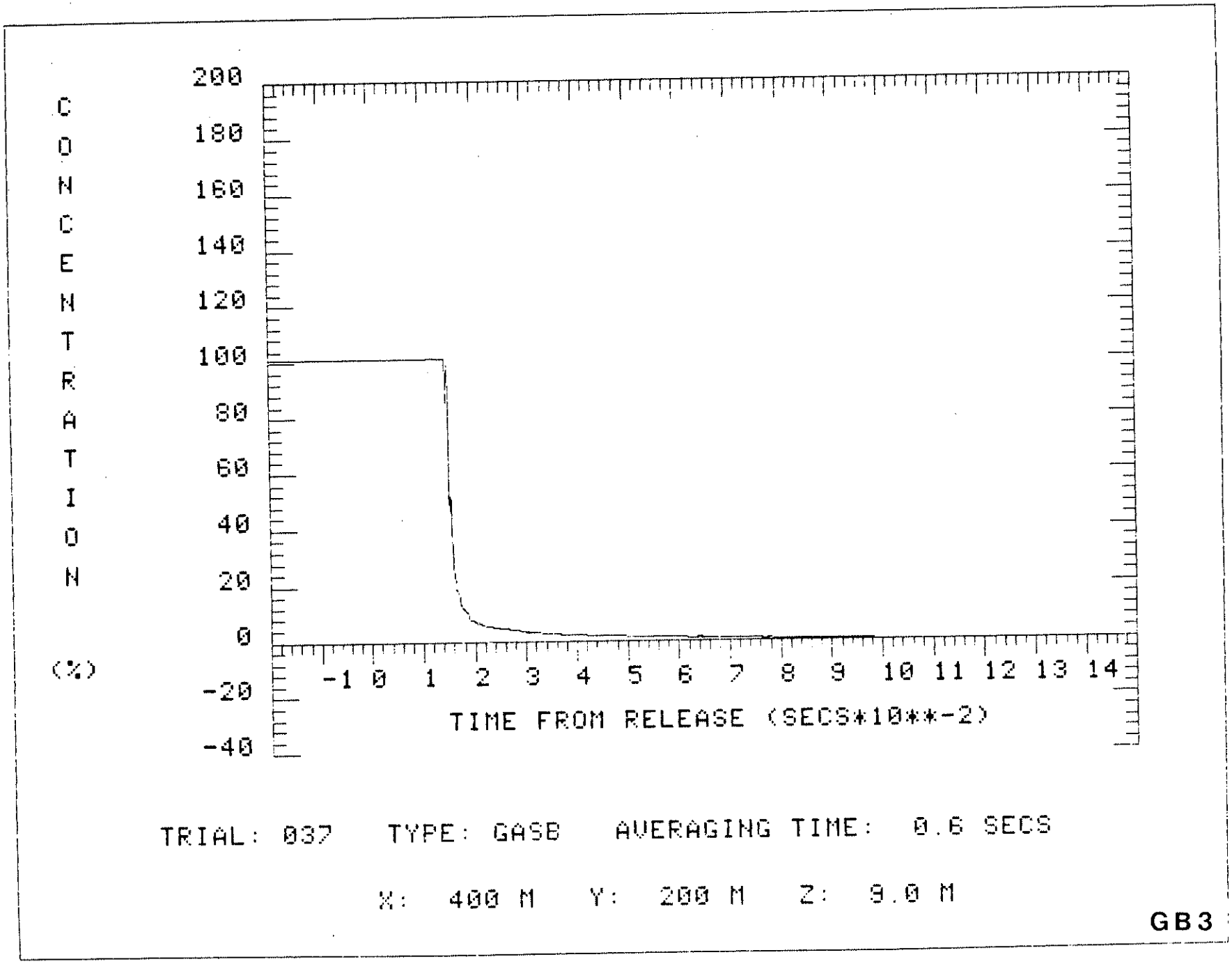
AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

