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Acoustic Measurements of the X-Wing Rotor

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ACOUSTIC MEASUREMENTS OF THE X-WING ROTOR

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SUMMARY

Noise measurements of a stoppable X-Wing rotor system model, tested in the Ames 40- by 80-Foot Wind Tunnel, are summarized. Performance, control system stability, and noise of the model were investigated at various forward speeds, tip speeds, collective blade angles, jet blowing velocities, and model attack angles. The model was tested in the rotating wing helicopter configuration, in the fixed wing configuration, and in wing configurations between the two. Noise data obtained in the helicopter configuration at the two highest tip speeds (Mach 0.44 and 0.47) and at wind tunnel speeds below 140 knots are reported. Test configuration and performance information are included. Fixed wing, low rotor tip speed, and high forward speed cases are excluded because the background noise exceeded the model noise under those conditions. General acoustic measurements (dB, dBA, and PNdB) at six microphone locations are presented for all conditions under which the background noise was below the model noise. More specific measurements (1/3-octave and blade passage frequency harmonic levels) are presented for selected conditions. Graphs of dBA and 1/3-octave spectra, which show the noise trends as functions of operating condition, are included. The noise depends mainly on the jet blowing velocity. The noise levels were highest at moderate jet blowing velocities, less at the highest velocity, and lowest with no blowing at all.

SYMBOLS

A	coefficient in background noise curve fit
B	coefficient in background noise curve fit
CLR/σ	rotor lift coefficient, $L/\rho(\Omega R)^2 S$
CPR/σ	rotor power coefficient, $P/\rho(\Omega R)^3 S$
CXR/σ	rotor force in x direction, $-D/\rho(\Omega R)^2 S$ (positive forward)
c	sound speed, m/sec
$\bar{c}$	mean chord, m
D	drag, N
dB	sound pressure level, 20 log (P_{rms}/P_{ref})
dBAC	A-weighted dB with background correction
dBAU	A-weighted dB without background correction

dBB	background sound pressure level, 20 log (P_{rms}/P_{ref})
dBC	sound pressure level with background correction
dBU	sound pressure level without background correction
L	lift, N
M	tunnel Mach number, V/c
M_{at}	advancing-tip Mach number, $(1 + \mu)M_{tip}$
M_{slot}	jet Mach number, V_{slot}/c
M_{tip}	tip Mach number, $\Omega R/c$
N	number of blades
P	rotor power, W
PNdBC	perceived noise level with background correction
PNdBU	perceived noise level without background correction
P_{ref}	reference pressure (0.00002 N/m^2)
P_{rms}	root-mean-square sound pressure, N/m^2
R	rotor radius, m
r	distance from rotor hub, m
S	reference area, $N\bar{c}R$
V	wind tunnel speed, knots or m/sec
V_{slot}	jet blowing velocity, m/sec
x	direction upstream from hub, m
y	direction left from hub, looking upstream, m
z	direction up from hub, m
α	angle of rotor shaft from vertical, positive pitch up, deg
θ	blade pitch angle, deg
μ	advance ratio, $V/\Omega R$
ρ	air density, kg/m^3
σ	solidity, $S/\pi R^2$
ϕ	angle below rotor plane, $\tan^{-1}(-z/r)$, deg

ψ azimuth angle from downstream, $\tan^{-1}(-y/-x)$, deg

Ω rotor rotational speed, rad/sec

INTRODUCTI'N

The lifting capacity of the rotor on the retreating side of the rotor disk limits the maximum speed of the helicopter in forward flight. In previous attempts to solve this problem and thus increase forward speed, counter-rotating rotors, tilting rotors, and compound helicopters with nonrotating wings have been used with limited success.

The X-Wing model, shown in figure 1, has a stoppable rotor. Four blades rotate like those of a helicopter for hover and low speed flight but they can be stopped and used as two oblique wings for high speed forward flight. The X-Wing airfoil, shown in figure 2, is used as a rotor or as a wing, with the lift producing airflow going either direction over the airfoil. This dual direction airflow is possible because the cambered elliptic airfoil has upper surface blowing at both the leading and trailing edges. Compressed air is ducted through the airfoil and blown over the trailing edge to produce controllable lift by the Coanda effect; this technique, described by Cheeseman (ref. 1), is also known as circulation control. A more detailed description of the X-Wing aircraft is given in reference 2.

X-Wing noise may be expected to differ from conventional helicopter rotor noise. First, the use of circulation control achieves good rotor performance while the rotor is operating at low tip speeds. Lowering the tip speed reduces noise from all of the conventional sources and reduces the convective amplification factor. Second, circulation control introduces several new sources of noise: all of the noise sources associated with the jet blowing, turbulent mixing, shear-layer instabilities, and nozzle lip noise, which add to the broadband noise.

EXPERIMENT

Model

The X-Wing model (fig. 1) consists of a 7.6-m diameter rotor above a streamlined fuselage mounted on three struts in the wind tunnel. An electric motor inside the fuselage powers the rotating shaft. During hover and low speed flight, the four blades rotate as they would on a conventional helicopter; however, during high speed flight, the configuration of the four rotor blades is changed, and they are used as two fixed, oblique wings that cross at the center of the fuselage. The cambered elliptic airfoils (fig. 2) provide lift in all configurations; slots on both edges of the top surfaces of the airfoils allow jets to provide circulation control. Air for circulation control was supplied by two compressors located below the wind tunnel floor. This air was ducted through the floor, up a strut, through the model to the rotor hub, and thence to the rotor wing. Valves at the hub control the air distribution to produce controlled jet blowing at the trailing edge slot of each airfoil. The report by Ballard et al. (ref. 3) contains a more detailed description of the model.

Acoustic Equipment

Acoustic data were acquired with six 1.3-cm condenser microphones equipped with nose cones to reduce airflow noise on the microphones. Figure 3 and table 1 show the locations of the six microphones. Four microphones were located upstream of the model, and two microphones were located close to the model. Detailed measurements are shown in the figures and appendixes for the microphones circled in figure 3. Signal conditioners powered the microphones and controlled the gain of the acoustic signal. A 14-track FM tape recorder, running at 15 ips to give a bandwidth of 10 kHz, was used to record the acoustic signals. The signals were monitored before and after recording with a dual-channel oscilloscope and narrow-band analyser. Figure 4 is a schematic of the data acquisition system.

Test

The performance, control system capabilities, and noise of the X-Wing model were measured in the Ames 40- by 80-Foot Wind Tunnel. The model was tested for changes with the following parameters: forward speed, tip speed, lift coefficient, jet pressure ratio, and model attack angle. Testing included the rotating and fixed wing configurations and transitions between the two. A more detailed description of the test is in reference 3.

During each steady condition, a 30-sec sample of acoustic data was recorded for later analysis. To assure a maximum signal-to-noise ratio, the gain of the acoustic signal was adjusted in 10-dB intervals. All of the microphones were calibrated each day with a 124-dB, 250-Hz signal from a pistonphone. Background wind tunnel noise was recorded at 60, 90, 120, and 180 knots while the model was installed in the wind tunnel without rotors.

Acoustic Data Reduction

The acoustic data were initially reduced and analyzed off-line on a minicomputer. The recorded data were played back through an anti-aliasing filter and digitized to go into the minicomputer. The minicomputer generated 1/3-octave spectra from 1-Hz spectra in the range of 10 to 1000 Hz and from 10-Hz spectra in the range of 1 to 10 kHz. From the 1/3-octave spectra, the minicomputer computed dB, dBA, and PNdB. The first 10 blade passage harmonics were computed from the 1-Hz, narrow-band spectra. The computed acoustic data were transferred into a computer with the data base containing all of the test parameters measured. Background noise corrections were made to the 1/3-octave spectra. The background noise measurements were fitted to a linear regression of the form

$$dBB = A + B * \log(V)$$

and subtracted from the measured spectra on a power basis for each 1/3 octave,

$$dBC = 10 \log[10^{(dBU/10)} - 10^{(dBB/10)}]$$

Graphs and tables were constructed from this larger data base. A flow chart of the equipment used for data reduction is shown in figure 5.

RESULTS

General results for the X-Wing measurements when the model noise was above the background noise are presented in appendix A. Configuration parameters, performance measurements, and the global acoustic measurements (corrected and uncorrected dB, dBA, and PNdB) are shown for all of the microphones. The data shown are from rotating rotor configurations with forward speeds of 60, 90, 120, and 140 knots. At higher wind speeds and for the fixed wing configuration, the measured noise was 3 dB or less above the background noise. At this level the measurements become uncertain, so only a few representative ones are included.

The general trends in the global data are shown in figures 6 through 9. Data from microphone 3, upstream of the rotor, and from microphone 6, under the rotor, are plotted in the figures. The uncorrected dBA is shown as a function of jet blowing Mach number in figure 6. Data from wind tunnel speeds of 60, 90, and 120 knots are shown. The data were collected from configurations with rotor angles of attack from -4° to 4°, with blade collective pitch of -3° to 3°, and at a tip Mach number of 0.47. The noise level is insensitive to rotor angle of attack, and is lowest with no jet blowing, increases with jet blowing to a maximum at about Mach 0.7, and then decreases with increased subsonic blowing. Figure 7 displays uncorrected dBA as a function of tunnel wind speed for microphones 3 and 6. With jet blowing, the noise level is constant below 90 knots and increases above 90 knots. Without blowing, the noise level increases with forward speed within the entire range of 60 to 180 knots. Figures 8 and 9 show the uncorrected dBA as a function of rotor lift coefficient at 60 knots. The rotor lift is a function of jet blowing, collective pitch, and shaft angle. Data are grouped by constant collective pitch setting in figure 8 and by constant jet blowing velocity in figure 9. The collective pitch does not show any correlation with the noise levels for the range tested; however, the jet blowing does correlate with the noise levels, giving the highest noise levels at a Mach number of 0.54 for the slotted jet.

Appendix B presents more detailed acoustic data for selected data points. These data are for various wind speeds, jet blowing velocities, and angles of attack; the data are from microphones 3 and 6. The table in appendix B shows 1/3-octave spectra, 1/3-octave spectra corrected for background noise, and the first 10 blade passage harmonic sound levels.

The background noise used for corrections on microphones 3 and 6 is presented in appendix C. In each 1/3-octave frequency, the background noise was fitted to a curve of the form

$$dB = A + B * \log(V)$$

The curve fits are excellent above 250 Hz. At lower frequencies, the fit is not as good because the spectrum is dominated by the rotational noise of the tunnel drive system; the frequency, as well as the amplitude, increases as the tunnel velocity increases. This ill fit is of no consequence, because at low frequencies the rotor's rotational harmonics dominate, and they are of higher amplitude than the background noise.

Figure 10 shows 1/3-octave spectra as functions of jet Mach number. Data for microphones 3 and 6 are shown for wind tunnel speeds of 60, 90, and 120 knots and for angles of attack of 0° and 4°. The curves show the background noise and the measured noise from the model with jet Mach numbers of 0.0, 0.54, and 0.76. In all cases and throughout the frequency range, model noise levels with jet blowing for circulation control exceed noise levels without jet blowing. The tones from the air compressor increased the level as much as 15 dB at the 3125-Hz and 6300-Hz 1/3-octave levels where the compressor blade harmonics exist. Noise levels are highest throughout the entire frequency range for the intermediate jet Mach number of 0.54.

Figure 11 shows the 1/3-octave spectra as functions of rotor angle of attack. Each figure displays the 1/3-octave spectra at angles of attack of 4°, 0°, and either -2° or -4° at a fixed wind tunnel speed and jet blowing Mach number. Spectra are shown for wind tunnel speeds of 60 or 120 knots and for jet Mach numbers of 0.0, 0.54, and 0.76. The angle of attack has little effect on the noise spectra except at one condition: at 60 knots with no jet blowing, the -4° angle of attack has higher noise levels in the mid-frequency range.

CONCLUDING REMARKS

Noise measurements were made on a 7.6-m-diameter model X-Wing rotor in the Ames 40- by 80-Foot Wind Tunnel. General noise measurements (dB, dBA, and PNdB for uncorrected and background corrected noise) at all microphone locations and specific noise measurements (blade-passage harmonic spectra and uncorrected and background corrected 1/3-octave spectra) for two representative microphones are presented. With the model in the fixed wing configuration or at forward speeds above 120 knots, the model noise was below the background tunnel noise. X-Wing noise depended mainly on the jet blowing. Noise levels were lowest without any jet blowing, highest with some jet blowing, and intermediate with high subsonic jet blowing. Collective blade pitch changes had little effect on the noise for the range tested, namely -3° to 3°. Noise levels remained constant with changes in angle of attack in the range of 4° to -4° and increased with increased forward speed.

The X-Wing rotor has the potential of being quieter than conventional rotors; according to Mosher (ref. 4), its noise levels are less than those of a modern helicopter at moderate and high forward speed.

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APPENDIX A

GENERAL ACOUSTIC AND PERFORMANCE PARAMETERS

SYMBOLS

ALPHA	model pitch, positive up, deg
CLR	rotor lift coefficient
CPR	rotor power coefficient
CXR	rotor propulsive force coefficient
DBAC	dBA corrected for background noise
DBAU	dBA uncorrected for background noise
DBC	dB corrected for background noise
DBU	dB uncorrected for background noise
MAT	advancing tip Mach number
MSLOT	blowing slot Mach number
MTIP	rotor tip Mach number
MTUN	tunnel Mach number
MU	advance ratio
PNDBC	PNdB corrected for background noise
PNDBU	PNdB uncorrected for background noise
THETA	collective pitch
VELOCITY	tunnel velocity, knots
VSLOT	blowing slot velocity, m/sec
VTIP	rotor tip velocity, m/sec

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 24							
POINT 5	60.0	-4.0	-0.01944	0.0*	160.8	0.559	-0.00229
	0.090	0.192	-2.8	0.0*	0.469	0.00023	
MICROPHONE 1							
MICROPHONE 2	103.4	103.2	108.4	108.2	115.5	115.3	
MICROPHONE 3	103.4	103.0	109.1	108.7	115.6	115.2	
MICROPHONE 4	102.8	102.5	107.8	107.6	115.1	114.8	
MICROPHONE 5	102.7	102.4	112.7	112.5	117.2	117.0	
MICROPHONE 6	103.9	103.6	110.4	110.2	117.0	116.6	
RUN 24							
POINT 15	59.8	-2.0	0.06092	257.6	161.2	0.555	0.00209
	0.090	0.191	-2.8	0.750	0.469	-0.00365	
MICROPHONE 1							
MICROPHONE 2	105.4	105.3	109.6	109.5	119.7	119.6	
MICROPHONE 3	106.7	106.5	111.1	110.8	121.6	121.5	
MICROPHONE 4	104.3	104.1	108.5	108.3	118.2	118.0	
MICROPHONE 5	106.3	106.1	110.5	110.2	121.1	120.9	
MICROPHONE 6	112.2	112.1	114.0	113.9	128.2	128.1	
RUN 47							
POINT 4	60.0	-2.0	0.06825	213.0	158.6	0.557	0.00268
	0.091	0.194	3.0	0.626	0.466	-0.00293	
MICROPHONE 1	109.2	109.2	111.7	111.6	123.5	123.4	
MICROPHONE 2	108.7	108.6	111.2	111.0	122.9	122.9	
MICROPHONE 3	109.6	109.5	112.2	112.0	124.0	123.8	
MICROPHONE 4	107.3	107.3	110.1	110.0	121.6	121.5	
MICROPHONE 5	110.0	109.9	111.9	111.7	124.2	124.1	
MICROPHONE 6							

* SET TC 0.0 WHEN THE COMPRESSERS WERE OFF.

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 47 POINT 6	59.9 0.091	-2.0 0.194	0.06850 3.0	220.4 0.648	158.6 0.466	0.557 -0.00294	0.00335
MICRCPHCNE 1	108.5	108.4	111.4	111.2	122.7	122.6	
MICROPHCNF 2	107.2	107.2	110.3	110.2	121.2	121.1	
MICROPHCNE 3	110.0	109.8	112.4	112.2	124.1	124.0	
MICROPHONE 4	108.1	108.0	110.7	110.6	122.3	122.2	
MICROPHCNE 5	109.1	109.0	111.3	111.0	123.1	122.9	
MICRCPHCNE 6							
RUN 47 POINT 5	59.8 0.090	-2.0 0.194	0.07081 3.0	219.8 0.646	158.6 0.466	0.557 -0.00325	0.00336
MICROPHCNE 1	109.6	109.5	112.0	111.9	123.9	123.8	
MICROPHONE 2	107.1	107.1	110.1	110.0	121.2	121.1	
MICROPHONE 3	107.5	107.4	110.3	110.0	121.5	121.3	
MICROPHONE 4	110.2	110.2	112.7	112.6	124.1	124.0	
MICRCPHCNE 5	110.2	110.2	112.7	112.5	124.5	124.4	
MICROPHCNE 6							
RUN 47 PCINT 7	59.7 0.090	-2.0 0.194	0.07422 3.0	210.6 0.619	158.6 0.466	0.556 -0.00459	0.00184
MICROPHONE 1	109.2	109.1	111.8	111.7	123.3	123.2	
MICROPHCNE 2	107.8	107.8	110.4	110.3	122.0	121.9	
MICRCPHCNE 3	111.2	111.1	113.5	113.4	125.3	125.2	
MICROPHONF 4	108.3	108.2	110.8	110.7	122.5	122.4	
MICROPHONE 5	108.8	108.7	111.9	111.7	122.6	122.5	
MICRCPHCNE 6							

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 24 POINT 4	60.5 0.091	0.0 0.194	-0.01019 -2.8	0.0* 0.0*	160.5 0.468	0.559 0.00025	-0.00094
MICROPHONE 1							
MICROPHONE 2	100.9	100.5	105.3	104.9	113.5	113.1	
MICROPHONE 3	100.9	100.1	107.2	106.6	113.8	113.1	
MICROPHONE 4	100.2	99.8	106.7	106.3	113.2	112.7	
MICROPHONE 5	100.7	100.2	109.5	109.1	114.4	114.0	
MICROPHONE 6	101.9	101.5	107.4	107.0	115.5	115.0	
RUN 24 POINT 3	60.3 0.090	0.0 0.192	0.01488 0.0	0.0* 0.0*	161.3 0.471	0.561 -0.00073	-0.00084
MICROPHONE 1							
MICROPHONE 2	101.8	101.5	105.6	105.1	114.3	114.0	
MICROPHONE 3	102.2	101.7	107.2	106.6	114.7	113.9	
MICROPHONE 4	101.2	100.9	105.5	105.0	113.3	112.8	
MICROPHONE 5	101.0	100.5	108.4	108.0	114.1	113.7	
MICROPHONE 6	92.6	87.6	97.6	92.2	105.6	96.2	
RUN 24 POINT 7	59.9 0.090	0.0 0.191	0.02896 -2.7	186.1 0.542	161.4 0.470	0.560 -0.00174	-0.00039
MICROPHONE 1							
MICROPHONE 2	108.8	108.8	111.6	111.5	123.0	122.9	
MICROPHONE 3	108.7	108.6	111.9	111.7	123.1	123.0	
MICROPHONE 4	107.1	107.0	110.4	110.3	121.5	121.4	
MICROPHONE 5	110.2	110.2	112.7	112.5	124.5	124.5	
MICROPHONE 6	113.8	113.8	[illegible]	115.6	128.6	128.6	

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 24 POINT 13	60.0 0.090	0.0 0.193	0.05021 0.3	188.9 0.550	159.9 0.465	0.555 -0.00202	0.00029
MICROPHONE 1							
MICROPHONE 2	108.6	108.5	110.9	110.8	122.1	122.1	
MICROPHONE 3	109.6	109.5	111.9	111.7	123.9	123.8	
MICROPHONE 4	107.5	107.4	110.6	110.4	122.0	121.9	
MICROPHONE 5	110.1	110.0	112.7	112.5	124.4	124.3	
MICROPHONE 6	112.8	112.8	114.4	114.3	127.4	127.3	
RUN 24 POINT 9	59.8 0.090	0.0 0.191	0.06004 -2.8	263.5 0.767	161.2 0.469	0.559 -0.00183	0.00128
MICROPHONE 1							
MICROPHONE 2	105.6	105.5	109.3	109.2	120.8	120.7	
MICROPHONE 3	107.6	107.[illegible]	112.1	111.9	123.4	123.3	
MICROPHONE 4	105.1	105.0	109.4	109.2	120.9	120.8	
MICROPHONE 5	107.7	107.6	111.7	111.4	123.0	122.9	
MICROPHONE 6	111.5	111.5	114.1	114.0	127.6	127.5	
RUN 24 POINT 12	59.8 0.090	0.0 0.191	0.06247 -2.8	262.8 0.765	161.1 0.469	0.559 -0.00386	0.00065
MICROPHONE 1							
MICROPHONE 2	105.6	105.5	109.3	109.1	120.1	120.0	
MICROPHONE 3	106.9	106.7	112.4	112.2	122.0	121.9	
MICROPHONE 4	105.5	105.3	109.6	109.5	120.2	120.1	
MICROPHONE 5	107.0	106.9	112.8	112.6	122.0	121.9	
MICROPHONE 6	111.1	111.1	113.9	113.8	127.1	127.0	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 24							
POINT 10	59.4	0.0	0.06360	262.2	161.0	0.558	-0.00124
	0.089	0.190	-2.8	0.763	0.469	-0.00499	
MICROPHONE 1							
MICROPHONE 2	106.6	106.5	110.0	109.9	121.5	121.4	
MICROPHONE 3	107.3	107.1	111.6	111.4	122.3	122.2	
MICROPHONE 4	105.7	105.6	110.2	110.0	120.7	120.6	
MICROPHONE 5	107.5	107.4	111.6	111.4	122.4	122.3	
MICROPHONE 6	111.2	111.1	112.9	112.8	127.0	127.0	
RUN 24							
POINT 8	59.8	0.0	0.06404	261.1	161.5	0.560	0.00038
	0.090	0.190	-2.8	0.760	0.470	-0.00375	
MICROPHONE 1							
MICROPHONE 2	105.8	105.7	109.6	109.4	120.4	120.3	
MICROPHONE 3	106.9	106.8	112.0	111.8	122.1	122.0	
MICROPHONE 4	105.1	105.0	109.1	108.9	119.9	119.8	
MICROPHONE 5	107.9	107.8	112.0	111.8	123.2	123.1	
MICROPHONE 6	110.7	110.6	113.3	113.2	126.5	126.5	
RUN 24							
POINT 11	59.6	0.0	0.06509	253.7	160.5	0.557	-0.00015
	0.089	0.191	-2.8	0.739	0.467	-0.00339	
MICROPHONE 1							
MICROPHONE 2	106.6	106.5	109.5	109.3	122.1	122.0	
MICROPHONE 3	106.9	106.8	111.3	111.1	121.8	121.7	
MICROPHONE 4	105.2	105.1	109.9	109.7	120.0	119.9	
MICROPHONE 5	107.1	107.0	110.4	110.1	121.9	121.8	
MICROPHONE 6	112.2	112.2	113.5	113.4	128.0	128.0	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 25 POINT 8	60.8 0.091	0.0 0.196	0.06717 -2.9	257.0 0.747	160.0 0.465	0.556 -0.00383	0.00030
MICROPHONE 1	107.0	106.9	112.6	112.5	121.5	121.5	
MICROPHONE 2	105.6	105.5	109.2	109.0	120.1	119.9	
MICROPHONE 3	106.1	105.9	111.5	111.3	120.7	120.5	
MICROPHONE 4	104.2	104.1	109.2	109.0	118.1	118.0	
MICROPHONE 5	107.8	107.6	111.9	111.6	123.2	123.1	
MICROPHONE 6	110.1	110.0	112.9	112.8	125.6	125.5	
RUN 24 POINT 14	60.2 0.090	0.0 0.193	0.08270 0.3	262.6 0.764	160.9 0.468	0.559 -0.00412	0.00101
MICROPHONE 1							
MICROPHONE 2	106.4	106.3	110.1	110.0	121.2	121.1	
MICROPHONE 3	106.8	106.7	111.6	111.4	121.7	121.5	
MICROPHONE 4	105.8	105.6	109.7	109.6	121.3	121.2	
MICROPHONE 5	107.2	107.1	111.1	110.9	121.9	121.8	
MICROPHONE 6	110.4	110.4	112.1	111.9	126.1	126.1	
RUN 24 POINT 16	59.3 0.089	2.0 0.188	0.06914 -2.7	259.2 0.755	162.1 0.472	0.561 -0.00388	-0.00201
MICROPHONE 1							
MICROPHONE 2	104.9	104.7	110.1	110.0	118.6	118.5	
MICROPHONE 3	106.1	105.9	112.0	111.9	121.2	121.1	
MICROPHONE 4	104.1	103.9	109.9	109.7	118.0	117.9	
MICROPHONE 5	105.7	105.6	112.2	112.0	121.4	121.3	
MICROPHONE 6	109.8	109.7	112.5	112.4	125.8	125.7	

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 24							
POINT 6	60.3	4.0	-0.00213	0.0*	161.3	0.561	-0.00090
	0.091	0.192	-2.8	0.0*	0.470	0.00015	
MICROPHONE 1							
MICROPHONE 2	101.1	100.7	106.4	106.0	114.1	113.8	
MICROPHONE 3	101.5	100.9	110.7	110.4	115.0	114.3	
MICROPHONE 4	99.9	99.5	105.9	105.5	113.0	112.5	
MICROPHONE 5	101.5	101.0	111.0	110.8	115.9	115.6	
MICROPHONE 6	101.8	101.4	107.4	106.9	115.4	115.0	
RUN 24							
POINT 17	59.8	4.0	0.03781	186.3	161.6	0.560	-0.00283
	0.090	0.190	-2.7	0.543	0.470	-0.00199	
MICROPHONE 1							
MICROPHONE 2	106.5	106.4	109.6	109.4	121.0	120.9	
MICROPHONE 3	108.1	108.0	112.0	111.8	122.7	122.6	
MICROPHONE 4	105.6	105.5	109.8	109.6	119.9	119.8	
MICROPHONE 5	109.2	109.2	111.7	111.5	124.2	124.1	
MICROPHONE 6	112.1	112.1	114.2	114.1	126.7	126.6	
RUN 25							
POINT 4	60.2	4.0	0.05878	231.5	161.6	0.560	-0.00335
	0.090	0.192	-2.9	0.674	0.470	-0.00129	
MICROPHONE 1	107.8	107.7	112.6	112.5	122.2	122.1	
MICROPHONE 2	106.7	106.6	109.7	109.6	120.7	120.6	
MICROPHONE 3	107.6	107.4	112.6	112.4	121.9	121.8	
MICROPHONE 4	105.6	105.5	109.3	109.1	119.9	119.8	
MICROPHONE 5	109.9	109.8	113.6	113.5	124.4	124.3	
MICROPHONE 6	112.5	112.4	114.2	114.1	126.5	126.4	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 25							
POINT 7	60.3	4.0	0.06196	234.9	160.7	0.557	-0.00411
	0.090	0.193	-2.9	0.683	0.467	-0.00330	
MICROPHCNE 1	108.0	107.9	113.4	113.4	122.4	122.3	
MICROPHONE 2	106.9	106.8	109.7	109.6	120.9	120.8	
MICRCPHCNE 3	107.5	107.3	112.3	112.1	121.5	121.4	
MICROPHCNE 4	105.7	105.5	109.6	109.4	119.5	119.4	
MICROPHCNE 5	110.0	109.9	113.5	113.3	124.5	124.4	
MICROPHCNE 6	112.5	112.4	114.6	114.5	126.9	126.9	
RUN 25							
POINT 5	60.2	4.0	0.06328	234.5	161.0	0.558	-0.00555
	0.090	0.192	-2.9	0.682	0.468	-0.00453	
MICROPHONE 1	108.5	108.4	112.6	112.5	122.2	122.1	
MICROPHONE 2	107.6	107.6	111.6	111.5	121.6	121.6	
MICROPHONE 3	108.2	108.1	112.8	112.6	122.1	122.0	
MICROPHONE 4	106.3	106.2	110.8	110.6	120.1	120.0	
MICROPHONE 5	109.8	109.7	112.6	112.4	124.2	124.1	
MICROPHONE 6	112.0	112.0	114.4	114.3	125.9	125.9	
RUN 25							
POINT 3	60.3	4.0	0.06330	236.6	161.4	0.560	-0.00424
	0.090	0.192	-2.9	0.688	0.469	-0.00324	
MICROPHCNF 1	108.2	108.1	112.9	112.8	122.5	122.5	
MICROPHCNE 2	107.1	107.0	110.6	110.5	121.2	121.2	
MICROPHONE 3	107.9	107.8	112.7	112.6	122.3	122.2	
MICRCPHCNE 4	106.0	105.9	110.4	110.3	120.2	120.1	
MICROPHCNE 5	109.9	109.8	112.6	112.5	124.3	124.3	
MICROPHONE 6	112.4	112.4	114.4	114.3	126.9	126.8	

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBA	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 25 POINT 6	60.2 0.090	4.0 0.192	0.06330 -2.9	223.8 0.650	160.8 0.467	0.557 -0.00316	-0.00461
MICROPHONE 1	107.9	107.9	112.6	112.5	122.1	122.0	
MICROPHONE 2	106.9	106.8	110.8	110.6	121.0	120.9	
MICROPHONE 3	107.7	107.6	112.3	112.1	122.3	122.2	
MICROPHONE 4	105.7	105.6	109.8	109.7	119.7	119.6	
MICROPHONE 5	109.7	109.7	112.0	111.7	124.3	124.2	
MICROPHONE 6	112.1	112.0	114.2	114.1	126.4	126.4	
RUN 24 POINT 20	60.3 0.090	4.0 0.192	0.07114 -2.6	262.2 0.763	161.3 0.469	0.559 -0.00201	-0.00349
MICROPHONE 1							
MICROPHONE 2	103.8	103.6	109.5	109.3	117.8	117.7	
MICROPHONE 3	105.3	105.1	111.8	111.6	120.5	120.3	
MICROPHONE 4	102.7	102.5	109.5	109.3	117.4	117.2	
MICROPHONE 5	104.5	104.3	110.9	110.6	119.7	119.5	
MICROPHONE 6	108.2	108.1	112.0	111.9	123.9	123.8	
RUN 24 POINT 18	59.8 0.090	4.0 0.191	0.07362 -2.7	265.1 0.771	161.2 0.469	0.558 -0.00400	-0.00465
MICROPHONE 1							
MICROPHONE 2	105.3	105.2	110.3	110.1	119.3	119.2	
MICROPHONE 3	106.7	106.5	112.4	112.3	121.4	121.3	
MICROPHONE 4	104.4	104.3	109.9	109.7	118.1	118.0	
MICROPHONE 5	106.3	106.2	112.1	111.9	121.1	121.0	
MICROPHONE 6	110.8	110.7	112.9	112.8	126.8	126.7	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 25 POINT 12	90.2 0.135	0.0 0.290	-0.01459 -2.8	0.0* 0.0*	160.3 0.466	0.601 0.00138	-0.00132
MICROPHONE 1	105.0	103.8	112.3	111.6	118.3	116.9	
MICROPHONE 2	104.1	102.7	109.0	107.5	117.3	115.7	
MICROPHONE 3	104.5	102.4	111.7	110.5	117.8	115.4	
MICROPHONE 4	103.6	102.0	109.3	107.8	116.7	114.3	
MICROPHONE 5	105.1	103.1	114.2	113.3	119.2	117.6	
MICROPHONE 6	104.6	102.7	109.4	107.1	118.0	115.1	
RUN 25 POINT 13	90.6 0.135	0.0 0.289	0.03061 -2.8	179.9 0.523	161.4 0.469	0.605 -0.00163	-0.00047
MICROPHONE 1	109.9	109.5	114.2	113.7	123.6	123.2	
MICROPHONE 2	109.3	108.9	112.5	111.9	123.2	122.7	
MICROPHONE 3	110.0	109.5	113.1	112.3	124.4	123.8	
MICROPHONE 4	107.8	107.2	111.6	110.7	121.8	121.1	
MICROPHONE 5	110.1	109.6	113.8	112.7	124.7	124.1	
MICROPHONE 6	113.9	113.7	116.2	115.8	127.8	127.5	
RUN 25 POINT 17	90.6 0.136	0.0 0.289	0.06036 -2.8	251.0 0.729	161.1 0.468	0.604 -0.00196	0.00097
MICROPHONE 1	107.2	106.5	114.2	113.8	121.7	121.1	
MICROPHONE 2	106.2	105.4	111.1	110.2	120.7	120.0	
MICROPHONE 3	106.6	105.5	113.0	112.2	121.1	120.1	
MICROPHONE 4	105.1	104.0	111.2	110.3	119.5	118.4	
MICROPHONE 5	107.9	106.9	114.1	113.1	122.5	121.6	
MICROPHONE 6	109.2	108.6	114.1	113.4	124.0	123.4	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 25 POINT 14	90.8 0.136	0.0 0.290	0.06282 -2.8	239.3 0.696	160.9 0.468	0.603 -0.00346	0.00044
MICROPHONE 1	107.8	107.1	112.8	112.1	121.7	121.2	
MICROPHONE 2	106.9	106.2	111.6	110.8	121.4	120.8	
MICROPHONE 3	107.4	106.4	113.2	112.3	121.8	121.0	
MICROPHONE 4	106.0	105.0	111.8	111.0	120.3	119.3	
MICROPHONE 5	106.2	104.6	111.8	110.0	120.8	119.1	
MICROPHONE 6	110.2	109.7	114.4	113.7	125.2	124.7	
RUN 25 POINT 18	90.1 0.135	0.0 0.288	0.06529 -2.9	236.9 0.688	161.2 0.468	0.603 -0.00327	-0.00016
MICROPHONE 1	108.4	107.9	113.1	112.5	122.8	122.3	
MICROPHONE 2	106.6	105.8	111.2	110.4	120.9	120.3	
MICROPHONE 3	107.0	106.0	113.1	112.2	121.0	120.1	
MICROPHONE 4	106.1	105.2	111.9	111.1	120.5	119.7	
MICROPHONE 5	107.3	106.2	112.9	111.6	121.9	120.8	
MICROPHONE 6	110.8	110.4	113.9	113.2	126.3	125.8	
RUN 25 POINT 15	90.4 0.135	4.0 0.289	0.04170 -2.8	182.5 0.531	161.0 0.468	0.603 -0.00240	-0.00310
MICROPHONE 1	109.5	109.1	113.3	112.7	123.1	122.7	
MICROPHONE 2	108.9	108.5	112.2	111.5	122.7	122.2	
MICROPHONE 3	109.1	108.5	113.0	112.2	122.8	122.2	
MICROPHONE 4	107.5	106.9	111.9	111.2	121.3	120.6	
MICROPHONE 5	111.3	110.9	114.3	113.3	125.8	125.3	
MICROPHONE 6	113.8	113.6	116.3	115.8	127.8	127.5	

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 25							
POINT 16	90.2	4.0	0.06206	220.7	161.0	0.603	-0.00433
	0.135	0.288	-2.8	0.641	0.468	-0.00338	
MICROPHONE 1	108.1	107.5	112.8	112.1	122.3	121.8	
MICROPHONE 2	107.4	106.7	111.7	110.9	121.5	121.0	
MICROPHONE 3	108.1	107.3	112.9	112.0	122.0	121.3	
MICROPHONE 4	106.6	105.9	111.7	110.9	121.0	120.3	
MICROPHONE 5	109.7	109.2	113.2	112.0	123.9	123.2	
MICROPHONE 6	112.3	112.0	115.3	114.7	126.5	126.1	
RUN 25							
POINT 20	119.8	-2.0	-0.02558	0.0*	161.4	0.647	-0.00299
	0.179	0.382	-2.9	0.0*	0.468	0.00279	
MICROPHONE 1	109.2	107.0	115.5	114.0	122.6	119.2	
MICROPHONE 2	108.2	105.6	113.3	110.6	121.9	118.6	
MICROPHONE 3	108.7	105.4	114.7	112.5	121.9	117.4	
MICROPHONE 4	108.0	105.1	112.7	109.7	120.9	116.5	
MICROPHONE 5	109.3	104.4	117.2	114.8	123.4	118.0	
MICROPHONE 6	109.6	106.6	115.9	113.8	123.1	118.8	
RUN 25							
POINT 19	119.8	0.0	-0.01465	0.0*	161.2	0.647	-0.00201
	0.179	0.382	-2.8	0.0*	0.468	0.00227	
MICROPHONE 1	108.8	106.2	115.7	114.2	122.7	119.4	
MICROPHONE 2	107.9	105.0	113.2	110.5	122.1	118.7	
MICROPHONE 3	109.0	106.1	114.3	111.6	122.1	117.7	
MICROPHONE 4	108.0	105.0	112.6	109.3	121.4	117.3	
MICROPHONE 5	109.9	105.9	118.0	116.0	123.8	119.9	
MICROPHONE 6	109.4	106.2	115.1	112.4	123.2	118.8	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27 POINT 25	119.8	0.0	0.00953	194.7	160.6	0.640	-0.00146
	0.178	0.384	-4.1	0.561	0.463	-0.00110	
MICROPHONE 1	110.7	109.2	115.0	113.3	124.3	122.6	
MICROPHONE 2	110.2	108.7	115.2	113.7	123.8	121.7	
MICROPHONE 3	110.8	109.0	115.7	113.7	124.3	121.7	
MICROPHONE 4	109.4	107.4	115.0	113.4	123.2	120.6	
MICROPHONE 5	111.8	109.8	117.4	114.9	126.6	124.7	
MICROPHONE 6	115.8	115.2	118.4	117.3	130.7	129.5	
RUN 27 POINT 3	119.6	0.0	0.02302	184.9	161.5	0.651	-0.00103
	0.180	0.381	-3.2	0.540	0.471	-0.00142	
MICROPHONE 1	111.2	109.9	116.8	115.6	125.1	123.7	
MICROPHONE 2	110.5	109.1	114.5	112.7	124.2	122.2	
MICROPHONE 3	111.1	109.5	115.6	113.7	124.7	122.8	
MICROPHONE 4	110.0	108.3	115.1	113.5	123.5	121.2	
MICROPHONE 5	110.5	107.4	116.2	112.2	125.2	122.1	
MICROPHONE 6	115.8	115.3	118.2	117.0	130.6	129.9	
RUN 27 POINT 24	119.7	0.0	0.03387	190.5	159.7	0.638	-0.00046
	0.177	0.386	-1.6	0.549	0.460	-0.00130	
MICROPHONE 1	111.0	109.6	114.8	112.7	125.3	123.5	
MICROPHONE 2	110.4	109.0	114.7	112.9	124.7	122.9	
MICROPHONE 3	110.8	109.0	115.5	113.4	124.9	122.7	
MICROPHONE 4	109.7	107.8	114.5	112.7	123.4	120.6	
MICROPHONE 5	111.9	109.8	116.4	113.1	126.4	124.2	
MICROPHONE 6	115.3	114.6	118.0	116.8	129.8	128.5	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27 POINT 6	120.8 0.180	0.0 0.385	0.03478 -3.1	225.9 0.654	161.6 0.468	0.647 -0.00083	-0.00067
MICROPHONE 1	110.2	108.4	116.2	114.7	124.5	122.6	
MICROPHONE 2	109.9	108.1	114.8	113.0	124.1	122.0	
MICROPHONE 3	110.6	108.6	116.2	114.4	124.6	122.6	
MICROPHONE 4	109.3	107.1	114.6	112.6	123.2	120.5	
MICROPHONE 5	112.1	110.1	117.4	114.8	127.3	125.3	
MICROPHONE 6	114.8	114.0	117.7	116.4	130.0	129.1	
RUN 27 POINT 21	119.9 0.178	0.0 0.429	0.03542 -3.2	230.8 0.665	143.7 0.414	0.592 -0.00103	0.00013
MICROPHONE 1	109.6	107.5	114.7	112.6	124.1	121.8	
MICROPHONE 2	108.5	105.9	114.0	112.0	122.8	119.7	
MICROPHONE 3	109.2	106.4	115.1	112.9	122.9	118.9	
MICROPHONE 4	108.3	105.6	115.1	113.5	122.4	119.0	
MICROPHONE 5	110.8	107.9	115.8	111.8	125.0	121.7	
MICROPHONE 6	113.8	112.8	116.5	114.6	128.5	127.1	
RUN 27 POINT 8	120.9 0.180	0.0 0.386	0.04208 -3.1	218.2 0.631	161.3 0.466	0.646 -0.00248	-0.00046
MICROPHONE 1	110.8	109.2	115.5	113.8	125.2	123.4	
MICROPHONE 2	110.1	108.4	114.5	112.5	123.8	121.4	
MICROPHONE 3	110.5	108.4	115.4	113.1	124.3	122.1	
MICROPHONE 4	109.6	107.6	115.0	113.3	123.8	121.4	
MICROPHONE 5	112.5	110.6	116.9	114.2	127.3	125.5	
MICROPHONE 6	115.2	114.4	118.2	117.0	130.5	129.6	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU CBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27 POINT 9	120.3 0.179	0.0 0.385	0.04304 -3.2	213.5 0.617	160.6 0.464	0.643 -0.00232	-0.00113
MICROPHONE 1	110.8	109.3	115.8	114.1	125.4	123.7	
MICROPHONE 2	110.0	108.4	114.9	113.2	124.0	122.0	
MICROPHONE 3	110.7	108.8	116.0	114.2	125.1	123.1	
MICROPHONE 4	109.6	107.6	115.5	114.0	124.0	121.8	
MICROPHONE 5	112.8	111.1	117.5	115.0	127.9	126.4	
MICROPHONE 6	115.1	114.4	117.7	116.4	130.1	129.0	
RUN 27 POINT 23	119.9 0.178	0.0 0.429	0.04390 -3.2	233.0 0.671	143.8 0.414	0.592 -0.00191	0.00054
MICROPHONE 1	109.3	107.0	114.9	113.0	123.7	121.4	
MICROPHONE 2	108.6	106.2	113.9	111.7	122.7	119.9	
MICROPHONE 3	109.4	106.6	113.8	110.6	123.2	119.8	
MICROPHONE 4	108.2	105.3	114.6	112.8	122.0	118.6	
MICROPHONE 5	110.7	107.7	115.4	110.7	124.8	121.1	
MICROPHONE 6	113.6	112.6	116.8	115.1	128.4	127.1	
RUN 27 POINT 7	120.9 0.180	0.0 0.386	0.04506 -3.2	227.0 0.657	161.2 0.466	0.646 -0.00415	-0.00117
MICROPHONE 1	111.0	109.6	116.0	114.4	125.6	124.0	
MICROPHONE 2	110.2	108.6	114.5	112.6	124.4	122.2	
MICROPHONE 3	111.3	109.6	115.9	114.0	125.7	124.0	
MICROPHONE 4	110.0	108.2	115.4	113.9	124.3	122.0	
MICROPHONE 5	112.1	110.1	116.9	113.9	126.7	124.7	
MICROPHONE 6	115.0	114.2	118.1	116.9	130.0	129.0	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27							
POINT 22	120.0	0.0	0.04582	224.8	143.4	0.591	-0.00012
	0.178	0.431	-3.2	0.647	0.413	-0.00291	
MICROPHONE 1	109.6	107.5	114.7	112.6	124.3	122.1	
MICROPHONE 2	109.0	106.7	114.2	112.2	123.5	121.1	
MICROPHONE 3	109.9	107.5	114.4	111.9	123.6	120.3	
MICROPHONE 4	108.7	106.2	115.2	113.6	123.1	120.1	
MICROPHONE 5	110.9	108.1	115.8	112.1	125.5	122.0	
MICROPHONE 6	113.9	112.9	117.1	115.5	128.8	127.6	
RUN 47							
POINT 12	119.8	0.0	0.04806	139.9	151.0	0.624	0.00008
	0.181	0.408	-2.2	0.410	0.443	-0.00261	
MICROPHONE 1	111.4	110.2	115.2	113.3	125.9	124.4	
MICROPHONE 2	110.4	108.9	114.3	112.3	124.9	123.4	
MICROPHONE 3	111.4	109.9	115.0	112.7	126.0	124.1	
MICROPHONE 4	110.3	108.8	115.0	113.3	124.2	122.4	
MICROPHONE 5	111.4	109.1	116.3	113.0	125.6	123.0	
MICROPHONE 6							
RUN 47							
POINT 11	119.7	0.0	0.05131	194.6	150.8	0.623	0.00012
	0.181	0.408	-1.2	0.571	0.442	-0.00240	
MICROPHONE 1	110.4	108.9	114.7	112.5	124.4	122.6	
MICROPHONE 2	109.9	108.2	114.2	112.2	123.9	122.3	
MICROPHONE 3	110.9	109.1	114.5	111.8	125.2	123.0	
MICROPHONE 4	110.3	108.7	114.9	113.2	124.1	122.1	
MICROPHONE 5	112.6	110.9	117.3	114.9	127.1	125.2	
MICROPHONE 6							

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBL	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 47 POINT 9	119.8 0.181	0.0 0.383	0.05654 -0.0	186.1 0.546	160.8 0.472	0.653 -0.00308	-0.00013
MICROPHONE 1	111.8	110.7	116.6	115.4	126.2	124.5	
MICROPHONE 2	110.5	109.1	114.2	112.2	124.6	123.2	
MICROPHONE 3	111.2	109.5	115.4	113.2	125.4	123.6	
MICROPHONE 4	111.2	110.0	115.1	113.5	125.3	123.8	
MICROPHONE 5	111.8	109.7	116.8	113.7	126.4	124.2	
MICROPHONE 6							
RUN 47 POINT 10	119.7 0.181	0.0 0.407	0.05866 -0.0	198.7 0.583	151.2 0.444	0.624 -0.00377	-0.00002
MICROPHONE 1	110.6	109.1	114.8	112.8	124.5	123.0	
MICROPHONE 2	110.8	109.4	114.5	112.7	125.1	123.8	
MICROPHONE 3	111.0	109.2	115.0	112.6	125.3	123.6	
MICROPHONE 4	110.9	109.5	115.0	113.4	124.7	123.0	
MICROPHONE 5	111.4	109.1	115.7	112.2	125.4	122.7	
MICROPHONE 6							
RUN 27 POINT 5	120.2 0.180	0.0 0.384	0.06070 -3.2	257.7 0.751	161.0 0.46[illegible]	0.649 -0.00333	-0.00021
MICROPHONE 1	109.3	107.0	115.9	114.3	[illegible]	121.0	
MICROPHONE 2	108.6	106.1	114.3	112.4	122.4	120.0	
MICROPHONE 3	109.1	106.0	115.6	113.6	122.5	118.9	
MICROPHONE 4	108.8	106.3	115.7	114.3	122.2	119.0	
MICROPHONE 5	110.7	107.7	117.8	115.5	124.9	122.1	
MICROPHONE 6	111.3	109.3	117.2	115.6	125.5	123.6	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 47 POINT 13	119.8 0.181	0.0 0.409	0.06173 -2.2	201.1 0.590	150.6 0.442	0.622 -0.00342	0.00043
MICROPHONE 1	110.0	108.2	114.7	112.6	124.4	122.5	
MICROPHONE 2	108.9	106.6	114.1	112.0	123.1	121.1	
MICROPHONE 3	108.9	105.8	113.9	110.5	122.8	119.4	
MICROPHONE 4	109.9	108.1	115.0	113.3	123.8	121.6	
MICROPHONE 5	110.4	107.1	115.9	112.0	124.8	121.2	
MICROPHONE 6							
RUN 25 POINT 21	120.0 0.179	2.0 0.383	-0.00406 -2.8	0.0* 0.0*	161.[illegible] 0.467	0.646 0.00120	-0.00178
MICROPHONE 1	108.4	105.4	114.4	112.0	121.8	117.7	
MICROPHONE 2	107.8	104.7	112.6	109.5	121.5	117.7	
MICROPHONE 3	107.9	103.3	113.1	108.8	121.1	114.6	
MICROPHONE 4	107.7	104.4	112.3	108.7	120.8	115.4	
MICROPHONE 5	109.3	104.3	116.6	113.7	123.1	118.0	
MICROPHONE 6	108.8	104.9	114.7	111.7	122.5	117.5	
RUN 47 POINT 18	120.0 0.180	2.0 0.408	0.07699 -3.2	280.1 0.818	151.2 0.442	0.622 -0.00524	-0.00184
MICROPHONE 1	110.5	108.9	115.7	114.0	125.2	123.8	
MICROPHONE 2	110.1	108.5	115.7	114.4	124.9	123.5	
MICROPHONE 3	110.8	109.0	115.6	113.6	125.7	123.8	
MICROPHONE 4	110.3	108.7	115.2	113.6	124.8	123.2	
MICROPHONE 5							
MICROPHONE 6							

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBL	VTIP MTIP PNDBU	MAT CPR PNDBC	CXP
RUN 47 POINT 24	120.2 0.180	3.0 0.408	0.05874 -3.1	249.8 0.728	151.4 0.441	0.621 -0.00317	-0.00291
MICROPHONE 1							
MICROPHONE 2	109.7	107.9	114.8	113.1	124.1	122.4	
MICROPHONE 3	110.2	108.0	114.9	112.4	125.0	122.8	
MICROPHONE 4	110.9	109.5	115.3	113.8	124.9	123.3	
MICROPHONE 5							
MICROPHONE 6							
RUN 47 POINT 19	119.7 0.180	3.0 0.407	0.06206 -3.1	245.7 0.718	151.2 0.442	0.621 -0.00420	-0.00350
MICROPHONE 1	109.6	107.5	114.3	111.8	123.5	121.4	
MICROPHONE 2	109.2	107.2	114.3	112.4	123.2	121.0	
MICROPHONE 3	109.3	106.4	114.9	112.5	123.1	120.0	
MICROPHONE 4	110.8	109.5	115.7	114.4	124.7	123.2	
MICROPHONE 5							
MICROPHONE 6							
RUN 47 POINT 20	119.8 0.180	3.0 0.408	0.06334 -3.2	239.6 0.699	151.3 0.441	0.621 -0.00389	-0.00344
MICROPHONE 1							
MICROPHONE 2	109.8	108.1	115.0	113.4	124.3	122.6	
MICROPHONE 3	109.2	106.2	115.0	112.7	123.2	119.9	
MICROPHONE 4	110.8	109.4	115.8	114.4	125.1	123.0	
MICROPHONE 5							
MICROPHONE 6							

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 47							
POINT 22	120.0	3.0	0.06341	238.1	151.5	0.622	-0.00397
	0.180	0.407	-3.2	0.694	0.442	-0.00439	
MICROPHONE 1							
MICROPHONE 2	109.6	107.8	115.2	113.6	124.0	122.5	
MICROPHONE 3	110.0	107.7	115.2	113.1	124.4	121.9	
MICROPHONE 4	110.7	109.2	115.6	114.2	124.8	123.2	
MICROPHONE 5							
MICROPHONE 6							
RUN 47							
POINT 23	120.0	3.0	0.06853	231.9	151.3	0.621	-0.00423
	0.180	0.408	-3.2	0.676	0.441	-0.00626	
MICROPHONE 1							
MICROPHONE 2	109.9	108.2	115.4	113.9	124.3	122.8	
MICROPHONE 3	110.3	108.1	115.2	112.9	124.7	122.5	
MICROPHONE 4	110.9	109.5	115.4	113.9	125.0	123.5	
MICROPHONE 5							
MICROPHONE 6							
RUN 47							
POINT 21	120.0	3.0	0.07665	281.1	151.3	0.621	-0.00347
	0.180	0.408	-3.2	0.820	0.441	-0.00503	
MICROPHONE 1							
MICROPHONE 2	109.1	107.0	115.0	113.4	123.4	121.6	
MICROPHONE 3	109.3	106.6	115.0	112.6	123.8	120.9	
MICROPHONE 4	110.3	109.6	115.6	114.1	124.5	122.5	
MICROPHONE 5							
MICROPHONE 6							