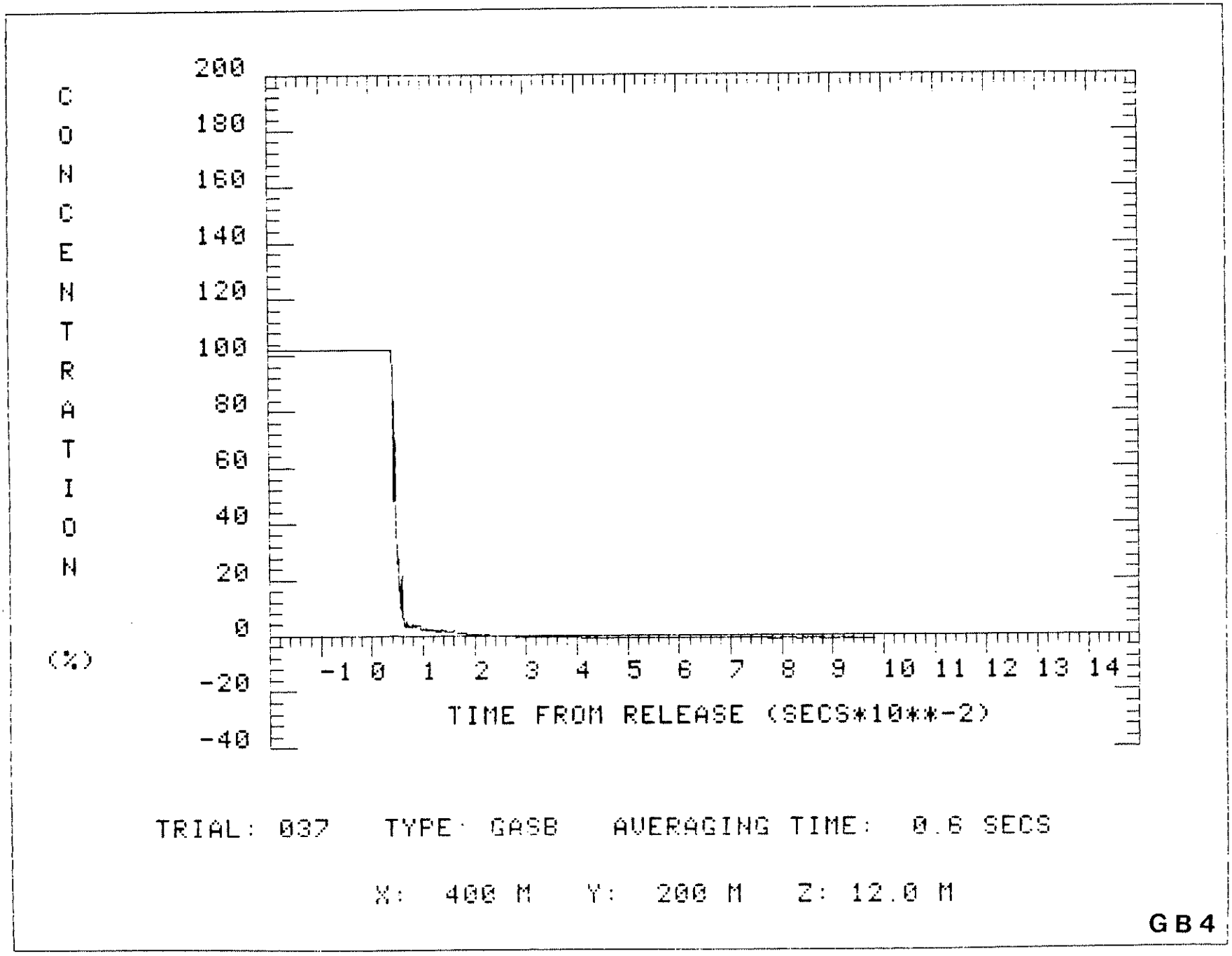
MEAN OF RUN UP: -18.25 MEAN OF RUN DOWN: -6.63

E62


CONCENTRATION (%)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GASB AVERAGING TIME: 0.6 SECS
X: 400 M Y: 200 M Z: 0.4 M
GB1


CONCENTRATION
(%)
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GASB AVERAGING TIME: 0.6 SECS
X: 400 M Y: 200 M Z: 4.5 M
GB2