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBL	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27							
POINT 30	119.8	4.0	-0.02282	0.0*	161.2	0.642	-0.00087
	0.178	0.382	-4.4	0.0*	0.464	0.00222	
MICROPHONE 1	107.3	102.9	114.6	112.4	121.0	116.1	
MICROPHONE 2	107.4	103.8	113.1	110.3	121.1	116.6	
MICROPHONE 3	108.4	104.4	115.5	113.4	121.9	117.2	
MICROPHONE 4	107.7	104.3	113.5	111.0	120.8	116.0	
MICROPHONE 5	108.6	101.7	115.1	110.4	122.3	114.5	
MICROPHONE 6	108.9	105.2	115.6	113.3	122.6	117.7	
RUN 27							
POINT 28	119.8	4.0	-0.00178	132.5	159.7	0.638	-0.00147
	0.177	0.386	-4.4	0.382	0.460	0.00062	
MICROPHONE 1	108.9	106.5	114.6	112.4	122.3	119.4	
MICROPHONE 2	108.6	106.2	114.6	112.8	122.4	120.1	
MICROPHONE 3	109.0	106.0	115.2	113.0	122.6	119.5	
MICROPHONE 4	108.6	106.0	114.9	113.3	122.9	120.2	
MICROPHONE 5	109.8	105.9	116.1	112.7	124.3	119.7	
MICROPHONE 6	110.8	108.7	116.4	114.6	125.3	123.4	
RUN 25							
POINT 22	119.9	4.0	0.00578	0.0*	161.1	0.647	-0.00231
	0.179	0.383	-2.9	0.0*	0.468	0.00021	
MICROPHONE 1	108.2	105.0	114.4	112.0	121.6	117.6	
MICROPHONE 2	107.3	103.7	112.2	108.3	120.8	116.3	
MICROPHONE 3	107.9	103.6	113.4	109.8	120.9	114.6	
MICROPHONE 4	107.5	104.0	111.7	107.7	120.4	114.7	
MICROPHONE 5	108.9	102.9	116.7	113.5	122.8	116.5	
MICROPHONE 6	108.8	104.9	115.2	112.6	122.4	117.8	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU CBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27 POINT 26	119.7 0.177	4.0 0.382	0.02039 -4.4	191.0 0.550	161.1 0.464	0.641 -0.00225	-0.00254
MICROPHONE 1	110.6	109.1	115.4	113.7	124.8	123.1	
MICROPHONE 2	110.2	108.6	115.2	113.7	123.8	121.8	
MICROPHONE 3	110.5	108.6	115.7	113.9	124.2	121.6	
MICROPHONE 4	109.4	107.4	114.6	112.7	123.1	120.3	
MICROPHONE 5	111.8	109.7	116.6	113.8	126.0	123.7	
MICROPHONE 6	115.5	114.8	118.7	117.7	130.3	129.6	
RUN 27 POINT 10	120.2 0.179	4.0 0.385	0.03642 -3.1	190.3 0.550	160.6 0.464	0.643 -0.00189	-0.00336
MICROPHONE 1	110.8	109.3	115.5	113.9	124.6	122.9	
MICROPHONE 2	110.5	109.0	114.6	112.7	124.3	122.3	
MICROPHONE 3	111.6	110.1	115.4	113.2	125.8	123.7	
MICROPHONE 4	109.9	108.2	115.6	114.2	123.9	121.6	
MICROPHONE 5	112.4	110.6	116.9	114.1	127.3	125.5	
MICROPHONE 6	115.2	114.5	117.9	116.7	129.7	128.8	
RUN 27 POINT 14	120.2 0.179	4.0 0.385	0.04366 -3.1	199.9 0.577	160.7 0.464	0.643 -0.00298	-0.00445
MICROPHONE 1	110.5	108.9	115.5	113.8	125.0	123.3	
MICROPHONE 2	110.4	108.9	114.9	113.2	124.7	122.9	
MICROPHONE 3	110.8	108.9	115.9	114.1	124.8	122.5	
MICROPHONE 4	110.2	108.5	115.5	114.1	124.8	122.8	
MICROPHONE 5	112.5	110.7	116.9	114.2	127.3	125.2	
MICROPHONE 6	116.1	115.5	118.2	117.1	131.1	130.2	

X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27							
POINT 15	120.2	4.0	0.04542	211.8	161.4	0.645	-0.00337
	0.179	0.383	-3.1	0.612	0.466	-0.00198	
MICROPHONE 1	111.0	109.6	115.9	114.3	125.3	123.8	
MICROPHONE 2	110.4	109.0	114.5	112.6	124.7	122.9	
MICROPHONE 3	111.2	109.6	115.5	113.5	125.7	124.0	
MICROPHONE 4	110.0	108.2	115.4	113.9	124.3	122.2	
MICROPHONE 5	112.5	110.8	117.3	114.8	127.4	125.8	
MICROPHONE 6	116.8	116.4	118.6	117.6	132.0	131.3	
RUN 27							
POINT 13	120.2	4.0	0.04846	205.4	161.8	0.646	-0.00429
	0.179	0.382	-3.1	0.593	0.467	-0.00426	
MICROPHONE 1	111.0	109.6	115.4	113.7	125.2	123.5	
MICROPHONE 2	110.5	109.0	114.6	112.8	124.6	122.8	
MICROPHONE 3	111.2	109.6	115.5	113.5	125.0	123.1	
MICROPHONE 4	109.8	107.9	115.4	113.9	123.9	121.5	
MICROPHONE 5	112.0	110.1	116.7	113.7	126.6	124.6	
MICROPHONE 6	115.9	115.4	118.4	117.3	131.0	130.2	
RUN 27							
POINT 27	119.6	4.0	0.06078	255.5	161.4	0.642	-0.00492
	0.177	0.381	-4.5	0.736	0.465	-0.00412	
MICROPHONE 1	109.4	107.3	115.5	113.8	122.8	120.4	
MICROPHONE 2	109.0	106.8	115.3	113.8	122.3	119.7	
MICROPHONE 3	108.8	105.5	115.6	113.7	121.8	118.1	
MICROPHONE 4	108.5	105.9	114.9	113.3	121.4	117.7	
MICROPHONE 5	109.9	106.1	116.9	114.1	124.4	121.0	
MICROPHONE 6	111.0	109.0	117.3	115.9	125.7	123.7	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27 POINT 29	119.7 0.177	4.0 0.381	0.06103 -4.5	259.2 0.747	161.8 0.466	0.643 -0.00408	-0.00500
MICROPHONE 1	109.6	107.6	116.0	114.5	122.9	120.4	
MICROPHONE 2	109.2	107.2	115.3	113.9	122.3	120.0	
MICROPHONE 3	109.4	106.7	116.0	114.2	122.4	119.1	
MICROPHONE 4	108.5	105.8	114.3	112.2	122.0	118.9	
MICROPHONE 5	110.0	106.3	116.0	112.6	124.4	120.6	
MICROPHONE 6	111.6	109.9	117.5	116.1	126.5	124.9	
RUN 27 POINT 31	139.6 0.207	0.0 0.445	-0.02178 -3.1	0.0* 0.0*	161.3 0.465	0.672 0.00262	-0.00250
MICROPHONE 1	110.6	106.0	118.2	116.3	124.3	118.5	
MICROPHONE 2	110.3	106.0	116.5	113.9	124.1	118.5	
MICROPHONE 3	110.7	105.2	117.1	114.0	124.2	117.8	
MICROPHONE 4	110.6	106.5	115.0	110.9	123.8	117.8	
MICROPHONE 5	112.2	104.9	119.8	116.3	126.0	116.9	
MICROPHONE 6	112.7	109.3	117.8	114.4	126.0	121.0	
RUN 27 POINT 35	140.0 0.207	0.0 0.448	0.01675 -3.3	186.0 0.536	161.0 0.463	0.671 -0.00097	-0.00124
MICROPHONE 1	112.6	110.1	118.1	116.0	126.6	123.6	
MICROPHONE 2	111.5	108.6	117.1	114.7	125.3	121.7	
MICROPHONE 3	113.4	111.1	118.0	115.5	127.4	124.2	
MICROPHONE 4	111.4	108.1	115.3	111.5	124.4	119.2	
MICROPHONE 5	113.5	109.1	119.9	116.2	127.5	122.6	
MICROPHONE 6	115.4	113.7	119.6	117.5	129.1	126.5	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27							
POINT 37	140.0	0.0	0.04719	255.7	161.4	0.671	-0.00043
	0.207	0.446	-3.3	0.735	0.464	-0.00315	
MICROPHONE 1	110.6	105.7	117.8	115.7	124.4	118.7	
MICROPHONE 2	109.9	104.7	116.4	113.6	123.9	117.8	
MICROPHONE 3	111.1	106.2	118.0	115.4	124.4	117.8	
MICROPHONE 4	110.5	106.4	115.1	110.6	123.5	116.0	
MICROPHONE 5	112.1	105.0	119.7	115.9	125.8	116.5	
MICROPHONE 6	112.4	108.4	118.1	115.1	125.9	119.8	
RUN 27							
POINT 36	139.9	0.0	0.04971	249.8	161.0	0.671	-0.00063
	0.207	0.447	-3.3	0.719	0.463	-0.00307	
MICROPHONE 1	111.3	107.6	118.1	116.1	125.1	121.2	
MICROPHONE 2	110.7	106.7	117.2	114.9	124.8	120.0	
MICROPHONE 3	111.3	106.5	118.5	116.3	124.8	119.6	
MICROPHONE 4	110.6	106.4	115.5	111.5	123.7	117.2	
MICROPHONE 5	112.7	106.7	119.2	114.7	126.4	118.0	
MICROPHONE 6	113.3	110.3	118.9	116.5	127.0	123.0	
RUN 27							
POINT 32	139.8	2.0	-0.01113	0.0*	161.1	0.671	-0.00219
	0.207	0.446	-3.2	0.0*	0.464	0.00156	
MICROPHONE 1	110.7	106.0	117.4	115.1	124.3	118.7	
MICROPHONE 2	110.1	105.3	116.3	113.3	124.2	119.2	
MICROPHONE 3	110.5	104.3	117.1	113.8	123.9	116.3	
MICROPHONE 4	110.0	104.9	114.7	110.1	123.0	114.6	
MICROPHONE 5	112.4	106.3	119.9	116.4	126.1	117.9	
MICROPHONE 6	112.7	109.2	118.2	115.3	126.1	120.9	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 27 POINT 34	140.0 0.207	4.0 0.446	-0.01462 -4.1	0.0* 0.0*	161.3 0.464	0.672 0.00190	-0.00190
MICROPHONE 1	110.3	105.0	118.3	116.4	124.1	117.7	
MICROPHONE 2	109.7	104.3	115.5	111.7	123.5	116.7	
MICROPHONE 3	110.1	102.8	116.7	113.0	123.3	112.9	
MICROPHONE 4	110.2	105.8	114.9	110.6	123.3	115.0	
MICROPHONE 5	112.0	104.6	119.9	116.4	125.9	116.6	
MICROPHONE 6	112.5	108.7	118.0	114.9	125.7	120.1	
RUN 27 POINT 33	139.9 0.207	4.0 0.446	0.00164 -3.2	0.0* 0.0*	161.5 0.465	0.672 0.00008	-0.00258
MICROPHONE 1	110.3	105.0	116.9	114.3	124.1	117.7	
MICROPHONE 2	109.9	104.7	115.7	112.3	123.8	117.8	
MICROPHONE 3	110.2	102.9	116.5	112.4	123.5	115.4	
MICROPHONE 4	110.5	106.4	114.9	110.4	123.4	115.5	
MICROPHONE 5	111.8	104.0	119.7	116.0	125.7	115.7	
MICROPHONE 6	112.3	108.1	117.8	114.5	125.5	119.5	
RUN 28 POINT 20	188.7 0.276	0.0 0.603	0.01886 -2.1	182.4 0.518	161.1 0.457	0.733 -0.00086	-0.00031
MICROPHONE 1	117.3	112.3	124.2	121.3	131.4	124.9	
MICROPHONE 2	117.1	111.8	122.3	118.1	130.9	123.6	
MICROPHONE 3	117.2	111.8	123.4	119.6	131.0	123.1	
MICROPHONE 4	116.1	109.0	122.2	119.0	130.1	120.2	
MICROPHONE 5	119.6	112.6	125.2	120.1	133.6	123.4	
MICROPHONE 6	119.6	115.7	124.0	120.7	133.0	127.1	

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X-WING ACOUSTIC DATA

	VELOCITY MTUN DBAU	ALPHA MU DBAC	CLR THETA DBU	VSLOT MSLOT DBC	VTIP MTIP PNDBU	MAT CPR PNDBC	CXR
RUN 28 POINT 25	189.2 0.275	0.0 0.604	0.04114 -3.1	283.0 0.801	161.2 0.456	0.731 -0.00334	0.00056
MICROPHONE 1	116.8	110.6	123.2	119.1	130.7	123.1	
MICROPHONE 2	116.8	110.9	121.7	117.3	130.5	121.7	
MICROPHONE 3	117.3	112.0	123.6	120.5	130.8	121.3	
MICROPHONE 4	115.6	106.1	120.7	115.5	129.1	114.3	
MICROPHONE 5							
MICROPHONE 6	119.0	113.7	124.3	120.5	132.6	126.1	
RUN 28 POINT 12	187.6 0.277	2.0 0.600	0.00997 -2.1	0.0* 0.0*	160.8 0.461	0.738 -0.00622	-0.00156
MICROPHONE 1	117.4	112.6	123.4	119.6	131.4	125.3	
MICROPHONE 2	117.1	112.0	123.4	120.4	130.9	124.8	
MICROPHONE 3	117.1	111.4	123.6	120.6	130.7	123.2	
MICROPHONE 4	116.0	108.7	123.0	120.4	129.9	120.2	
MICROPHONE 5	119.2	111.8	125.3	120.8	133.0	122.5	
MICROPHONE 6	118.9	114.2	123.6	119.2	132.0	124.9	

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APPENDIX B

DETAILED ACOUSTIC MEASUREMENTS OF SELECTED POINTS

SYMBOLS

ALPHA	model pitch, positive up, deg
CLR	lift coefficient
MSLOT	blowing jet Mach number
POINT	point number
RUN	run number

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	5	60.0	-4.0	-0.01944	0.0*

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	75.7	73.8	78.9	77.2
12.5	62.9	0.0	65.1	0.0
16.0	77.1	72.0	72.5	0.0
20.0	83.0	81.0	75.6	0.0
25.0	92.5	92.4	86.1	85.4
31.5	99.2	99.2	92.3	92.1
40.0	80.2	76.3	85.3	83.8
50.0	99.4	99.3	98.8	98.7
63.0	92.8	92.5	93.2	92.9
80.0	93.7	93.4	103.6	103.5
100.0	94.9	94.4	99.2	99.0
125.0	96.6	93.9	93.4	83.3
160.0	96.5	96.4	98.3	98.2
200.0	99.0	98.9	102.1	102.0
250.0	97.7	97.5	100.3	100.2
315.0	97.3	97.2	96.9	96.7
400.0	97.6	97.6	97.6	97.4
500.0	96.6	96.4	96.7	96.4
630.0	95.6	93.4	95.3	95.0
800.0	94.6	94.3	94.1	93.9
1000.0	93.3	93.1	93.5	93.3
1250.0	93.0	92.8	92.7	92.6
1600.0	91.8	91.5	91.6	91.4
2000.0	91.2	91.1	91.4	91.2
2500.0	88.9	88.7	89.1	88.9
3150.0	85.4	85.1	86.9	86.5
4000.0	81.4	80.8	86.5	86.0
5000.0	79.7	78.9	85.5	85.0
6300.0	77.3	76.2	85.5	84.9
8000.0	75.7	74.2	87.2	86.7

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	100.0	93.0
2	100.1	99.5
3	93.1	103.5
4	91.7	97.4
5	92.7	86.0
6	95.0	96.3
7	93.7	99.4
8	92.5	97.2
9	89.2	92.9
10	93.4	89.2

* SET TO 0.0 WHEN THE COMPRESSERS WHERE OFF.

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	15	59.8	-2.0	0.06092	0.750

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	76.9	75.6	83.9	83.4
12.5	75.5	75.0	86.4	86.2
16.0	80.7	79.1	91.5	91.4
20.0	85.6	84.6	82.2	76.7
25.0	83.1	82.6	88.5	88.1
31.5	90.9	90.7	94.4	94.3
40.0	80.5	77.0	92.1	91.8
50.0	100.6	100.6	101.0	101.0
63.0	96.2	96.1	98.3	98.2
80.0	98.0	97.9	101.2	101.1
100.0	101.3	101.2	98.7	98.5
125.0	101.6	100.9	103.6	103.2
160.0	99.6	99.5	103.5	103.5
200.0	98.8	98.7	101.5	101.4
250.0	96.8	96.6	97.4	97.2
315.0	98.4	98.3	97.2	97.0
400.0	97.1	96.9	97.2	96.9
500.0	97.8	97.6	96.4	96.1
630.0	97.1	95.6	96.1	95.8
800.0	96.7	96.5	96.0	95.9
1000.0	96.2	96.1	95.1	95.0
1250.0	95.8	95.7	96.6	96.6
1600.0	94.2	94.1	95.4	95.3
2000.0	94.2	94.1	97.5	97.5
2500.0	93.8	93.7	98.5	98.5
3150.0	98.4	98.4	108.9	108.9
4000.0	87.9	87.8	93.8	93.7
5000.0	88.8	88.7	96.6	96.6
6300.0	92.5	92.5	99.4	99.4
8000.0	79.9	79.4	91.4	91.2

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	90.9	94.2
2	101.3	102.2
3	96.2	100.3
4	100.2	93.0
5	95.9	102.7
6	96.9	101.6
7	87.8	91.4
8	85.5	91.5
9	89.3	85.9
10	76.0	87.1

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	4	60.5	0.0	-0.01019	0.0*

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	72.6	66.8	77.9	75.5
12.5	75.6	75.1	73.0	64.5
16.0	77.2	72.0	85.5	85.2
20.0	78.9	56.1	83.9	80.8
25.0	90.2	90.1	87.8	87.3
31.5	96.7	96.7	93.4	93.3
40.0	82.5	80.5	86.1	84.9
50.0	96.5	96.4	97.0	96.9
63.0	90.8	90.3	90.5	89.9
80.0	99.6	99.5	99.0	98.8
100.0	96.8	96.5	97.2	96.8
125.0	94.7	89.0	93.6	84.3
160.0	94.2	93.9	96.7	96.5
200.0	96.1	95.9	96.9	96.6
250.0	93.0	92.4	93.3	92.6
315.0	93.9	93.6	93.0	92.4
400.0	92.9	92.2	94.0	93.4
500.0	92.5	91.8	94.6	94.1
630.0	92.1	81.1	92.3	91.6
800.0	91.5	90.9	91.7	91.3
1000.0	90.5	90.1	91.5	91.2
1250.0	92.1	91.8	91.4	91.2
1600.0	90.7	90.4	90.2	89.9
2000.0	89.5	39.3	90.8	90.6
2500.0	87.9	87.7	89.4	89.2
3150.0	84.7	84.3	85.9	85.3
4000.0	81.0	80.3	85.8	85.1
5000.0	78.1	76.8	85.2	84.7
6300.0	76.5	75.1	85.5	84.9
8000.0	75.3	73.5	88.1	87.7

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	97.5	93.8
2	97.0	97.0
3	99.1	98.6
4	95.7	94.0
5	90.7	87.1
6	92.4	94.4
7	94.6	91.0
8	90.3	85.6
9	80.7	83.8
10	79.0	81.4

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	7	59.9	0.0	0.02896	0.542

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	81.3	80.9	89.8	89.7
12.5	81.0	80.9	87.2	87.1
16.0	87.2	86.9	92.9	92.9
20.0	88.0	87.5	88.3	87.5
25.0	81.5	80.7	91.2	91.0
31.5	87.1	86.7	95.3	95.2
40.0	84.8	83.8	92.0	91.7
50.0	93.9	93.7	99.9	99.9
63.0	89.2	88.5	96.3	96.1
80.0	100.7	100.6	99.3	99.2
100.0	98.1	97.9	97.4	97.1
125.0	99.4	98.2	102.3	101.8
160.0	102.2	102.2	101.9	101.8
200.0	100.0	99.9	101.0	100.9
250.0	97.1	96.9	100.3	100.2
315.0	100.5	100.4	104.8	104.8
400.0	98.6	98.4	103.3	103.2
500.0	100.6	100.5	103.8	103.7
630.0	101.5	101.0	105.7	105.7
800.0	98.7	98.6	103.2	103.2
1000.0	96.4	96.3	100.7	100.7
1250.0	98.7	98.6	102.5	102.5
1600.0	97.1	97.0	101.8	101.8
2000.0	95.4	95.3	100.7	100.7
2500.0	95.9	95.9	102.0	102.0
3150.0	100.4	100.4	106.6	106.6
4000.0	90.8	90.7	98.3	98.3
5000.0	88.0	87.9	97.3	97.3
6300.0	87.1	87.0	98.1	98.1
8000.0	82.3	82.0	92.9	92.8

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	86.1	95.7
2	92.4	99.6
3	100.3	97.9
4	96.3	92.8
5	96.1	97.0
6	100.4	93.3
7	91.7	96.8
8	86.9	94.5
9	85.9	89.3
10	85.2	93.4

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OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	8	59.8	0.0	0.06404	0.760

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	79.0	78.2	82.7	82.1
12.5	73.8	73.0	82.9	82.5
16.0	84.5	83.9	85.8	85.5
20.0	84.2	82.8	84.7	82.5
25.0	83.1	82.6	86.8	86.3
31.5	91.8	91.7	93.0	92.9
40.0	84.0	82.8	86.8	85.8
50.0	103.2	103.2	101.8	101.8
63.0	99.0	98.9	98.4	98.3
80.0	96.7	96.6	101.0	100.9
100.0	100.2	100.1	100.3	100.1
125.0	102.4	101.8	103.7	103.3
160.0	103.5	103.5	102.7	102.7
200.0	100.9	100.9	100.4	100.3
250.0	97.6	97.4	96.2	95.9
315.0	98.5	98.4	97.0	96.8
400.0	97.5	97.3	96.9	96.6
500.0	97.7	97.5	95.6	95.2
630.0	96.0	94.0	95.2	94.9
800.0	96.6	96.4	96.5	96.4
1000.0	96.3	96.2	94.7	94.0
1250.0	95.6	95.5	96.8	96.8
1600.0	94.9	94.8	94.9	94.8
2000.0	93.9	93.8	98.1	98.1
2500.0	93.4	93.3	98.2	98.2
3150.0	98.8	98.8	105.4	105.4
4000.0	88.5	88.4	94.9	94.8
5000.0	93.9	93.9	101.1	101.1
6300.0	90.0	90.0	98.5	98.5
8000.0	80.4	79.9	96.1	96.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	92.0	95.4
2	104.0	102.6
3	94.9	99.8
4	99.2	91.5
5	97.5	103.1
6	102.9	99.2
7	88.4	96.6
8	83.1	93.1
9	85.3	80.6
10	83.2	80.1

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	14	60.2	0.0	0.08270	0.764

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	83.1	82.8	86.3	86.0
12.5	85.8	85.8	75.9	73.4
16.0	95.5	95.5	87.1	86.9
20.0	89.0	88.6	86.2	84.7
25.0	88.7	88.6	88.0	87.6
31.5	96.4	96.3	92.9	92.7
40.0	91.0	90.8	90.5	90.1
50.0	99.0	98.9	96.7	96.6
63.0	95.1	94.9	94.0	93.7
80.0	96.3	96.1	97.9	97.7
100.0	101.3	101.2	96.3	95.9
125.0	100.5	99.6	100.3	99.4
160.0	100.3	100.2	98.7	98.6
200.0	101.9	101.9	100.1	100.0
250.0	98.7	98.6	97.2	96.9
315.0	98.9	98.8	99.0	98.9
400.0	99.7	99.6	97.9	97.7
500.0	98.5	98.3	96.5	96.2
630.0	96.7	95.1	96.5	96.3
800.0	96.8	96.6	95.8	95.7
1000.0	95.6	95.5	96.2	96.1
1250.0	95.7	95.6	96.2	96.1
1600.0	93.5	93.3	94.8	94.7
2000.0	94.4	94.3	96.1	96.0
2500.0	93.4	93.3	97.4	97.4
3150.0	97.8	97.8	105.4	105.4
4000.0	88.6	88.5	94.5	94.4
5000.0	93.8	93.8	100.6	100.6
6300.0	89.9	89.8	98.2	98.2
8000.0	81.5	81.1	92.3	92.1

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	95.8	92.6
2	98.1	97.0
3	91.4	92.4
4	98.3	89.0
5	93.5	92.5
6	97.2	91.8
7	89.3	86.7
8	81.9	89.4
9	88.7	86.1
10	81.6	90.4

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X-WING ACOUST.. DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	6	60.3	4.0	-0.00213	0.0*

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	81.2	80.7	81.8	81.0
12.5	76.4	76.0	83.8	83.5
16.0	73.3	0.0	84.6	84.2
20.0	83.5	81.7	82.7	77.9
25.0	86.5	86.3	87.5	87.0
31.5	95.7	95.6	91.7	91.5
40.0	84.7	83.6	86.7	85.6
50.0	100.2	100.2	95.4	95.3
63.0	97.9	97.8	93.0	92.7
80.0	106.7	106.7	100.4	100.3
100.0	96.4	96.1	93.4	92.5
125.0	95.9	92.4	94.9	90.3
160.0	101.2	101.1	95.9	95.6
200.0	98.8	98.7	96.3	95.9
250.0	93.8	93.3	95.6	95.2
315.0	95.0	94.8	95.1	94.8
400.0	92.2	91.4	92.9	92.1
500.0	93.0	92.4	93.4	92.8
630.0	91.9	78.0	92.5	91.9
800.0	91.6	91.0	91.4	91.0
1000.0	91.1	90.8	91.4	91.1
1250.0	92.2	91.9	91.8	91.7
1600.0	90.8	90.5	90.7	90.4
2000.0	89.8	89.6	90.2	90.0
2500.0	88.3	88.1	89.0	88.8
3150.0	85.9	85.6	86.3	85.8
4000.0	81.6	81.0	86.2	85.6
5000.0	79.4	78.5	85.1	84.5
6300.0	77.6	76.6	85.4	84.8
8000.0	76.0	74.5	86.8	86.2

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	96.1	92.5
2	102.0	96.5
3	106.6	100.0
4	95.5	88.8
5	91.7	92.9
6	100.3	92.7
7	90.7	87.4
8	81.6	86.0
9	76.2	80.5
10	76.5	81.1

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	17	59.8	4.0	0.03781	0.543

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	74.1	71.1	88.7	88.6
12.5	64.0	0.0	81.8	81.3
16.0	77.9	74.2	86.7	86.5
20.0	92.6	92.4	84.5	82.1
25.0	86.3	86.1	95.3	95.2
31.5	92.4	92.3	102.1	102.1
40.0	81.2	78.5	89.4	88.9
50.0	95.6	95.5	98.2	98.1
63.0	93.6	93.4	95.3	95.1
80.0	95.7	95.5	95.3	95.0
100.0	100.8	100.7	100.8	100.7
125.0	99.3	98.1	98.7	97.4
160.0	103.6	103.6	100.0	99.9
200.0	102.6	102.6	101.2	101.1
250.0	99.8	99.7	99.2	99.0
315.0	99.6	99.5	102.1	102.0
400.0	98.8	98.6	100.0	99.9
500.0	99.2	99.1	101.6	101.5
630.0	100.0	99.3	103.8	103.8
800.0	98.5	98.4	102.6	102.6
1000.0	95.0	94.9	98.7	98.7
1250.0	97.8	97.7	101.5	101.5
1600.0	97.1	97.0	100.8	100.8
2000.0	94.3	94.2	98.1	98.1
2500.0	95.6	95.6	100.9	100.9
3150.0	99.8	99.8	104.2	104.2
4000.0	88.9	88.8	96.3	96.2
5000.0	87.4	87.3	95.9	95.9
6300.0	87.8	87.7	97.7	97.7
8000.0	79.4	78.8	92.1	91.9

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	93.0	102.7
2	96.8	98.6
3	92.9	88.8
4	99.8	99.2
5	88.3	95.8
6	102.6	92.4
7	86.0	91.6
8	83.1	90.2
9	91.5	86.7
10	87.8	87.5

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	6	60.2	4.0	0.06330	0.650

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	81.9	81.5	84.4	84.0
12.5	81.9	81.8	85.8	85.6
16.0	83.6	82.9	96.7	96.7
20.0	82.3	79.8	87.8	86.8
25.0	86.9	86.7	91.4	91.2
31.5	90.1	89.9	95.6	95.5
40.0	86.2	85.5	93.1	92.9
50.0	96.6	96.5	97.2	97.1
63.0	96.7	96.6	98.4	98.3
80.0	102.3	102.3	97.6	97.4
100.0	103.4	103.3	96.7	96.3
125.0	101.4	100.7	104.9	104.6
160.0	101.2	101.1	101.7	101.6
200.0	99.6	99.5	100.3	100.2
250.0	100.3	100.2	101.4	101.3
315.0	101.9	101.9	101.5	101.4
400.0	98.1	97.9	100.4	100.3
500.0	98.8	98.7	98.9	98.7
630.0	96.7	95.1	99.2	99.1
800.0	95.9	95.7	98.3	98.2
1000.0	95.2	95.1	99.0	99.0
1250.0	98.2	98.1	103.4	103.4
1600.0	97.2	97.1	102.0	102.0
2000.0	95.8	95.8	99.9	99.9
2500.0	99.2	99.2	104.0	104.0
3150.0	92.9	92.8	98.9	98.9
4000.0	91.2	91.1	98.1	98.1
5000.0	91.3	91.2	99.9	99.9
6300.0	86.1	86.0	96.0	96.0
8000.0	83.8	83.6	95.3	95.2

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	91.3	96.0
2	96.7	95.8
3	101.7	87.3
4	102.2	87.0
5	97.0	102.5
6	97.5	93.8
7	94.4	94.2
8	88.3	95.5
9	93.1	90.7
10	95.7	87.7

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
24	20	60.3	4.0	0.07114	0.763

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	79.1	78.3	88.1	87.9
12.5	74.3	73.6	76.0	73.6
16.0	80.8	79.2	90.9	90.8
20.0	85.0	83.8	88.4	87.5
25.0	92.2	92.1	94.9	94.8
31.5	99.9	99.9	101.8	101.8
40.0	79.9	75.3	91.5	91.2
50.0	102.8	102.8	91.8	91.5
63.0	98.0	97.9	95.9	95.7
80.0	100.7	100.6	98.1	97.9
100.0	100.8	100.7	97.4	97.1
125.0	100.6	99.7	102.6	102.1
160.0	101.9	101.9	98.3	98.2
200.0	101.8	101.8	103.1	103.0
250.0	98.4	98.2	99.7	99.6
315.0	100.6	100.5	98.8	98.7
400.0	95.7	95.4	96.4	96.1
500.0	93.6	93.1	95.2	94.8
630.0	94.5	91.3	94.8	94.4
800.0	95.6	95.4	94.6	94.4
1000.0	94.2	94.0	94.8	94.7
1250.0	94.0	93.8	94.3	94.2
1600.0	94.2	94.1	93.1	92.9
2000.0	92.0	91.9	93.0	92.9
2500.0	91.1	91.0	94.6	94.5
3150.0	96.9	96.9	102.1	102.1
4000.0	86.0	85.8	91.0	90.8
5000.0	85.9	85.7	93.6	93.5
6300.0	90.4	90.4	100.6	100.6
8000.0	78.5	77.7	89.4	89.1

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	100.6	102.5
2	103.8	91.6
3	100.2	96.6
4	99.7	94.3
5	97.9	101.2
6	100.4	89.5
7	93.7	99.8
8	89.9	95.1
9	89.9	89.3
10	90.0	91.6

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	12	90.2	0.0	-0.01459	0.0*

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	78.8	67.2	86.4	84.2
12.5	83.8	83.2	86.5	85.5
16.0	98.5	98.4	91.9	91.1
20.0	79.8	0.0	82.1	0.0
25.0	90.7	89.6	87.3	0.0
31.5	103.1	103.0	95.2	94.5
40.0	89.1	83.7	88.5	0.0
50.0	103.2	103.0	95.8	94.7
63.0	100.4	100.0	94.2	91.3
80.0	100.7	99.9	99.7	98.4
100.0	97.5	94.0	96.4	89.5
125.0	100.8	96.7	99.3	92.1
160.0	100.4	99.7	97.8	95.6
200.0	99.0	98.0	98.0	95.7
250.0	95.4	92.3	97.3	95.3
315.0	96.9	95.5	96.4	94.2
400.0	94.6	91.3	95.6	92.8
500.0	95.4	93.2	95.2	92.3
630.0	97.9	93.3	96.8	95.0
800.0	95.0	92.8	95.8	94.5
1000.0	94.8	93.1	94.4	92.9
1250.0	94.4	92.7	94.6	93.4
1600.0	93.4	91.5	93.6	91.9
2000.0	92.2	91.0	93.6	92.6
2500.0	92.6	91.8	92.3	91.1
3150.0	89.4	87.8	89.2	86.0
4000.0	65.5	82.4	87.2	78.3
5000.0	82.1	0.0	86.0	73.6
6300.0	80.5	61.3	86.7	77.1
8000.0	78.2	0.0	85.6	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	102.9	94.1
2	104.2	95.2
3	98.1	97.1
4	91.3	86.9
5	93.0	88.4
6	97.7	83.1
7	89.1	84.0
8	84.1	86.7
9	82.3	84.7
10	76.1	80.4

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	13	90.6	0.0	0.03061	0.523

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	79.6	72.9	90.2	89.4
12.5	81.1	80.0	90.3	89.9
16.0	96.2	96.0	97.1	96.9
20.0	87.9	0.0	89.0	0.0
25.0	91.3	90.4	97.6	97.1
31.5	97.7	97.5	102.9	102.8
40.0	88.4	80.0	94.1	92.2
50.0	102.5	102.3	100.6	100.2
63.0	99.4	98.9	98.7	97.8
80.0	96.2	93.1	99.3	97.6
100.0	97.2	93.1	100.8	99.3
125.0	99.5	91.8	101.3	98.1
160.0	98.9	97.8	101.6	100.9
200.0	101.1	100.5	102.4	101.7
250.0	98.8	97.6	100.6	99.7
315.0	101.2	100.7	104.8	104.5
400.0	101.8	101.3	103.9	103.6
500.0	101.4	100.9	103.7	103.4
630.0	101.7	100.3	107.0	106.9
800.0	99.7	99.1	104.5	104.3
1000.0	97.4	96.5	101.4	101.1
1250.0	98.7	98.1	103.3	103.1
1600.0	97.8	97.2	102.5	102.3
2000.0	96.9	96.5	100.7	100.5
2500.0	103.6	103.5	105.2	105.1
3150.0	93.5	92.9	99.6	99.4
4000.0	90.8	90.1	98.1	97.8
5000.0	90.9	90.3	99.8	99.6
6300.0	85.4	83.7	95.4	94.8
8000.0	81.8	77.6	93.9	92.9

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	96.2	103.7
2	102.9	100.3
3	89.0	93.9
4	88.0	98.2
5	90.8	93.6
6	96.0	95.2
7	94.8	94.1
8	91.4	96.3
9	89.3	92.8
10	87.3	92.1

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	17	90.6	0.0	0.06036	0.729

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	84.5	83.2	86.0	83.4
12.5	75.8	69.1	73.1	0.0
16.0	100.4	100.3	97.8	97.6
20.0	84.2	0.0	85.8	0.0
25.0	97.3	97.1	99.7	99.4
31.5	103.7	103.6	106.5	106.5
40.0	89.6	85.0	88.0	0.0
50.0	99.0	98.6	98.2	97.6
63.0	98.0	97.3	99.9	99.3
80.0	101.8	101.1	98.8	97.1
100.0	101.9	100.9	100.5	98.8
125.0	100.3	95.2	100.5	96.3
160.0	103.7	103.4	104.2	103.8
200.0	102.7	102.3	104.0	103.5
250.0	98.0	96.5	99.5	98.4
315.0	100.7	100.2	100.3	99.5
400.0	96.2	94.2	97.4	95.7
500.0	96.4	94.7	97.4	95.9
630.0	99.0	95.9	98.8	97.7
800.0	96.5	95.0	97.0	96.0
1000.0	96.2	95.0	97.3	96.6
1250.0	96.7	95.8	99.2	98.8
1600.0	93.6	92.1	97.3	96.6
2000.0	93.1	92.1	96.6	96.1
2500.0	97.7	97.5	100.8	100.6
3150.0	90.7	89.5	95.9	95.4
4000.0	88.9	87.7	95.1	94.4
5000.0	89.8	88.9	97.3	97.0
6300.0	85.1	83.2	94.2	93.4
8000.0	81.0	75.1	91.8	90.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	104.4	107.3
2	98.9	97.8
3	99.9	85.1
4	100.1	94.4
5	95.0	96.2
6	101.6	100.8
7	91.3	95.4
8	86.3	95.4
9	90.7	93.5
10	94.3	89.1

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	14	90.8	0.0	0.06282	0.696

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	84.3	82.9	83.1	73.9
12.5	78.2	75.5	78.3	0.0
16.0	98.4	98.3	95.7	95.4
20.0	89.6	84.3	89.6	0.0
25.0	92.9	92.3	98.6	98.2
31.5	104.1	104.0	103.6	103.5
40.0	87.0	0.0	93.2	90.7
50.0	100.1	99.8	103.4	103.2
63.0	100.3	99.9	101.6	101.2
80.0	99.6	98.4	99.8	98.5
100.0	98.2	95.3	98.8	96.0
125.0	101.3	97.8	101.9	99.3
160.0	104.0	103.7	103.6	103.1
200.0	101.4	100.8	102.9	102.3
250.0	101.5	100.9	100.7	99.9
315.0	101.8	101.4	101.7	101.1
400.0	98.3	97.2	99.8	98.9
500.0	98.4	97.4	99.6	98.7
630.0	98.8	95.4	98.8	97.7
800.0	96.0	94.3	98.1	97.3
1000.0	95.9	94.6	96.7	95.8
1250.0	97.0	96.1	99.6	99.2
1600.0	95.4	94.3	98.4	97.9
2000.0	94.5	93.8	97.7	97.3
2500.0	98.8	98.6	102.8	102.7
3150.0	91.3	90.3	96.2	95.7
4000.0	89.7	88.7	95.7	95.1
5000.0	90.5	89.8	98.3	98.0
6300.0	84.7	82.6	93.9	93.1
8000.0	80.9	74.5	92.7	91.3

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	104.0	104.6
2	100.3	103.7
3	94.2	96.6
4	87.3	87.0
5	94.9	93.6
6	101.2	100.5
7	86.9	96.8
8	97.8	95.7
9	93.9	82.8
10	83.8	89.1

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	19	119.8	0.0	-0.01465	0.0*

1/3 OCTAVE CENTER FREQUENCF	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	83.7	67.5	83.9	0.0
12.5	87.0	85.9	84.2	0.0
16.0	80.4	0.0	91.8	0.0
20.0	95.3	88.4	101.5	99.6
25.0	95.8	93.9	96.5	90.0
31.5	101.6	101.2	100.5	99.7
40.0	95.5	89.2	98.6	95.1
50.0	106.1	105.8	99.1	96.1
63.0	103.1	102.2	99.2	94.1
80.0	101.4	89.1	105.8	104.3
100.0	99.2	0.0	102.1	88.2
125.0	102.7	91.2	101.1	0.0
160.0	102.2	98.8	102.5	98.1
200.0	103.8	101.9	108.5	107.8
250.0	101.0	97.3	102.4	99.8
315.0	100.8	97.8	100.6	96.6
400.0	98.6	93.6	100.1	96.5
500.0	96.9	83.8	99.0	94.4
630.0	99.3	86.4	100.7	97.4
800.0	99.3	95.6	99.2	95.6
1000.0	103.3	102.1	99.3	96.4
1250.0	97.0	89.1	98.6	94.1
1600.0	97.8	94.0	98.4	95.2
2000.0	96.4	93.8	97.7	95.6
2500.0	96.1	94.1	98.0	96.4
3150.0	96.4	94.7	95.8	92.3
4000.0	93.4	91.2	94.0	86.7
5000.0	86.8	0.0	90.7	0.0
6300.0	84.9	0.0	89.9	0.0
8000.0	81.8	0.0	90.1	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	102.3	101.8
2	107.5	98.7
3	93.5	102.3
4	94.5	97.6
5	92.7	97.6
6	97.8	91.1
7	80.1	95.4
8	91.3	91.1
9	88.6	90.7
10	90.7	92.7

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	24	119.7	0.0	0.03387	0.549

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	87.3	84.9	84.9	0.0
12.5	87.1	86.0	84.8	0.0
16.0	88.9	84.9	93.4	88.0
20.0	103.7	103.2	97.2	83.4
25.0	96.5	94.9	101.3	100.0
31.5	99.2	98.6	104.9	104.6
40.0	93.7	0.0	100.3	98.3
50.0	104.1	103.6	105.3	104.6
63.0	103.1	102.2	102.7	101.1
80.0	103.1	98.7	101.1	92.3
100.0	102.0	85.0	102.1	88.5
125.0	105.8	103.2	102.9	95.0
160.0	101.4	96.9	104.2	101.8
200.0	103.2	100.9	106.2	104.9
250.0	102.0	99.4	102.8	100.5
315.0	102.1	100.1	105.8	104.9
400.0	101.2	99.2	104.9	104.0
500.0	101.7	100.1	106.2	105.6
630.0	103.5	101.6	107.0	106.4
800.0	101.3	99.4	106.2	105.7
1000.0	101.4	99.4	102.0	100.7
1250.0	99.1	95.9	103.7	102.7
1600.0	99.4	97.2	103.4	102.6
2000.0	98.2	96.7	101.5	100.7
2500.0	101.9	101.5	108.4	108.3
3150.0	96.0	94.1	100.6	99.7
4000.0	93.4	91.2	99.0	97.7
5000.0	91.5	87.6	99.7	98.7
6300.0	87.1	0.0	96.2	93.3
8000.0	84.2	0.0	95.6	91.5

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	100.0	106.0
2	103.7	105.2
3	100.4	94.1
4	91.0	88.8
5	100.5	84.0
6	86.5	93.1
7	95.3	96.8
8	92.5	87.5
9	92.2	92.9
10	85.1	91.5

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	22	120.0	0.0	0.04582	0.647

1/3 OCTAVE CENTER FREQUENCF	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	87.1	84.5	89.4	82.9
12.5	91.7	91.3	88.8	86.5
16.0	88.8	84.6	92.0	64.8
20.0	102.7	102.0	99.8	96.5
25.0	106.1	106.0	108.6	108.4
31.5	87.2	0.0	100.1	99.2
40.0	90.5	0.0	95.7	0.0
50.0	100.2	98.8	98.8	95.5
63.0	102.5	101.4	104.1	103.0
80.0	98.2	0.0	102.4	97.8
100.0	100.2	0.0	102.4	92.2
125.0	103.5	97.0	102.7	93.3
160.0	100.9	95.0	103.3	100.0
200.0	101.9	98.3	105.9	104.5
250.0	99.3	90.9	103.4	101.5
315.0	100.8	97.8	103.7	102.2
400.0	100.7	98.3	101.3	98.9
500.0	98.9	94.9	100.5	97.8
630.0	99.4	87.7	103.1	101.5
800.0	99.2	95.3	101.7	100.0
1000.0	102.9	101.6	100.6	98.6
1250.0	98.9	95.4	103.2	102.1
1600.0	99.2	96.8	103.3	102.5
2000.0	97.0	94.8	101.3	100.5
2500.0	100.5	99.9	107.6	107.4
3150.0	95.5	93.2	99.9	98.8
4000.0	93.3	91.0	98.7	97.3
5000.0	91.4	87.3	100.0	99.1
6300.0	87.1	0.0	95.5	91.7
8000.0	83.6	0.0	94.1	85.2

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	106.1	108.6
2	93.0	86.3
3	92.7	99.2
4	95.4	97.1
5	97.7	99.0
6	93.0	93.7
7	87.2	94.4
8	87.2	86.3
9	89.4	89.7
10	89.2	92.2

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	5	120.2	0.0	0.06070	0.751

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	90.0	88.9	91.8	89.2
12.5	83.2	79.7	93.0	92.3
16.0	86.6	0.0	101.3	100.8
20.0	101.3	100.3	103.6	102.5
25.0	98.7	97.8	101.8	100.6
31.5	104.7	104.5	105.3	105.0
40.0	92.3	0.0	99.6	97.0
50.0	106.9	106.6	102.7	101.6
63.0	102.0	100.7	100.8	97.9
80.0	105.9	104.1	103.3	100.0
100.0	101.5	0.0	103.3	97.4
125.0	103.0	93.9	105.0	101.8
160.0	104.3	102.5	106.4	105.1
200.0	105.0	103.6	109.7	109.2
250.0	101.5	98.3	104.2	102.6
315.0	103.5	102.1	104.7	103.5
400.0	99.1	94.9	102.2	100.3
500.0	99.1	95.3	100.7	98.1
630.0	99.2	82.5	100.7	97.4
800.0	99.0	94.8	100.0	97.2
1000.0	102.0	100.3	101.0	99.2
1250.0	98.5	94.5	100.0	97.2
1600.0	97.8	93.9	99.9	97.8
2000.0	95.3	91.5	97.7	95.5
2500.0	96.5	94.7	100.1	99.2
3150.0	94.8	91.9	96.5	93.7
4000.0	93.2	90.8	96.8	94.3
5000.0	91.1	86.4	97.8	96.2
6300.0	90.0	86.6	98.7	97.3
8000.0	84.9	0.0	94.3	86.5

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	105.4	106.1
2	107.0	102.5
3	102.4	93.0
4	92.5	95.3
5	97.0	102.8
6	100.1	99.9
7	97.8	100.6
8	94.9	99.0
9	85.2	94.3
10	86.5	94.5

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
25	22	119.9	4.0	0.00578	0.0*

1/3 OCTAVE CENTER FREQUENCF	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	90.1	89.0	85.7	0.0
12.5	86.8	85.6	90.9	89.6
16.0	86.5	0.0	94.2	90.2
20.0	92.8	0.0	102.6	101.2
25.0	95.0	92.6	94.6	0.0
31.5	98.4	97.6	102.0	101.5
40.0	94.0	0.0	99.9	97.6
50.0	103.9	103.4	99.8	97.4
63.0	99.2	96.3	103.0	101.5
80.0	104.8	102.3	104.3	101.9
100.0	99.5	0.0	103.2	97.2
125.0	102.9	93.3	102.7	93.4
160.0	101.7	97.6	103.2	99.8
200.0	103.0	100.5	108.0	107.2
250.0	98.6	0.0	102.2	99.4
315.0	100.3	96.7	101.7	98.9
400.0	97.8	90.2	100.2	96.7
500.0	98.2	92.9	98.6	93.0
630.0	97.3	0.0	99.9	95.5
800.0	98.7	94.1	98.7	94.3
1000.0	101.0	98.7	98.7	95.1
1250.0	98.3	94.0	98.7	94.3
1600.0	96.9	91.4	98.0	94.3
2000.0	95.1	91.1	96.2	92.7
2500.0	93.7	89.1	95.1	91.0
3150.0	94.4	91.2	95.2	90.8
4000.0	90.9	85.4	93.5	82.5
5000.0	86.9	0.0	90.3	0.0
6300.0	84.5	0.0	89.3	0.0
8000.0	82.1	0.0	89.3	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	99.3	101.9
2	104.5	101.9
3	94.7	95.7
4	93.4	97.0
5	96.9	87.8
6	94.4	92.7
7	88.5	98.1
8	87.4	96.7
9	85.9	88.3
10	85.2	88.5

ORIGINAL PAGE IS OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	10	120.2	4.0	0.03642	0.550

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	86.4	83.1	92.3	90.1
12.5	84.6	82.4	88.6	86.1
16.0	85.6	0.0	88.9	0.0
20.0	102.2	101.4	99.6	96.0
25.0	94.6	91.8	97.0	91.6
31.5	97.9	97.0	102.5	102.0
40.0	96.2	91.5	99.1	96.0
50.0	93.8	0.0	96.0	0.0
63.0	96.1	0.0	99.0	93.2
80.0	100.3	0.0	103.1	99.5
100.0	101.5	0.0	102.0	0.0
125.0	105.8	103.1	105.5	102.8
160.0	104.1	102.2	105.3	103.5
200.0	103.3	101.0	106.5	105.3
250.0	103.8	102.2	105.7	104.7
315.0	104.0	102.8	107.2	106.6
400.0	103.2	102.0	104.0	102.9
500.0	101.6	99.9	105.3	104.6
630.0	103.6	101.7	107.2	106.6
800.0	102.1	100.5	105.3	104.6
1000.0	101.8	100.0	102.8	101.7
1250.0	100.3	98.1	103.7	102.7
1600.0	99.2	96.8	103.4	102.6
2000.0	98.0	96.4	102.6	102.0
2500.0	103.5	103.2	107.7	107.5
3150.0	96.4	94.6	100.9	100.1
4000.0	94.0	92.1	99.3	98.1
5000.0	93.1	90.8	100.2	99.3
6300.0	87.9	78.7	96.7	94.1
8000.0	84.4	0.0	95.6	91.4

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	99.1	103.2
2	93.4	95.6
3	96.3	97.6
4	96.1	87.9
5	100.2	98.8
6	99.2	99.6
7	98.0	94.4
8	89.1	91.3
9	93.9	100.7
10	96.2	101.4

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	15	120.2	4.0	0.04542	0.612

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	87.3	84.8	92.3	90.1
12.5	88.3	87.5	93.8	93.2
16.0	83.7	0.0	94.2	90.1
20.0	102.4	101.7	98.2	91.7
25.0	95.5	93.4	97.6	93.4
31.5	103.3	103.1	101.2	100.5
40.0	92.8	0.0	97.6	92.1
50.0	100.1	98.7	98.3	94.2
63.0	103.0	102.0	102.1	100.1
80.0	97.3	0.0	103.5	100.4
100.0	103.8	99.1	105.7	103.3
125.0	105.6	102.7	103.0	95.3
160.0	103.2	100.7	105.8	104.2
200.0	103.1	100.7	105.4	103.7
250.0	101.9	99.1	104.8	103.5
315.0	104.2	103.1	107.7	107.1
400.0	101.6	99.7	103.7	102.5
500.0	100.4	97.9	103.8	102.7
630.0	102.3	99.5	105.8	105.0
800.0	100.2	97.4	104.4	103.6
1000.0	101.4	99.4	103.2	102.2
1250.0	100.3	98.1	105.6	105.0
1600.0	99.6	97.5	103.7	103.0
2000.0	98.4	96.9	102.7	102.1
2500.0	103.6	103.3	112.2	112.1
3150.0	97.8	96.6	101.6	100.9
4000.0	94.6	93.0	100.1	99.1
5000.0	92.5	89.7	101.3	100.6
6300.0	88.1	80.2	97.5	95.5
8000.0	84.4	0.0	95.7	91.6

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	103.8	101.3
2	103.3	96.5
3	91.9	99.0
4	102.5	96.5
5	96.6	94.4
6	95.6	91.6
7	95.6	93.6
8	90.3	89.0
9	94.7	93.2
10	98.5	88.1

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	27	119.6	4.0	0.06078	0.736

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	87.7	85.6	94.0	92.7
12.5	84.6	82.4	81.2	0.0
16.0	84.4	0.0	94.9	91.9
20.0	101.7	100.8	97.2	84.1
25.0	98.9	98.1	102.2	101.2
31.5	106.5	106.4	108.7	108.6
40.0	92.1	0.0	101.0	99.3
50.0	103.6	103.0	102.3	101.1
63.0	103.2	102.3	102.7	101.1
80.0	102.0	94.8	103.8	101.1
100.0	104.6	101.3	102.5	93.8
125.0	103.0	94.4	107.5	106.0
160.0	102.4	99.3	105.8	104.3
200.0	106.9	106.1	108.6	107.9
250.0	103.4	101.7	104.4	103.0
315.0	103.1	101.6	106.1	105.3
400.0	102.2	100.7	101.5	99.3
500.0	100.0	97.3	101.2	99.0
630.0	99.9	92.4	100.9	97.9
800.0	99.1	95.2	100.9	98.9
1000.0	100.7	98.3	100.3	98.2
1250.0	97.6	92.0	99.2	95.7
1600.0	96.9	91.6	98.1	94.6
2000.0	94.3	88.9	96.7	93.9
2500.0	95.1	92.4	101.4	100.7
3150.0	93.7	89.7	96.0	92.8
4000.0	90.7	84.8	95.4	91.6
5000.0	90.4	84.3	98.1	96.6
6300.0	86.0	0.0	93.4	82.3
8000.0	84.7	0.0	95.0	89.9

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	106.9	109.3
2	105.2	103.5
3	100.5	99.9
4	102.4	96.9
5	93.4	104.8
6	96.6	93.2
7	101.4	99.0
8	96.3	92.5
9	97.1	93.0
10	86.8	96.0

ORIGINAL PAGE IS OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	31	139.6	0.0	-0.02178	0.0*

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	92.9	91.8	90.1	0.0
12.5	90.6	89.6	90.5	87.3
16.0	97.9	97.3	101.7	100.3
20.0	105.8	105.1	100.7	83.6
25.0	102.0	101.0	99.2	0.0
31.5	103.4	102.9	103.2	102.3
40.0	98.5	89.2	105.1	103.6
50.0	106.3	105.7	99.0	0.0
63.0	103.4	101.2	103.1	98.7
80.0	107.1	102.1	105.9	101.2
100.0	102.7	0.0	105.0	0.0
125.0	103.3	0.0	106.0	101.4
160.0	107.8	105.8	105.8	100.3
200.0	106.3	103.3	108.9	107.3
250.0	104.8	101.7	106.4	104.4
315.0	104.3	101.3	105.9	103.9
400.0	100.1	89.2	102.7	98.9
500.0	100.7	94.4	102.6	99.2
630.0	99.8	0.0	102.0	94.9
800.0	99.7	0.0	102.3	98.0
1000.0	102.3	96.7	105.3	103.8
1250.0	101.2	95.4	102.5	97.0
1600.0	99.4	88.8	101.6	97.7
2000.0	98.7	94.6	100.4	97.5
2500.0	97.4	92.7	100.1	97.5
3150.0	97.3	92.7	98.6	93.7
4000.0	97.5	95.5	97.7	91.1
5000.0	91.4	0.0	94.9	0.0
6300.0	88.9	0.0	93.4	0.0
8000.0	87.0	0.0	92.3	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	103.1	102.8
2	107.2	96.1
3	105.0	105.0
4	96.3	101.3
5	92.6	96.6
6	104.0	96.1
7	87.9	94.4
8	93.8	93.8
9	93.8	94.6
10	93.4	95.5