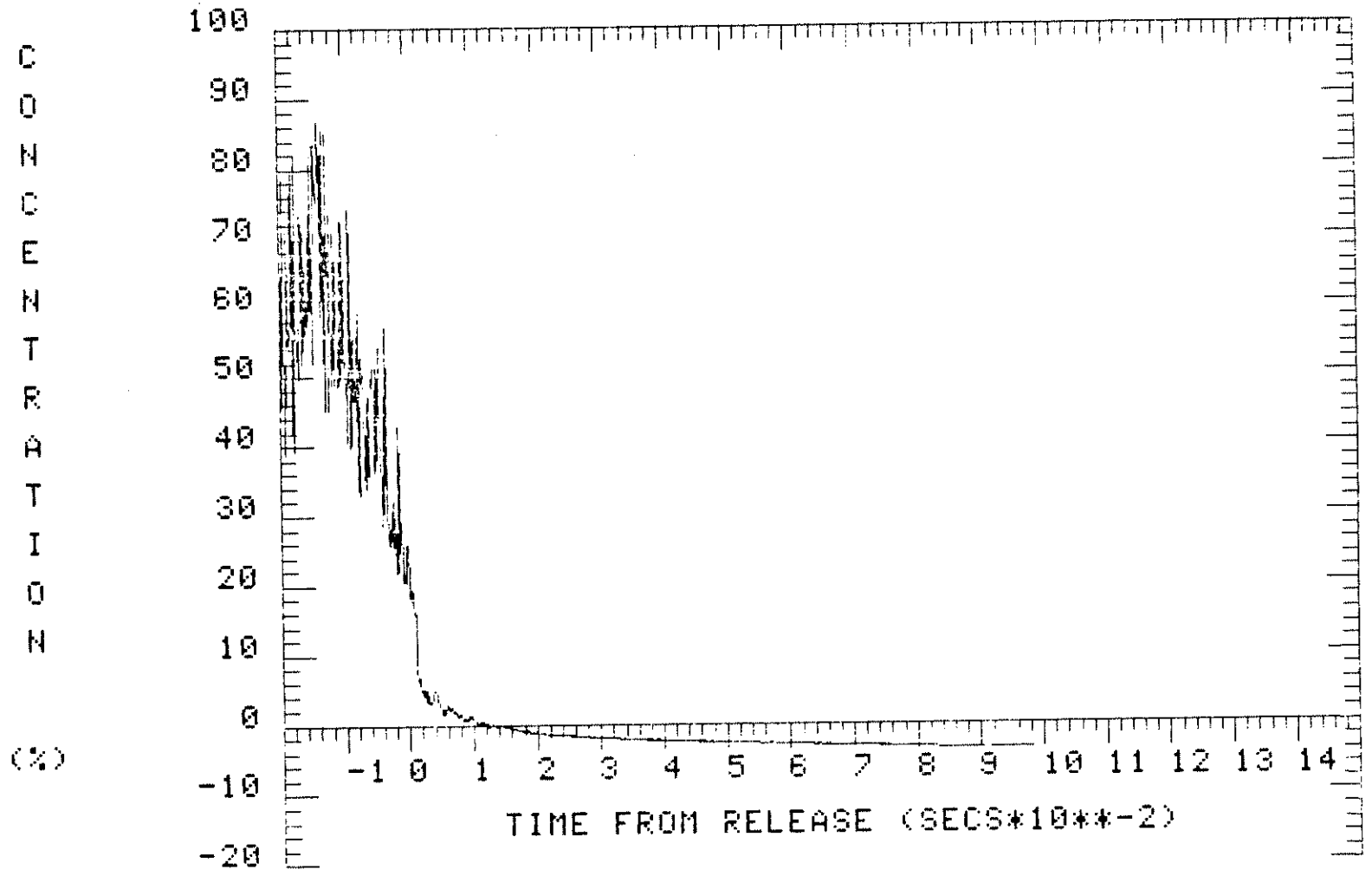

CONCENTRATION (%)
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 037 TYPE: GASB AVERAGING TIME: 0.6 SECS
X: 400 M Y: 200 M Z: 9.0 M
GB3



TRIAL: 037 TYPE: GASB AVERAGING TIME: 0.6 SECS

X: 400 M Y: 200 M Z: 12.0 M

GB4



TRIAL: 037 TYPE: GASB AVERAGING TIME: 0.6 SECS

X: 400 M Y: 200 M Z: 13.5 M

GB 5