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	35	140.0	0.0	0.01675	0.536

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	99.0	98.8	95.3	93.0
12.5	81.2	0.0	91.8	89.6
16.0	91.2	86.8	97.4	91.5
20.0	104.5	103.4	103.8	100.9
25.0	100.7	99.2	104.2	102.4
31.5	105.8	105.5	108.9	108.7
40.0	94.5	0.0	103.3	100.8
50.0	105.3	104.5	103.0	100.2
63.0	103.2	100.8	101.5	89.9
80.0	105.8	93.2	105.2	98.4
100.0	102.3	0.0	105.3	0.0
125.0	105.6	99.3	105.4	99.2
160.0	107.8	105.8	108.4	106.2
200.0	107.9	106.0	109.6	108.3
250.0	106.2	104.2	106.9	105.1
315.0	104.5	101.6	108.5	107.5
400.0	102.8	99.8	105.0	103.1
500.0	103.8	101.7	104.9	103.2
630.0	103.1	99.3	106.7	105.3
800.0	102.2	98.1	105.2	103.5
1000.0	103.6	100.2	105.7	104.3
1250.0	102.2	98.3	104.9	102.5
1600.0	100.5	95.0	103.5	101.4
2000.0	106.7	106.2	105.0	104.2
2500.0	100.6	98.9	104.9	104.2
3150.0	96.6	90.1	100.1	97.2
4000.0	97.8	95.9	100.6	98.3
5000.0	92.9	0.0	99.1	95.6
6300.0	89.8	0.0	95.8	0.0
8000.0	86.3	0.0	93.4	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	106.0	109.6
2	105.8	100.3
3	100.0	101.6
4	86.7	97.6
5	89.7	98.5
6	101.4	92.7
7	102.2	96.6
8	95.3	100.3
9	95.0	95.9
10	77.9	94.6

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
27	36	139.9	0.0	0.04971	0.719

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	93.9	93.1	96.0	94.1
12.5	87.1	84.3	88.1	77.2
16.0	94.4	92.8	103.5	102.6
20.0	107.7	107.2	99.9	0.0
25.0	103.9	103.3	104.0	102.1
31.5	108.5	108.4	110.4	110.2
40.0	97.8	0.0	104.7	103.1
50.0	109.7	109.4	102.2	98.6
63.0	105.5	104.3	104.2	101.2
80.0	104.4	0.0	104.7	95.4
100.0	106.8	100.1	106.0	96.4
125.0	106.8	103.0	106.4	102.4
160.0	108.1	106.2	107.5	104.6
200.0	107.1	104.7	109.0	107.4
250.0	104.3	100.6	106.9	105.1
315.0	103.6	99.7	105.9	103.8
400.0	102.4	99.0	103.8	101.1
500.0	101.7	97.6	102.5	99.0
630.0	101.9	95.6	102.2	95.7
800.0	101.2	94.8	102.5	98.5
1000.0	102.6	97.6	105.7	104.3
1250.0	100.7	92.8	102.1	95.1
1600.0	99.3	86.7	101.4	97.1
2000.0	100.7	98.5	102.5	100.9
2500.0	97.8	93.7	101.9	100.3
3150.0	96.1	87.3	97.7	89.6
4000.0	97.4	95.3	99.0	95.2
5000.0	92.2	0.0	96.6	80.7
6300.0	89.9	0.0	94.1	0.0
8000.0	87.6	0.0	92.5	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	109.1	111.0
2	110.5	100.8
3	93.6	98.7
4	101.7	100.0
5	98.1	98.6
6	100.5	96.0
7	98.7	101.4
8	99.8	101.0
9	83.9	93.2
10	92.0	93.6

ORIGINAL PAGE IS
OF POOR QUALITY

X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
28	20	188.7	0.0	0.01886	0.518

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	99.1	98.2	101.8	99.7
12.5	87.8	0.0	100.2	99.2
16.0	97.4	94.7	108.5	106.5
20.0	95.5	0.0	104.4	0.0
25.0	98.7	0.0	99.1	0.0
31.5	107.3	106.5	106.6	104.6
40.0	101.1	0.0	100.8	0.0
50.0	111.7	110.9	108.0	102.1
63.0	114.3	113.6	111.8	109.4
80.0	115.4	109.9	113.0	108.3
100.0	109.2	0.0	109.9	0.0
125.0	111.5	108.6	113.9	112.5
160.0	111.6	101.1	110.3	0.0
200.0	111.1	91.4	112.1	107.2
250.0	111.1	107.9	111.2	108.1
315.0	112.4	110.3	113.7	112.4
400.0	109.2	107.0	112.6	111.6
500.0	108.0	104.8	110.3	108.6
630.0	107.4	104.8	109.1	104.5
800.0	105.3	0.0	108.5	102.3
1000.0	105.8	0.0	109.2	104.2
1250.0	107.3	94.8	111.8	107.7
1600.0	108.0	103.6	108.8	104.6
2000.0	105.0	98.8	106.6	102.4
2500.0	105.2	101.0	107.5	105.0
3150.0	102.6	0.0	105.0	97.3
4000.0	101.9	96.5	103.2	0.0
5000.0	100.4	0.0	103.1	0.0
6300.0	97.3	0.0	101.5	0.0
8000.0	93.8	0.0	98.8	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	106.8	106.0
2	115.4	107.4
3	112.1	108.3
4	104.2	104.1
5	96.5	104.2
6	106.1	101.7
7	94.3	103.3
8	95.0	93.7
9	100.4	101.5
10	96.6	96.1

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
28	25	189.2	0.0	0.04114	0.801

1/3 OCTAVE CENTER FREQUENCF	MICROPHONE 3		MICROPHONE 6	
	UNCORRECTED	CORRECTED	UNCORRECTED	CORRECTED
10.0	101.2	100.7	99.2	93.9
12.5	97.8	97.0	98.6	97.1
16.0	95.3	89.2	110.1	108.8
20.0	97.6	0.0	102.7	0.0
25.0	101.7	0.0	110.8	108.3
31.5	109.5	109.0	113.4	113.1
40.0	103.3	0.0	104.0	0.0
50.0	113.4	112.9	107.5	99.4
63.0	113.6	112.8	111.1	108.1
80.0	113.4	0.0	111.6	100.4
100.0	108.8	0.0	113.3	105.9
125.0	115.0	113.9	110.5	106.6
160.0	110.3	0.0	113.7	108.9
200.0	110.2	0.0	112.2	107.4
250.0	111.3	108.2	110.7	106.9
315.0	112.8	110.9	113.1	111.5
400.0	111.1	109.8	112.2	111.0
500.0	107.7	104.1	108.6	105.8
630.0	107.3	104.6	108.1	100.4
800.0	106.3	0.0	108.4	101.6
1000.0	105.7	0.0	108.8	102.6
1250.0	107.4	95.3	110.1	98.8
1600.0	108.6	105.0	108.6	104.0
2000.0	103.8	0.0	105.9	100.0
2500.0	104.5	98.6	107.1	104.2
3150.0	101.9	0.0	104.6	93.4
4000.0	100.1	0.0	102.9	0.0
5000.0	100.8	89.1	102.4	0.0
6300.0	97.4	0.0	100.9	0.0
8000.0	93.7	0.0	98.5	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	108.0	114.3
2	115.5	109.8
3	109.1	103.5
4	105.6	111.2
5	106.5	102.3
6	96.0	102.9
7	101.3	92.9
8	100.5	104.6
9	93.9	100.0
10	98.4	97.7

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X-WING ACOUSTIC DATA

RUN	POINT	VELOCITY	ALPHA	CLR	MSLOT
28	12	187.6	2.0	0.00997	0.0*

1/3 OCTAVE CENTER FREQUENCE	MICROPHONE 3 UNCORRECTED	MICROPHONE 3 CORRECTED	MICROPHONE 6 UNCORRECTED	MICROPHONE 6 CORRECTED
10.0	98.7	97.7	102.4	100.7
12.5	98.4	97.7	102.0	101.4
16.0	97.6	95.2	104.7	96.7
20.0	100.7	0.0	105.5	0.0
25.0	103.0	90.7	107.5	98.2
31.5	110.8	110.5	108.2	107.0
40.0	101.7	0.0	102.5	0.0
50.0	112.6	112.0	106.8	94.0
63.0	116.2	115.8	110.9	107.9
80.0	111.4	0.0	111.2	96.5
100.0	109.2	0.0	112.6	101.8
125.0	113.3	111.6	110.7	107.2
160.0	112.9	108.3	111.4	0.0
200.0	111.5	102.6	112.6	108.8
250.0	111.0	107.8	110.2	105.9
315.0	111.4	108.7	114.3	113.2
400.0	108.5	105.9	111.9	110.7
500.0	106.0	99.0	108.9	106.5
630.0	107.0	104.1	108.4	102.5
800.0	106.3	92.0	108.1	100.9
1000.0	105.6	0.0	109.0	103.9
1250.0	107.5	98.5	110.3	102.5
1600.0	108.5	105.0	108.7	104.6
2000.0	105.1	99.6	106.2	101.5
2500.0	104.1	97.6	105.8	101.6
3150.0	102.7	0.0	104.1	85.2
4000.0	100.6	89.1	102.2	0.0
5000.0	100.4	84.9	101.7	0.0
6300.0	97.1	0.0	100.6	0.0
8000.0	93.0	0.0	97.8	0.0

BLADE PASSAGE HARMONICS	MICROPHONE 3	MICROPHONE 6
1	110.7	109.0
2	116.9	110.0
3	109.3	105.7
4	102.2	105.9
5	101.3	102.7
6	104.0	102.4
7	102.6	105.9
8	94.0	97.3
9	99.0	97.5
10	102.0	100.5

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APPENDIX C

BACKGROUND NOISE COEFFICIENTS

BACKGROUND NOISE CURVE FIT
DB = A • B * LOG(V)

1/3 OCTAVE CENTER FREQUENCY	MICROPHONE 3 A	MICROPHONE 3 B	MICROPHONE 6 A	MICROPHONE 6 B
10.0	-2.60	41.47	-10.36	47.44
12.5	-19.26	48.03	-2.94	42.26
16.0	9.37	37.20	-36.25	61.67
20.0	-13.74	51.99	-15.07	53.93
25.0	-30.79	58.74	-27.85	59.30
31.5	-3.12	45.05	-7.38	48.16
40.0	-19.02	54.54	-15.79	53.82
50.0	-3.61	47.22	-16.13	53.97
63.0	-7.62	49.87	-12.11	52.79
80.0	-34.12	65.08	-12.08	54.17
100.0	-15.82	56.65	-8.08	52.92
125.0	39.07	30.46	38.61	30.57
160.0	-23.25	59.08	-18.87	57.45
200.0	-24.23	59.45	-5.46	50.91
250.0	-3.65	49.18	-0.09	47.64
315.0	-12.29	52.95	-2.16	48.38
400.0	10.35	41.67	10.26	42.01
500.0	7.60	42.86	10.96	41.48
630.0	47.78	24.68	-0.19	47.20
800.0	-2.25	47.68	-15.23	53.85
1000.0	-23.23	57.87	-23.72	57.68
1250.0	-17.62	54.79	-40.26	65.89
1600.0	-16.25	53.73	-21.58	56.37
2000.0	-22.24	55.39	-22.06	55.63
2500.0	-27.70	57.49	-22.15	55.38
3150.0	-29.40	58.20	-22.43	55.64
4000.0	-26.27	55.67	-16.82	52.89
5000.0	-28.91	56.83	-24.47	56.37
6300.0	-27.57	55.24	-23.34	56.02
8000.0	-21.94	51.94	-16.15	52.73

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2. Williams, M. R.; Leitner, R. J.; and Rogers, E. D.: X-Wing: A New Concept in Rotary Wing VTOL. AHS Symposium on Rotor Technology. Aug. 1976.

3. Ballard, J. D.; McCloud, J. L. III; and Forsyth, T. J.: An Investigation of a Stoppable Helicopter Rotor with Circulation Control. NASA TM-81218, 1980.

4. Mosher, M.: Acoustics of Rotors Utilizing Circulation Control. AIAA Paper 81-0092. Jan. 1981.

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TABLE 1.- MICROPHONE LOCATIONS

Microphone	x, m	y, m	z, m	r, m	θ, deg	ψ, deg
1	15.5	-4.9	-3.3	17.5	11	164
2	15.5	.0	-3.5	16.8	12	180
3	15.5	4.9	-3.3	17.5	11	196
4	19.2	.0	3.9	20.5	11	180
5	-.5	3.1	-4.4	7.7	35	265
6	2.7	5.5	-3.3	5.9	34	242

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Figure 1.- X-Wing model in 40- by 80-Foot Wind Tunnel.

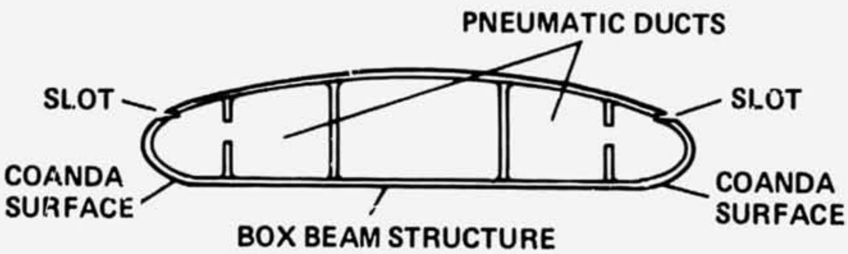

Figure 2.- Circulation control airfoil.

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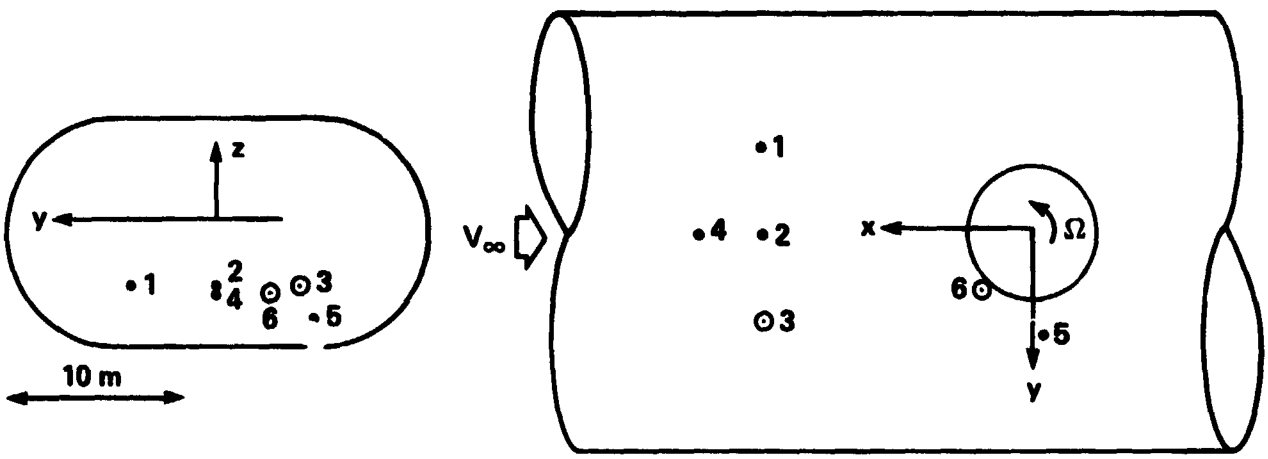

Figure 3.- Microphone locations.

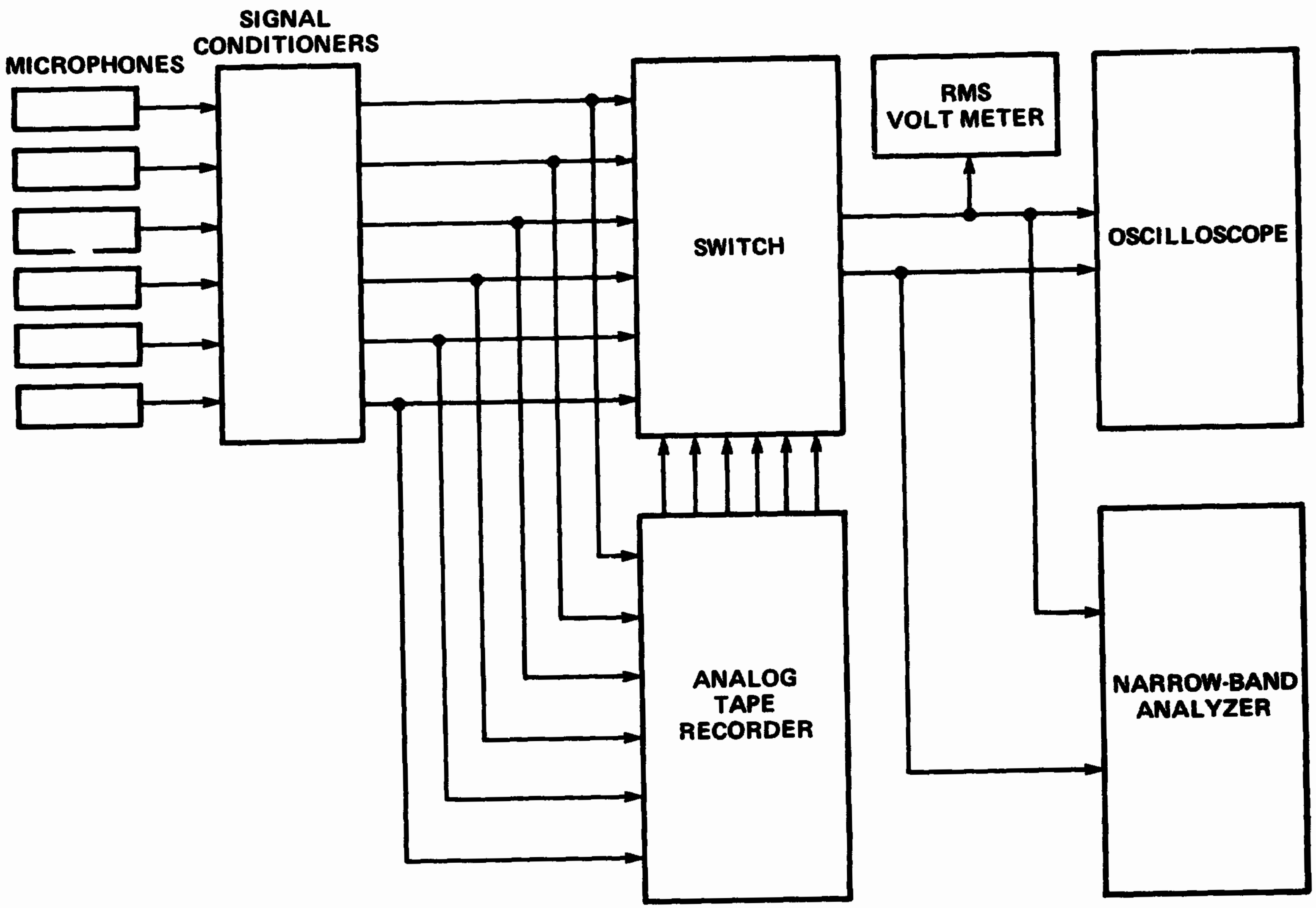

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Figure 4.- Instrumentation for data recording.

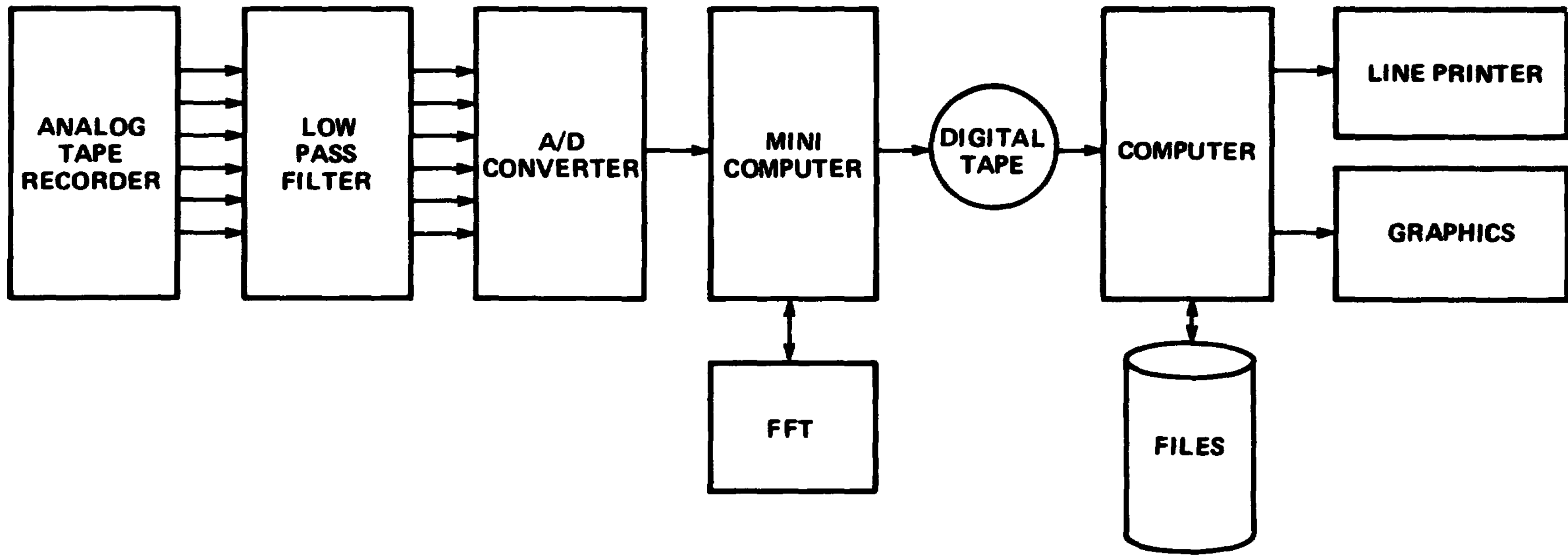

Figure 5.- Instrumentation for data analysis.

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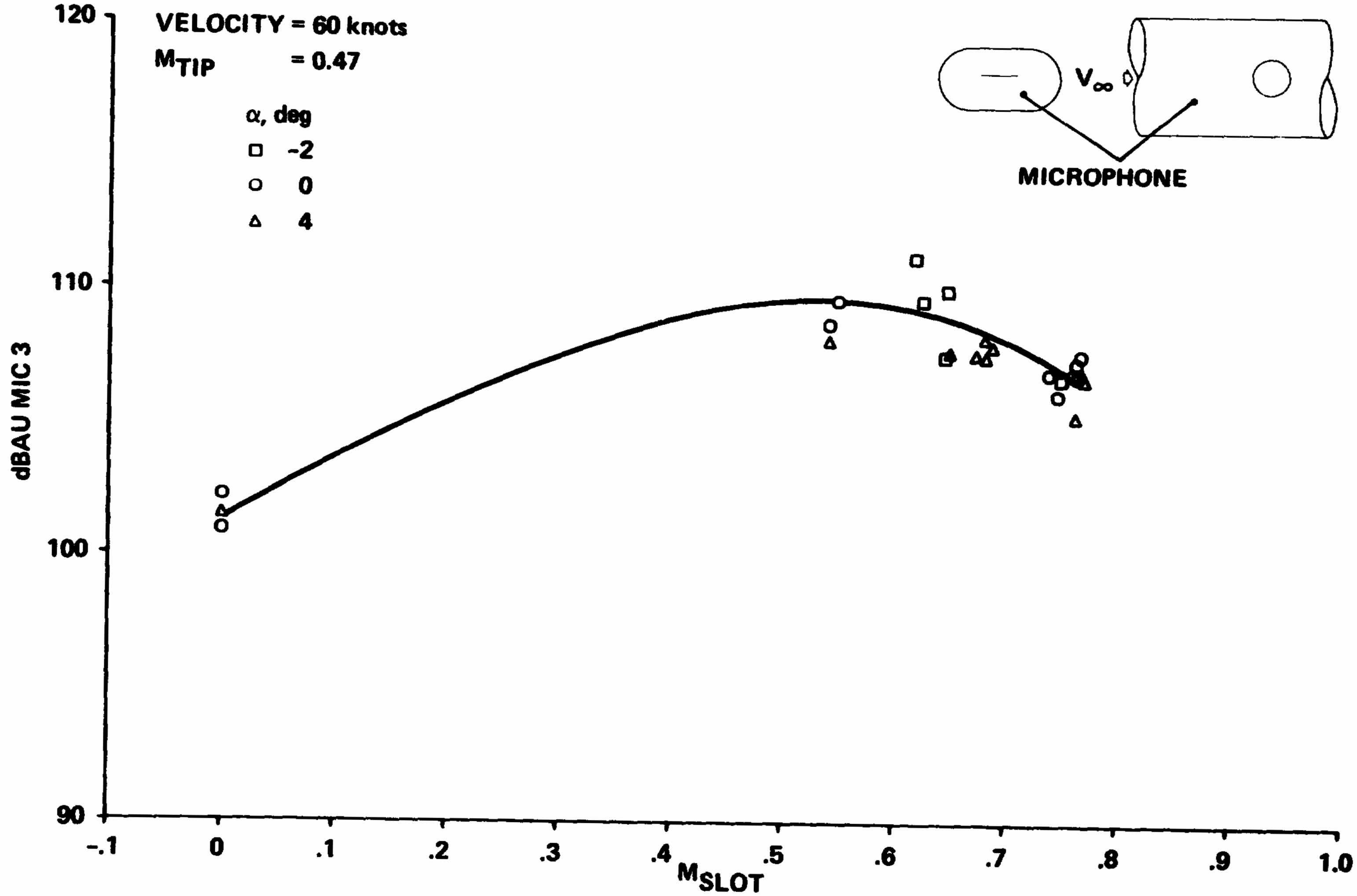

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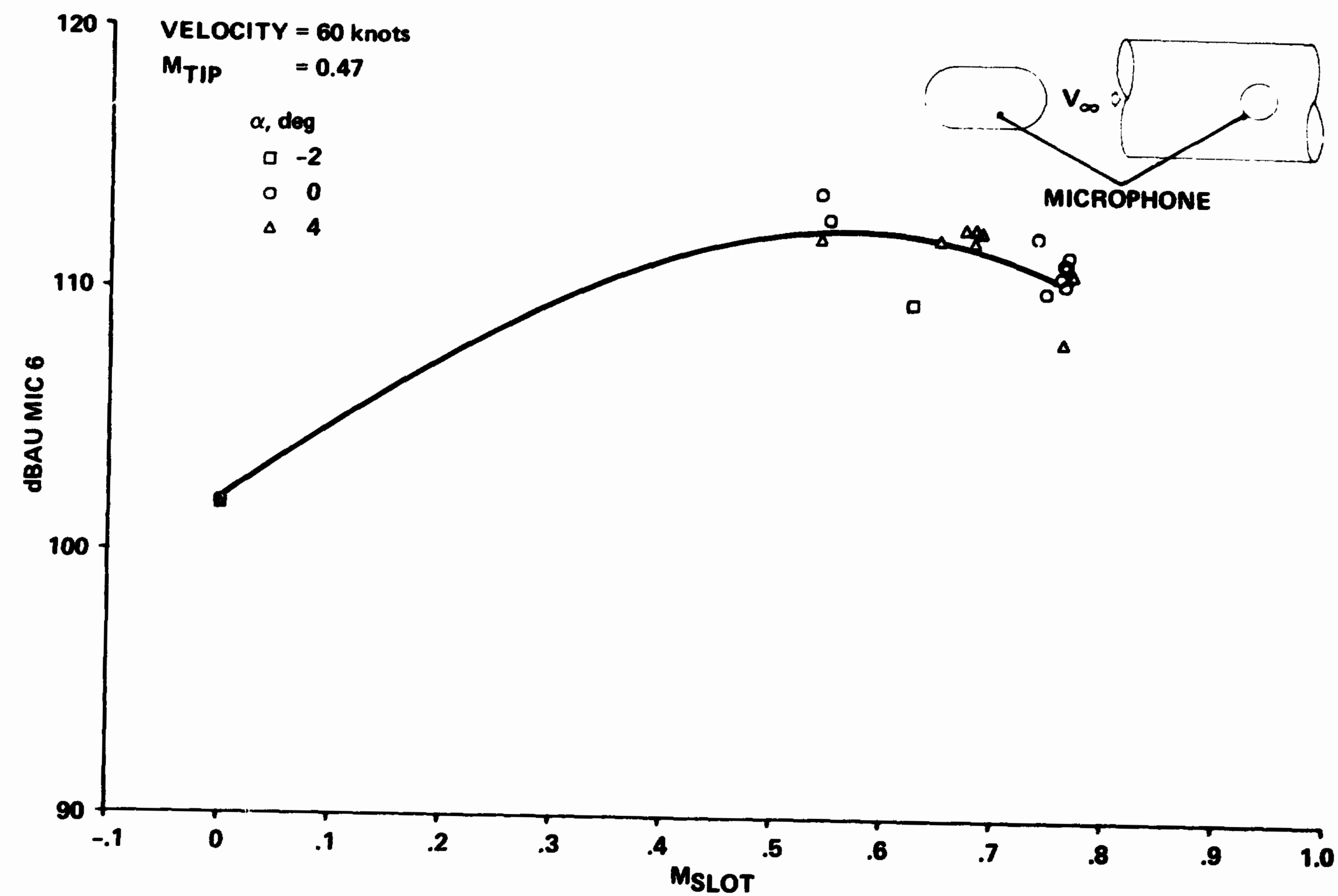
(a) V = 60 knots, microphone 3.

Figure 6.- Sound level as a function of M_{slot}.



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(b) V = 60 knots, microphone 6.

Figure 6.- Continued.

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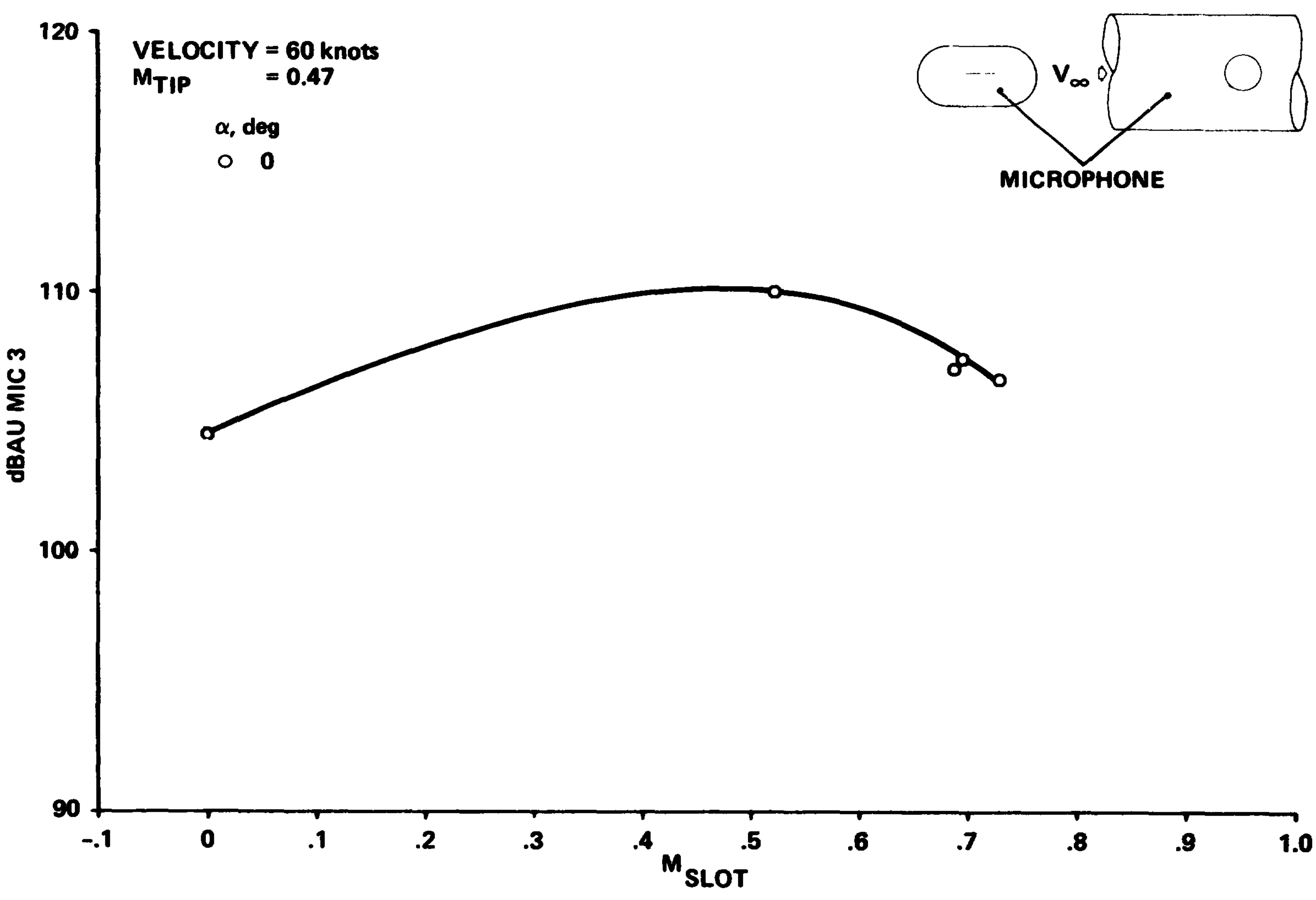
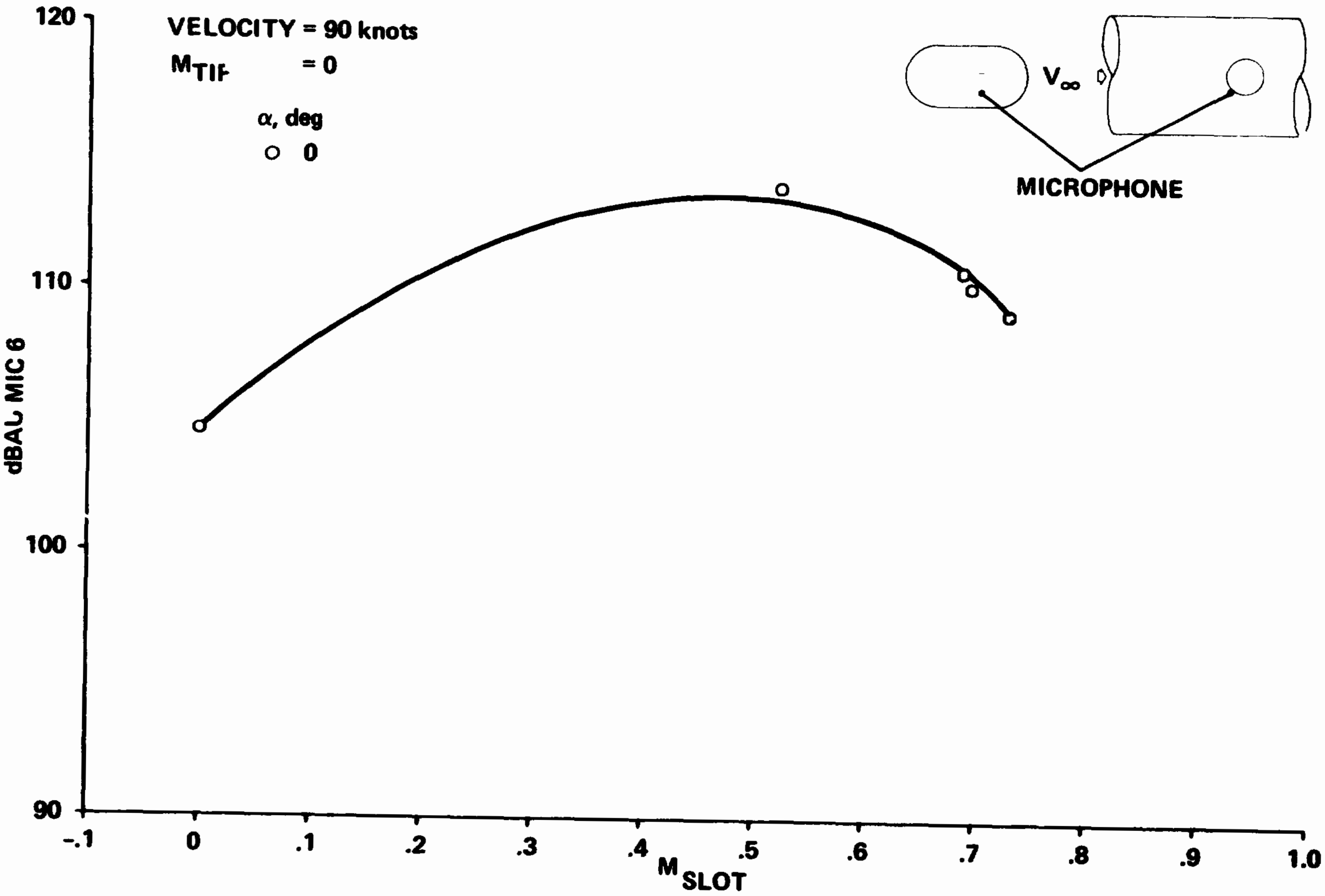


(c) V = 90 knots, microphone 3.

Figure 6.- Continued.



(d) V = 90 knots, microphone 6.

Figure 6.- Continued.

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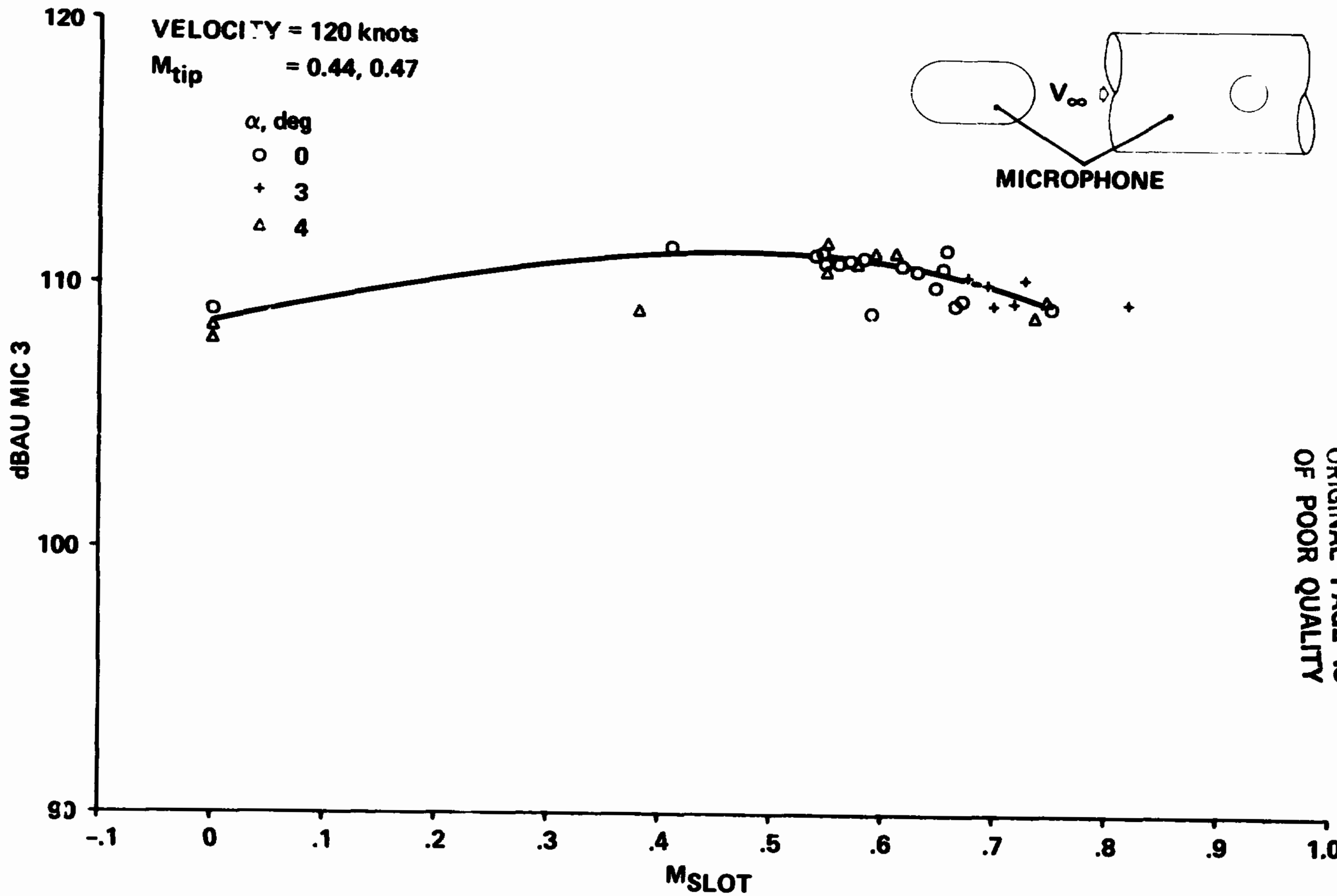

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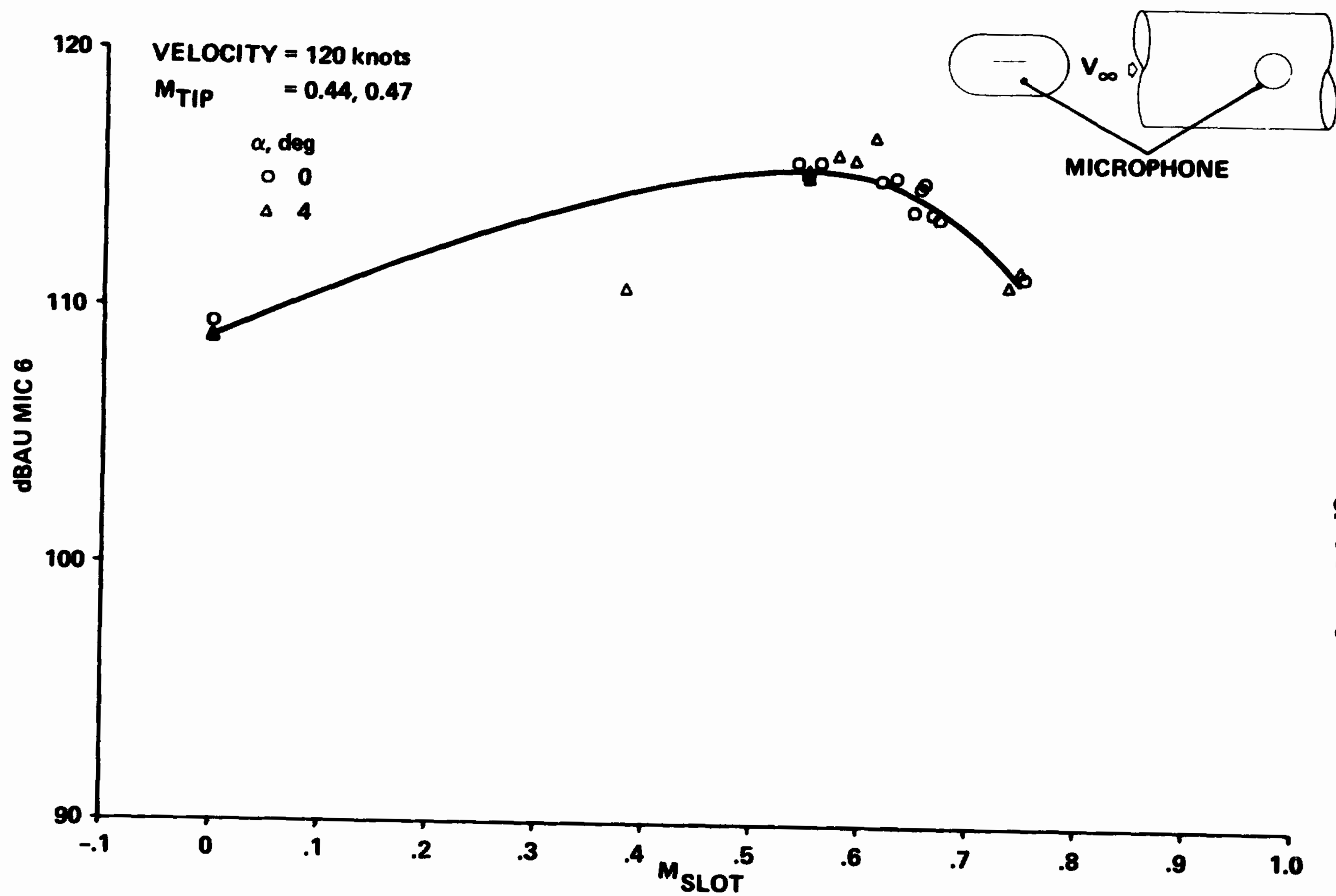
(e) V = 120 knots, microphone 3.

Figure 6.- Continued.



(f) V = 120 knots, microphone 6.

Figure 6.- Concluded.

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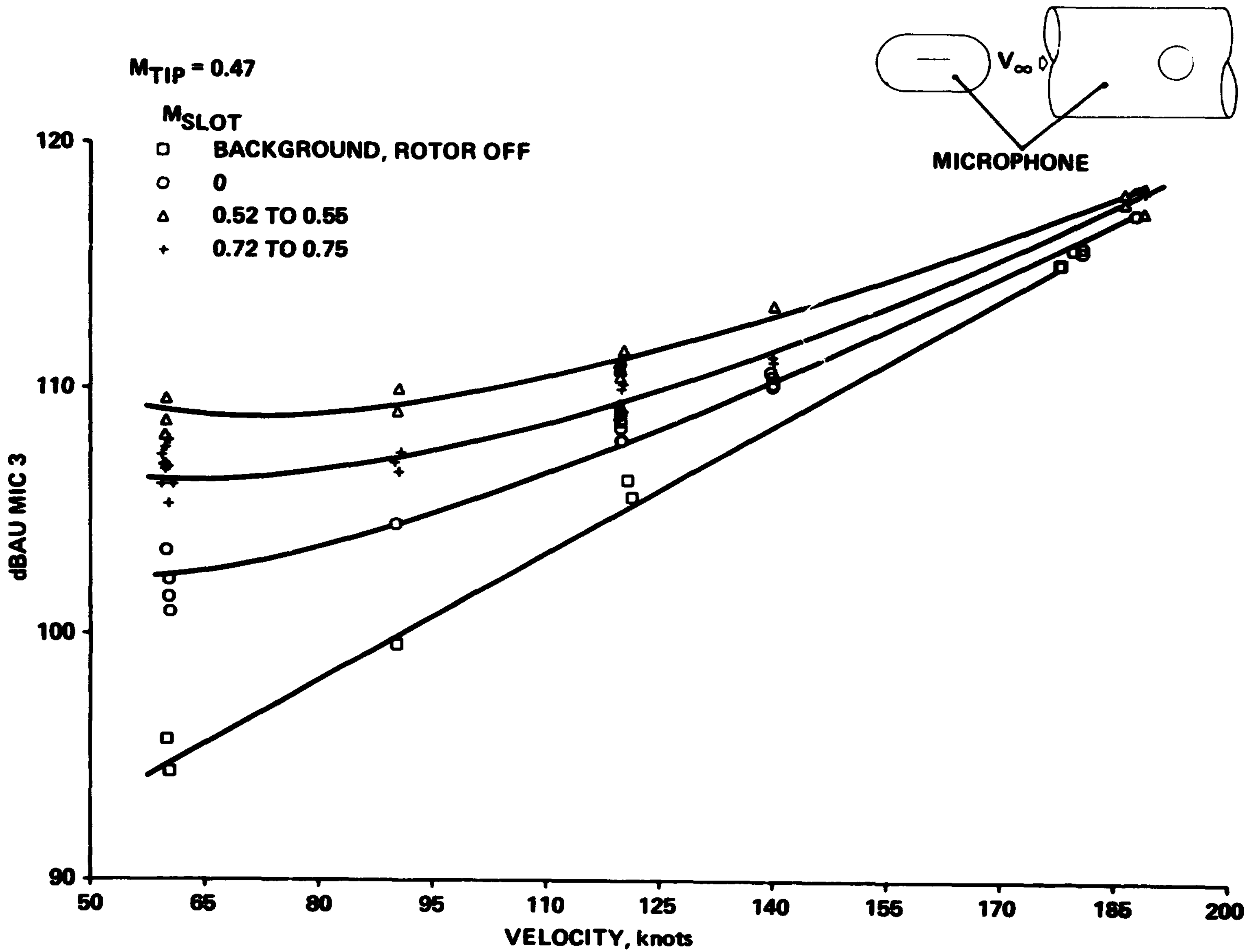
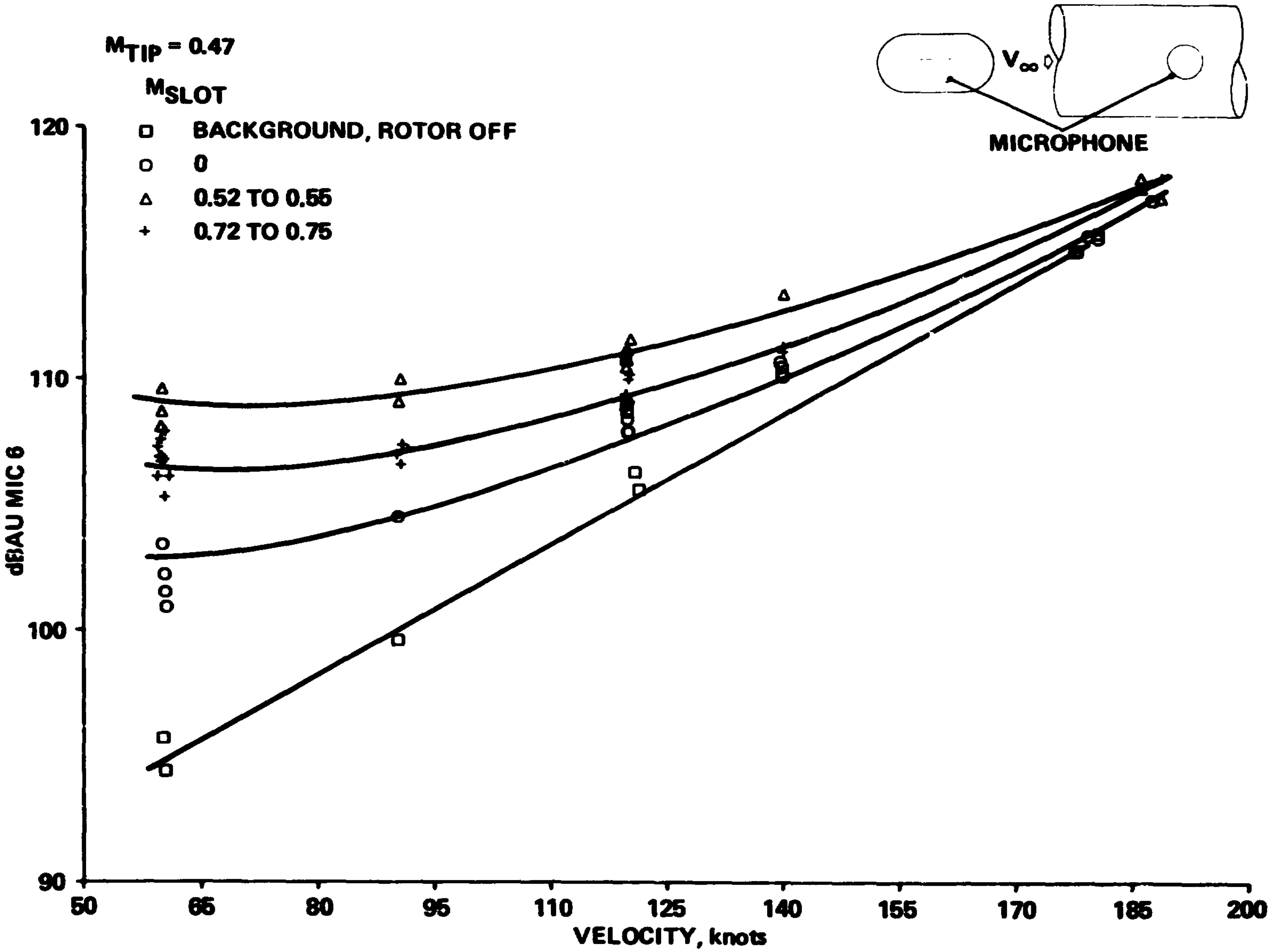


(a) Microphone 3.

Figure 7.- Sound level as a function of forward speed.



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(b) Microphone 6.

Figure 7.- Concluded.

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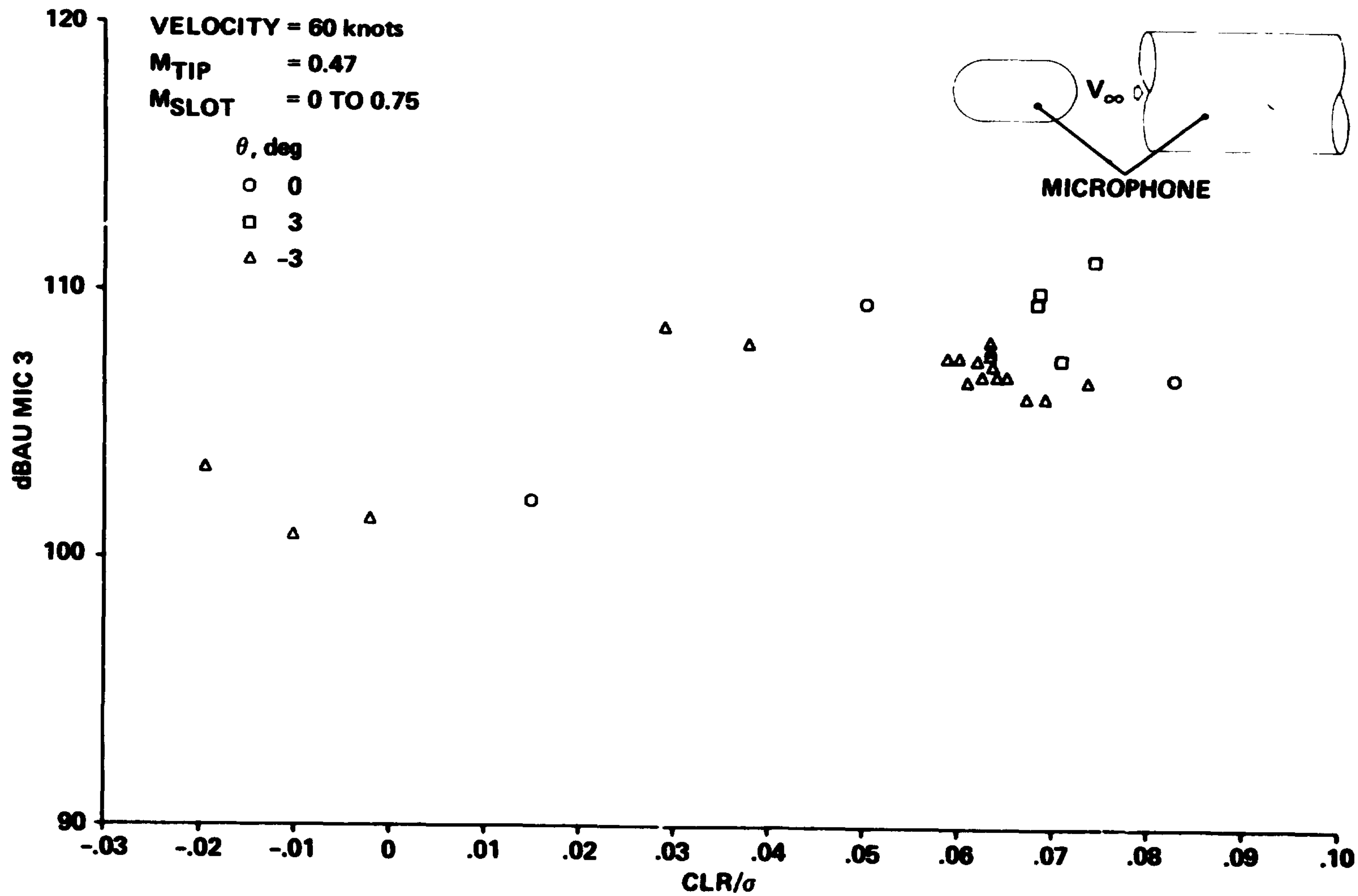

(a) Microphone 3.

Figure 8.- Sound level as a function of CLR/σ.

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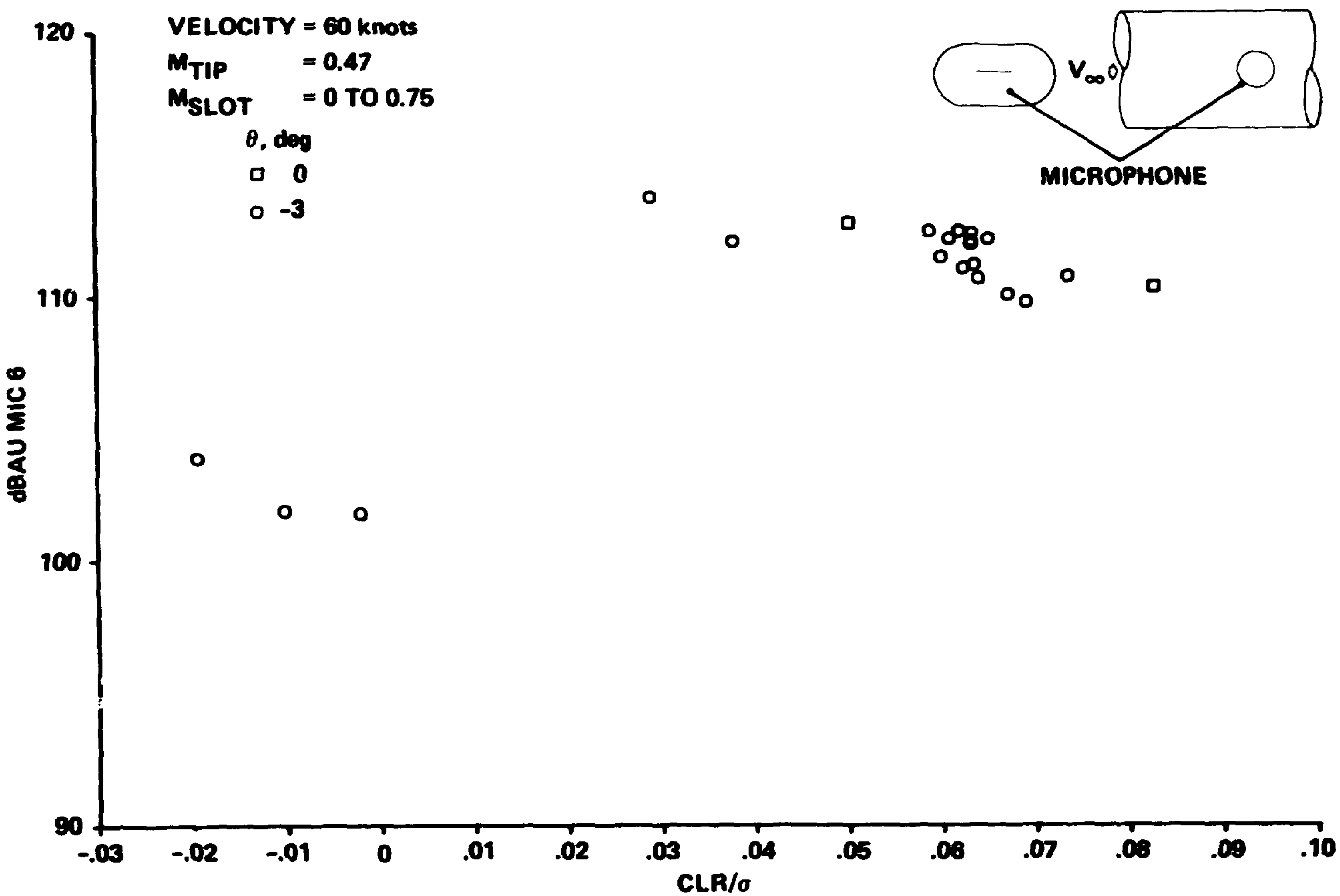
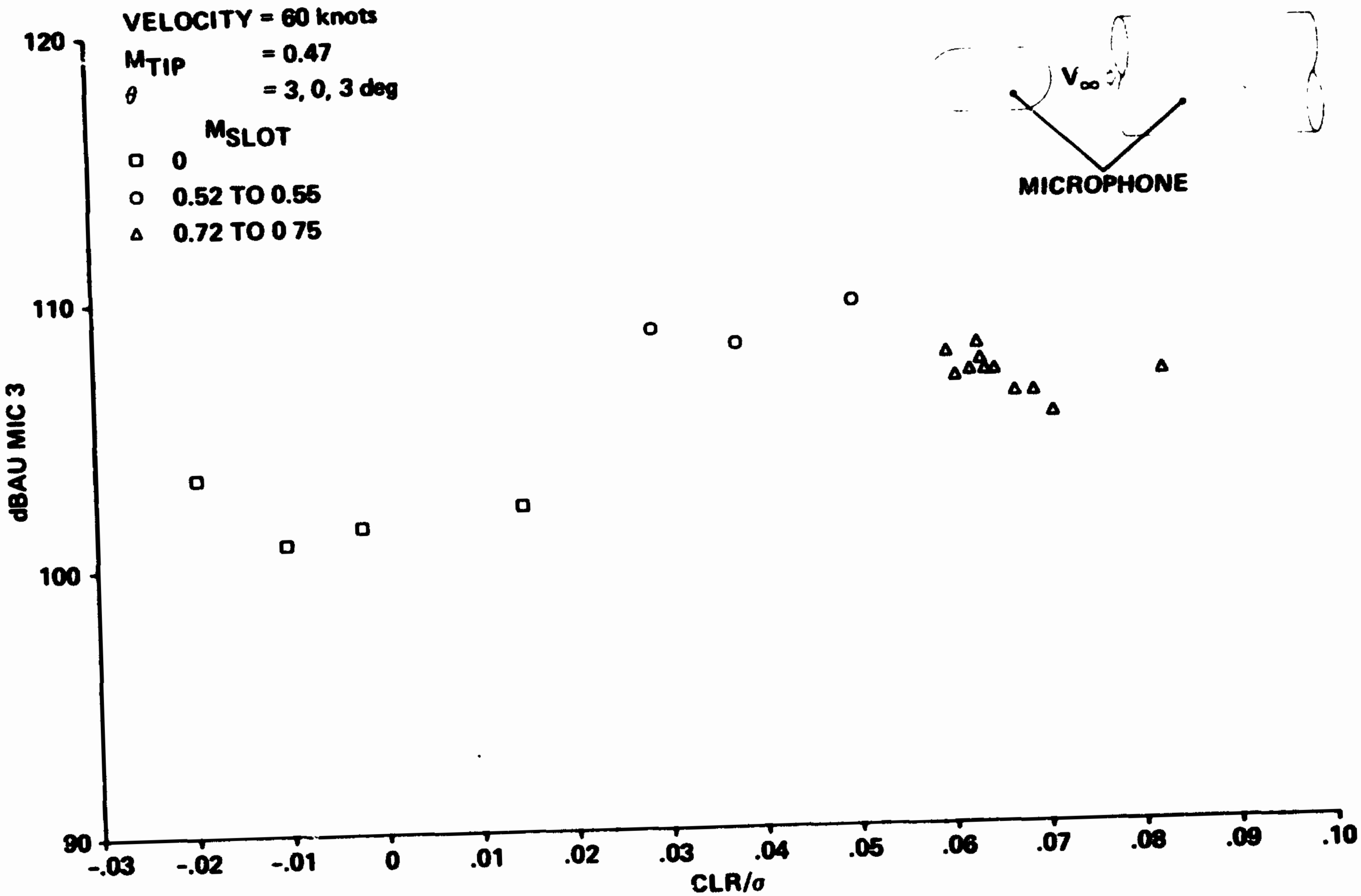


(b) Microphone 6.

Figure 8.- Concluded.



(a) Microphone 3.

Figure 9.- Sound level as a function of CLR/σ.

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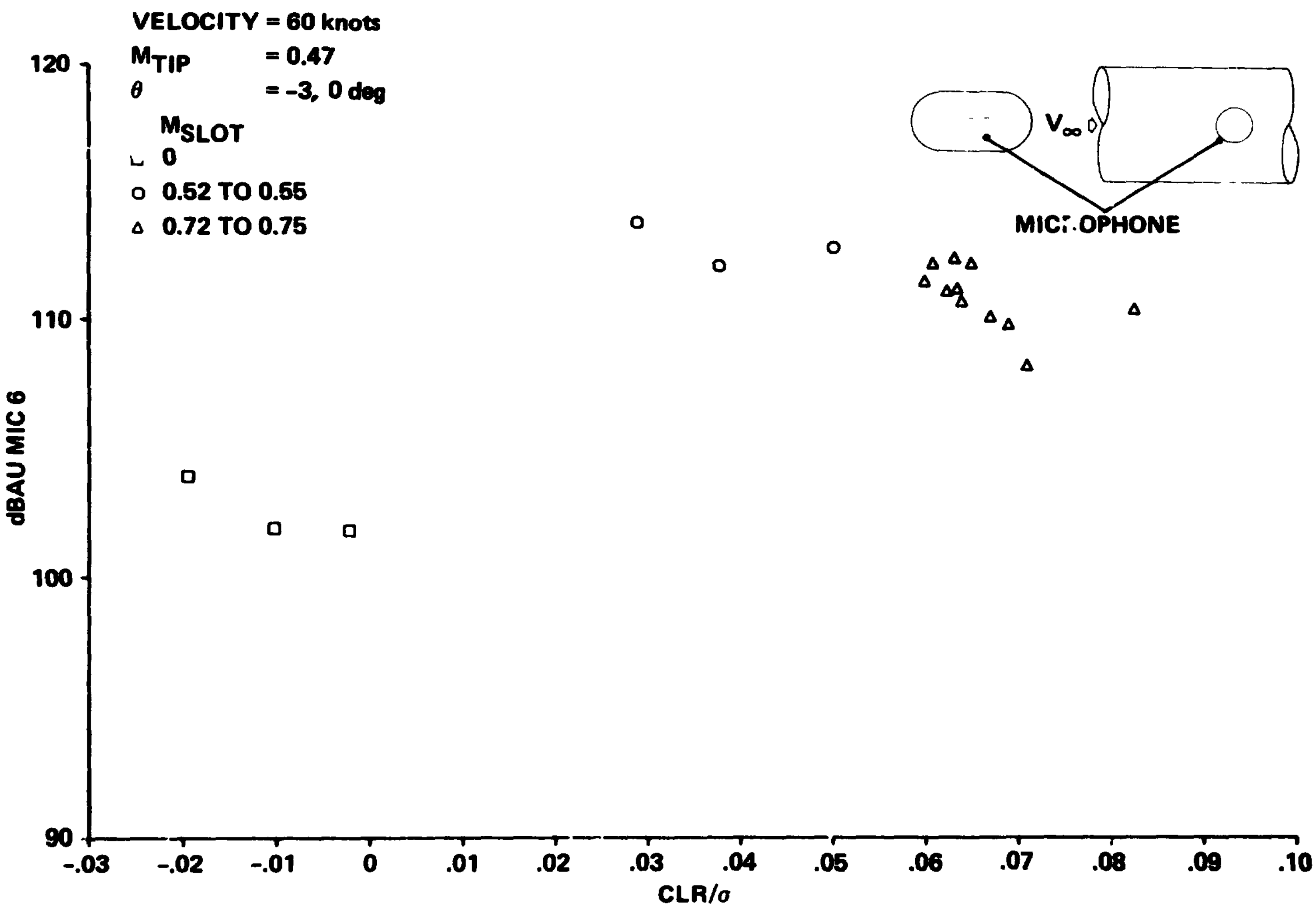

(b) Microphone 6.

Figure .- Concluded.

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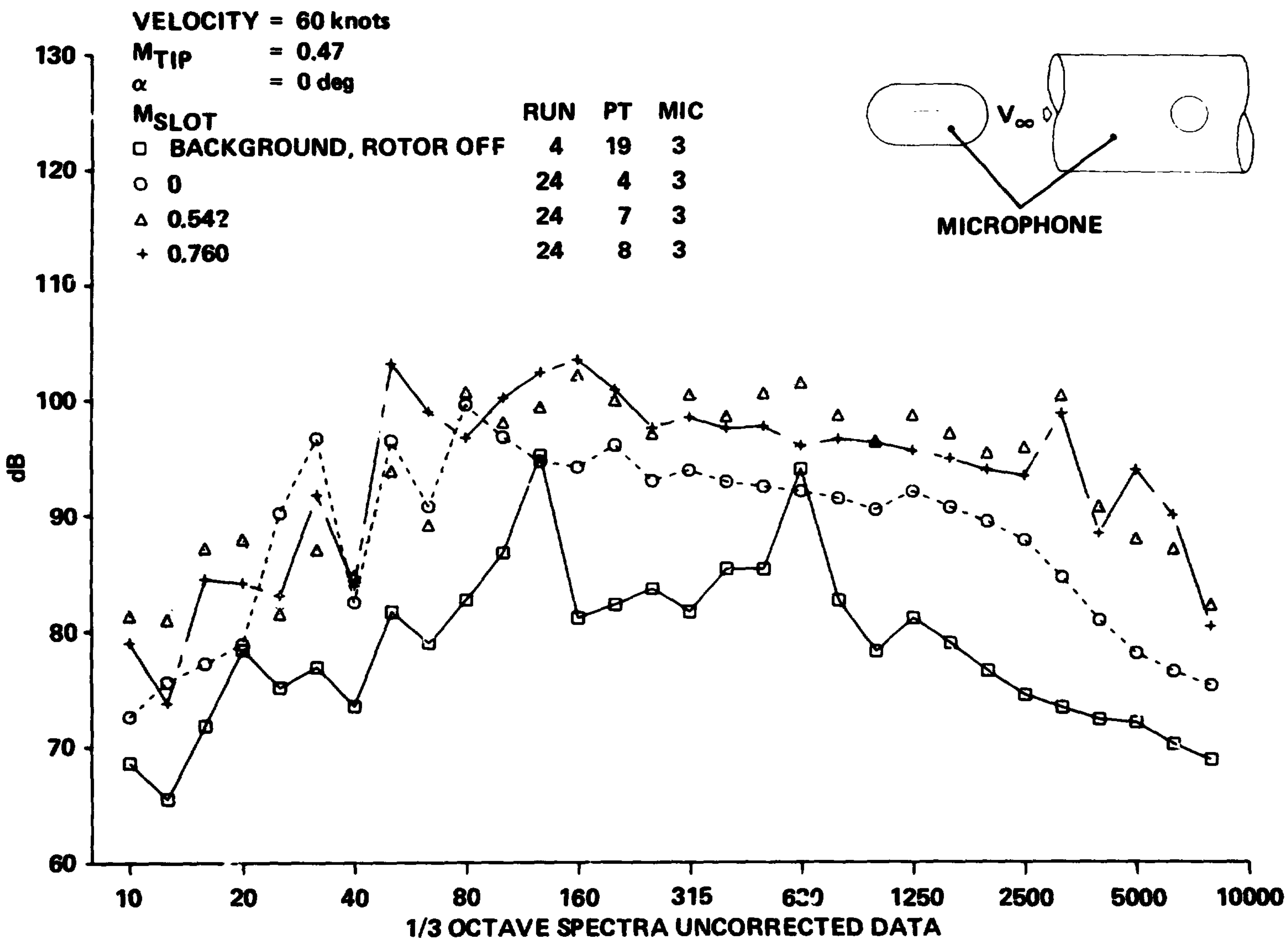

(a) V = 60 knots, α = 0°.

Figure 10.- One-third octave spectra as a function of M_{slot}.

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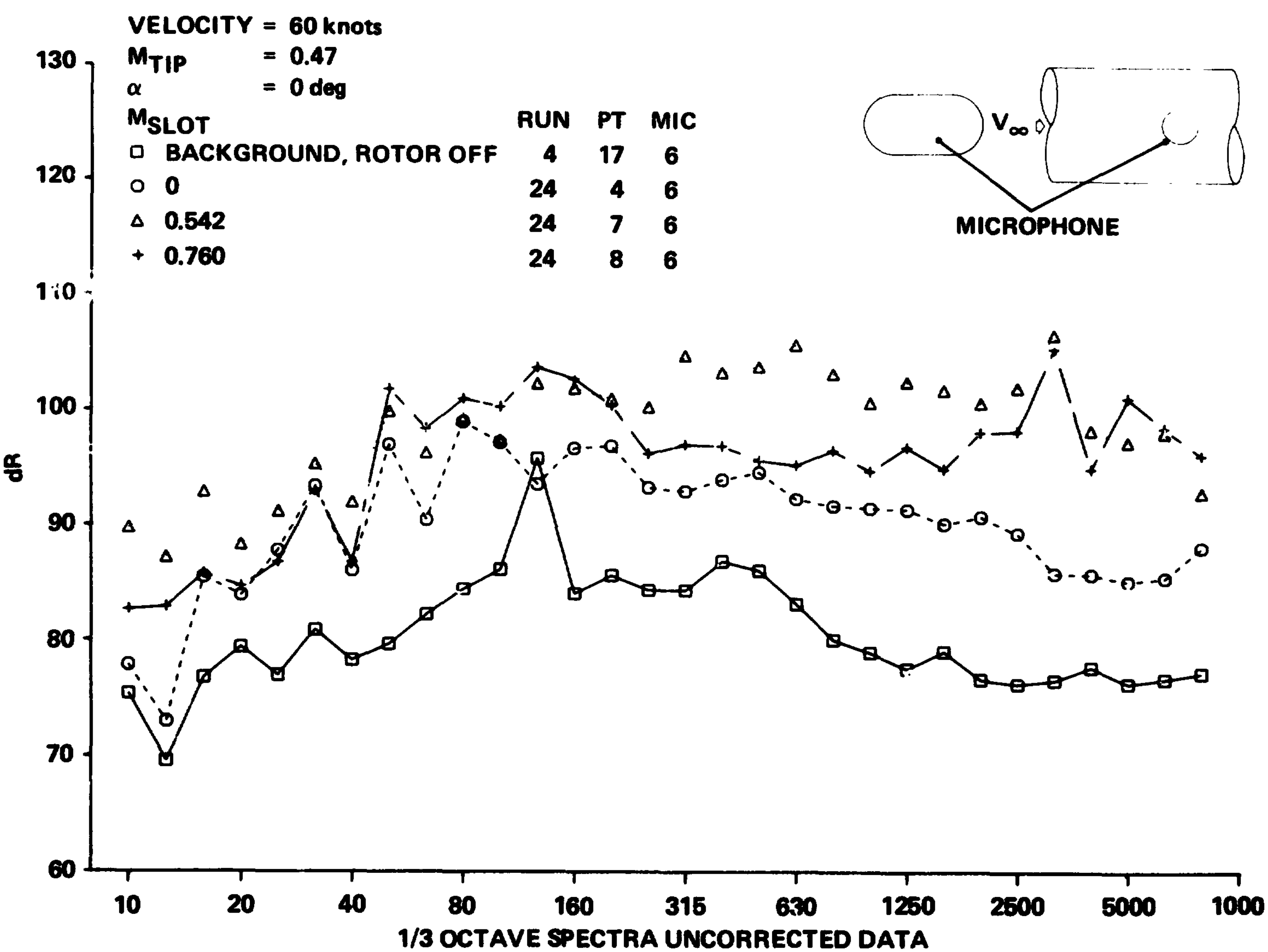

(b) V = 60 knots, α = 0°.

Figure 10.- Continued.

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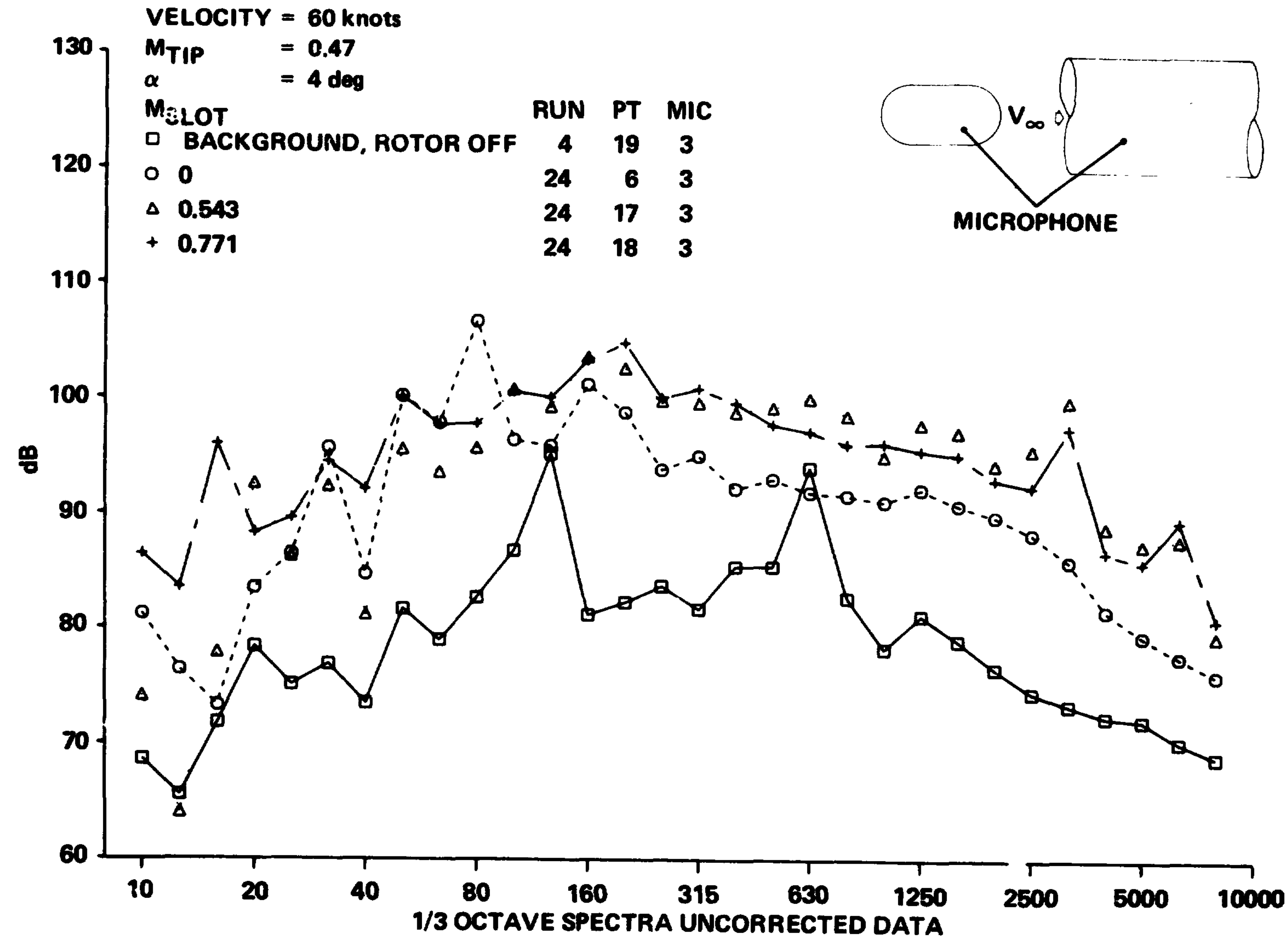

(c) V = 60 knots, α = 4°.

Figure 10.- Continued.

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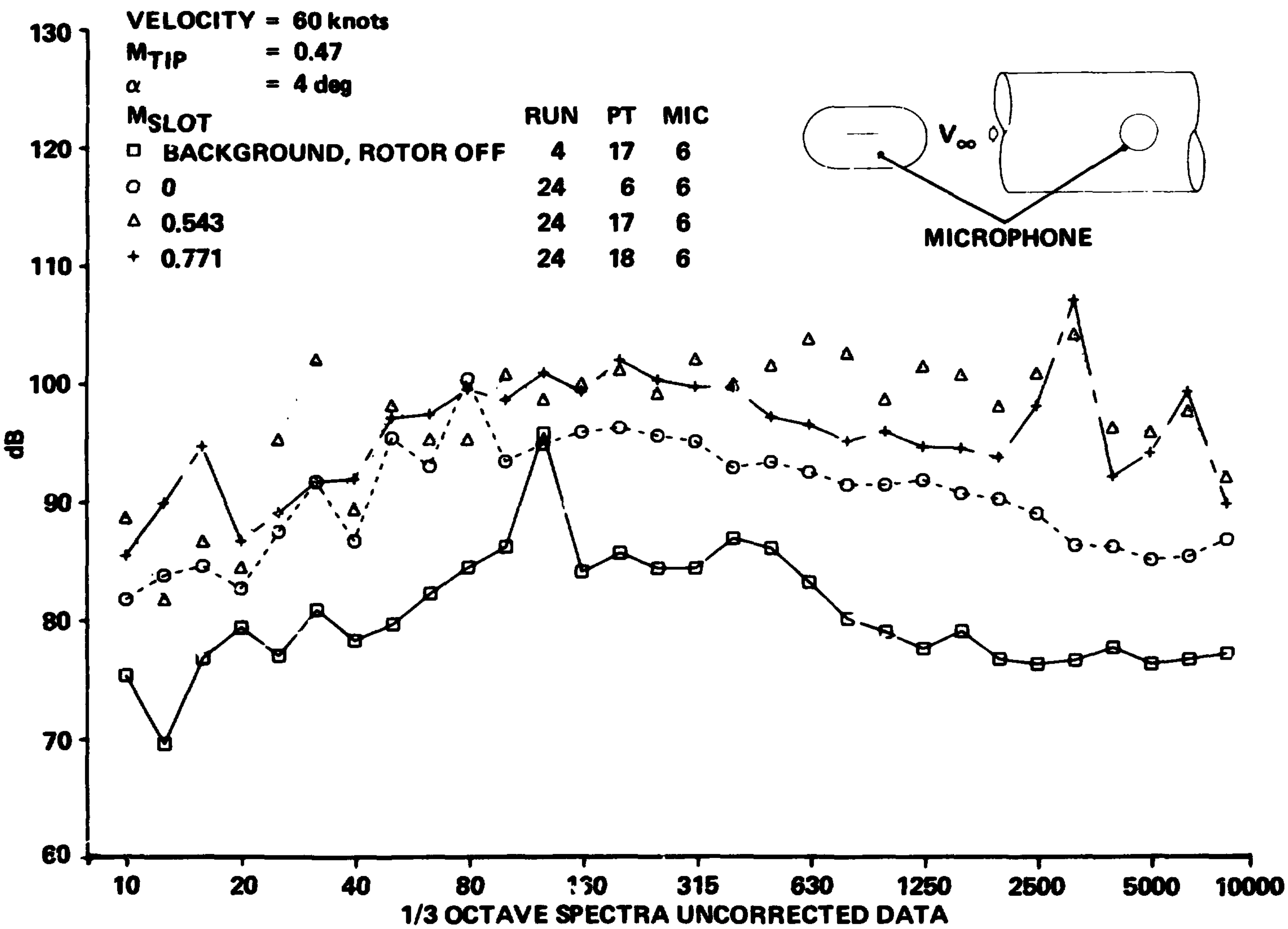
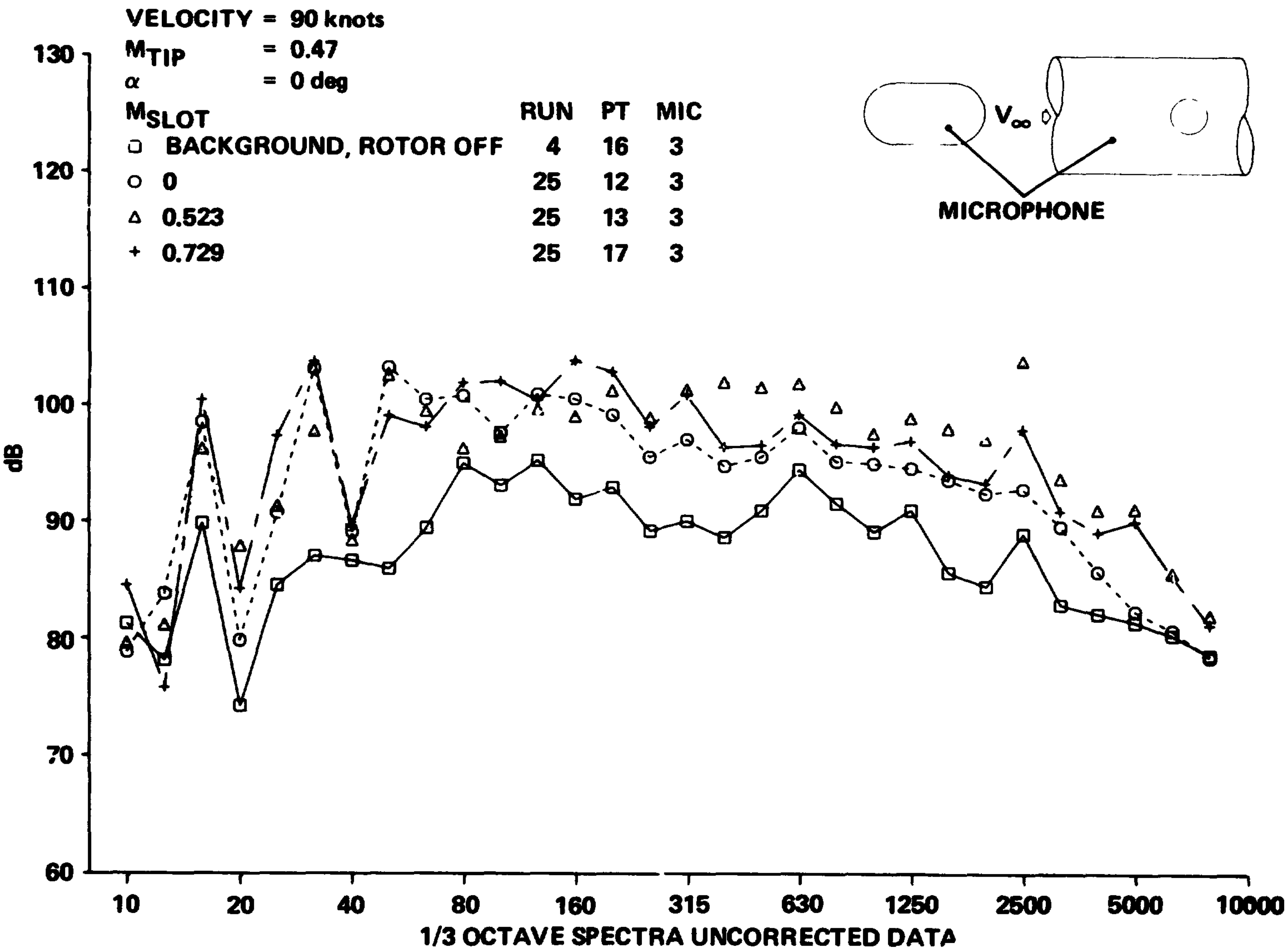


(d) V = 60 knots, α = 4°.

Figure 10.- Continued.



(e) V = 90 knots, α = 0°.

Figure 10.- Continued.

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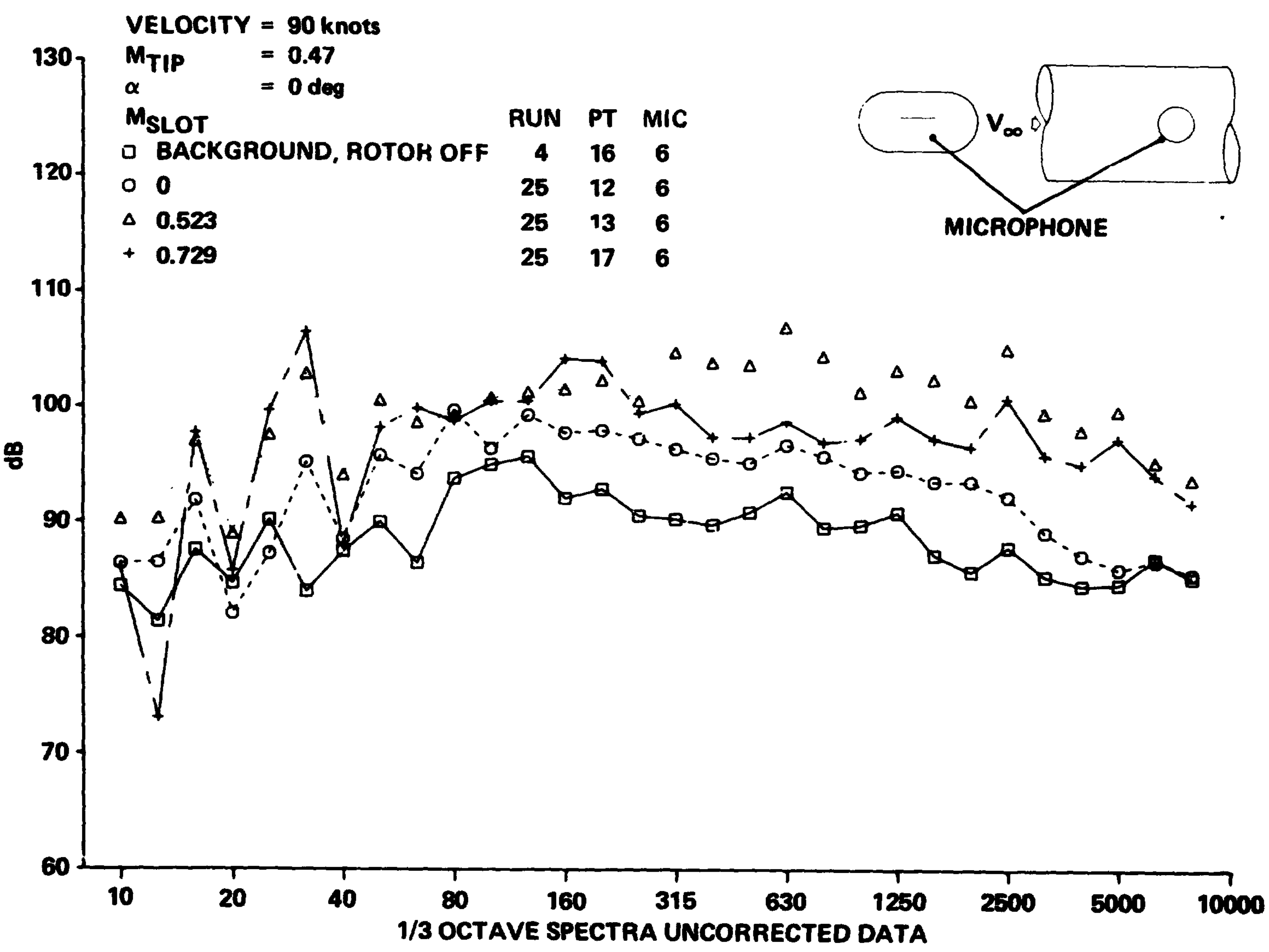

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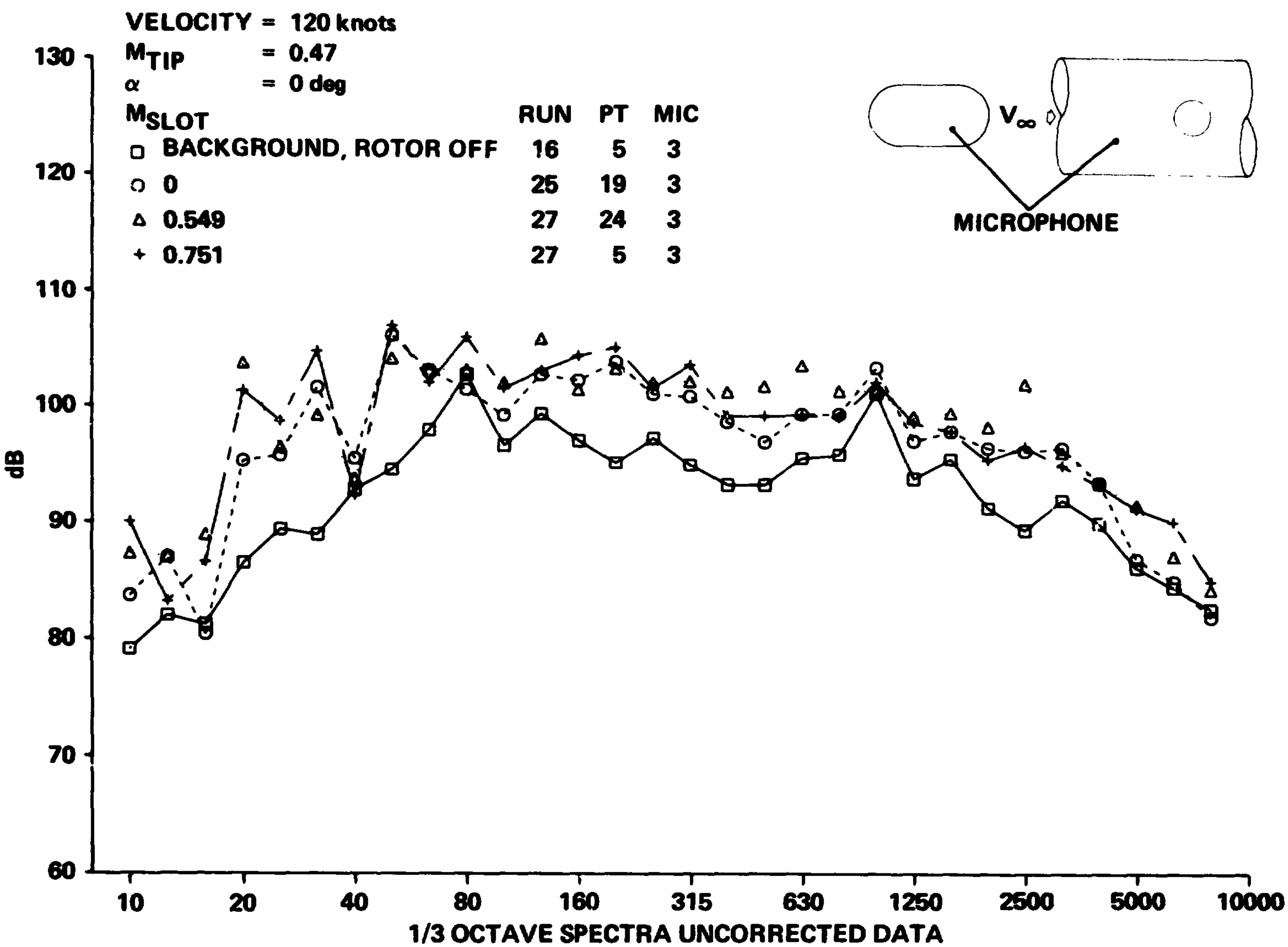
(f) V = 90 knots, α = 0°.

Figure 10.- Continued.



(g) V = 120 knots, α = 0°.

Figure 10.- Continued.

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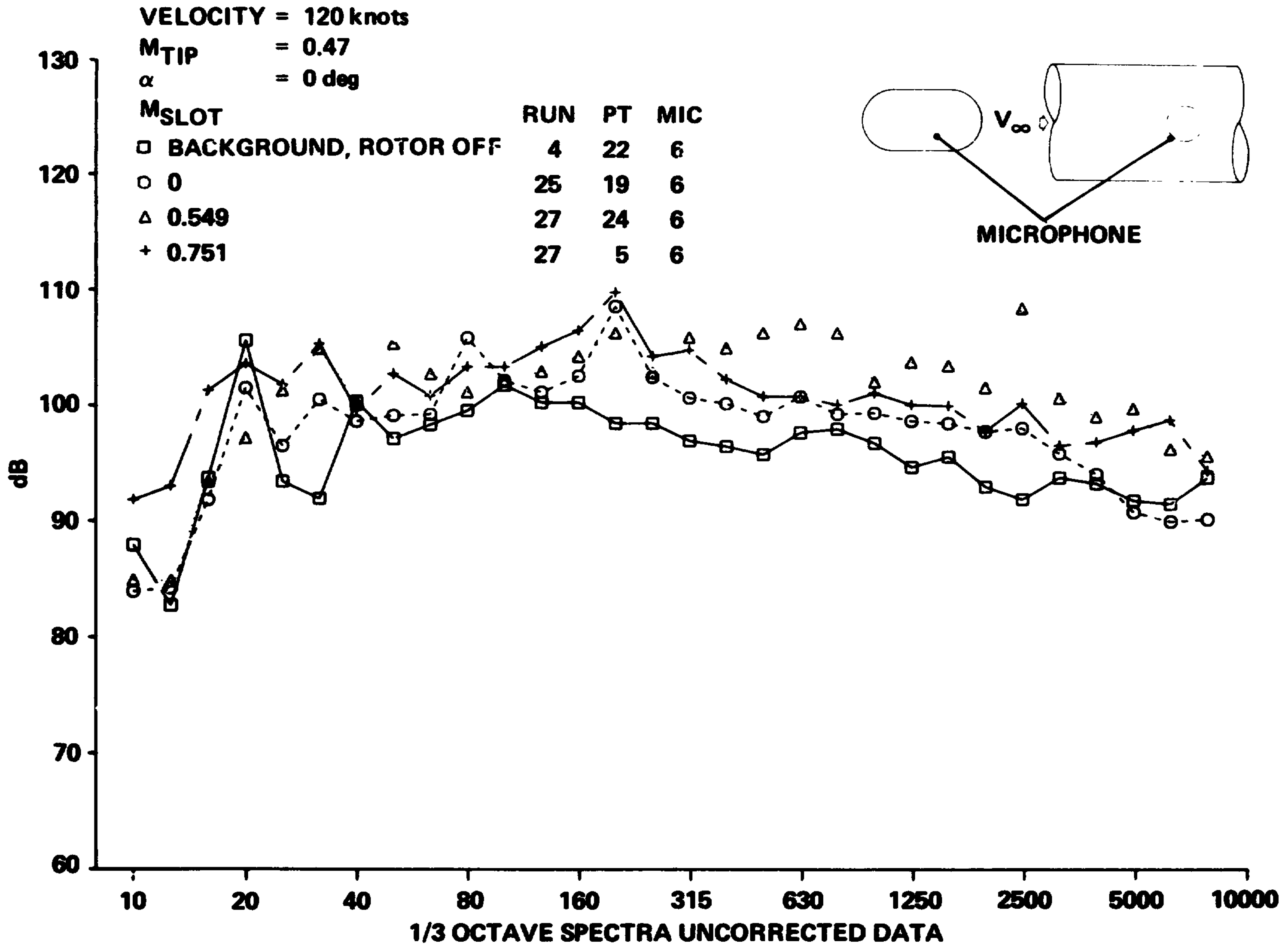

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(h) V = 120 knots, α = 0°.

Figure 10.- Continued.

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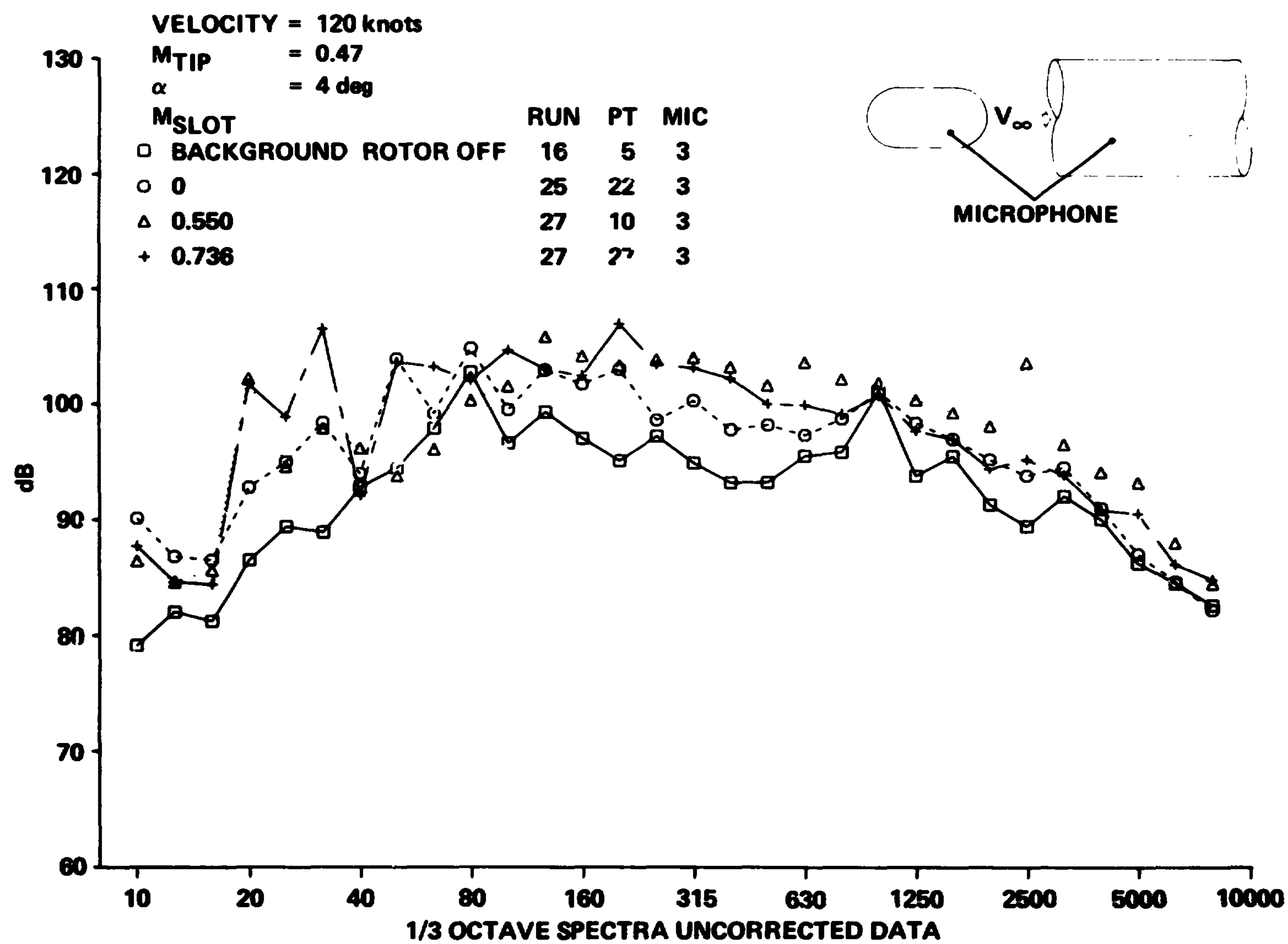
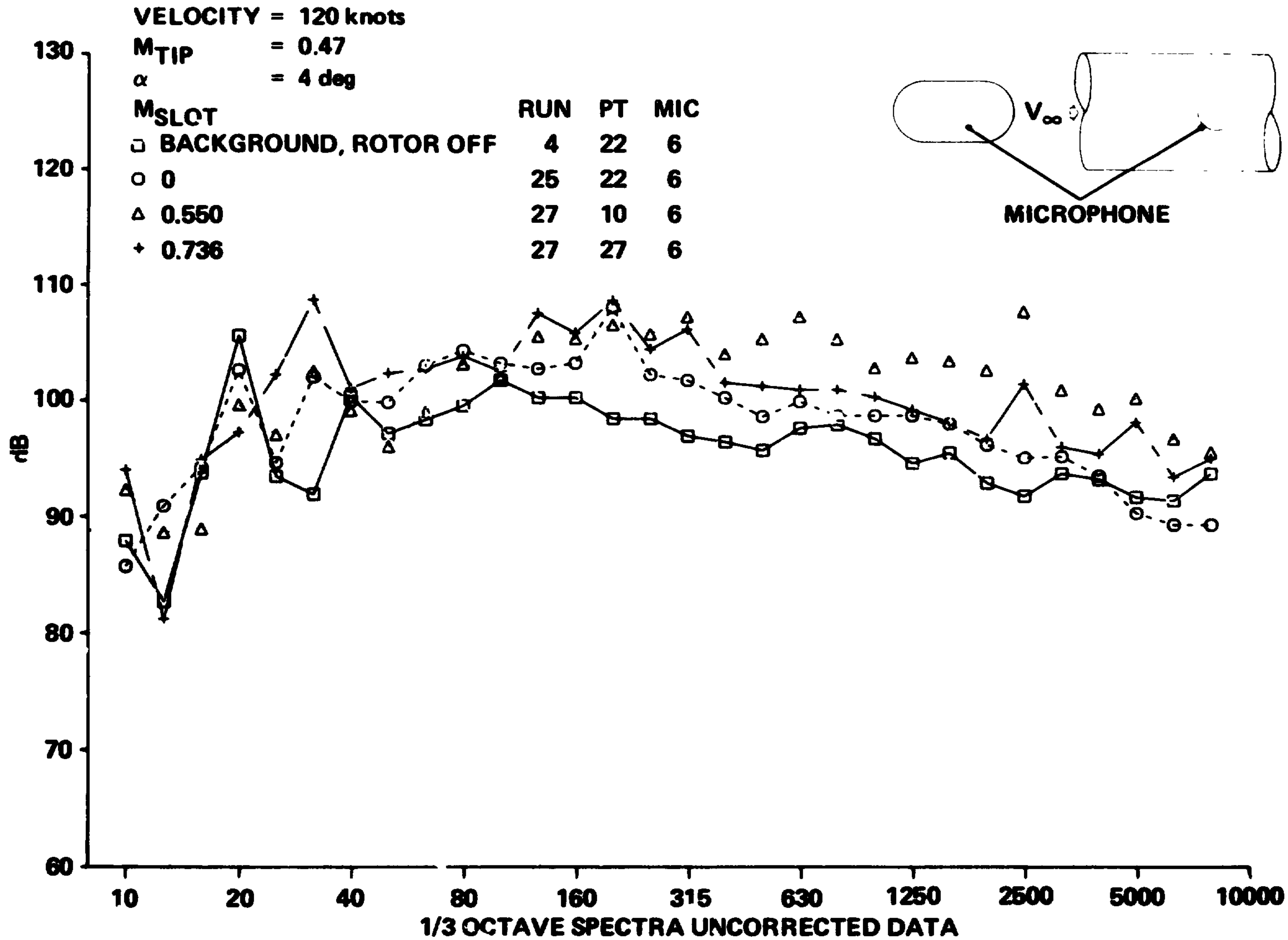


(i) V = 120 knots, α = 4°.

Figure 10.- Continued.



(j) V = 120 knots, α = 4°.

Figure 10.- Concluded.

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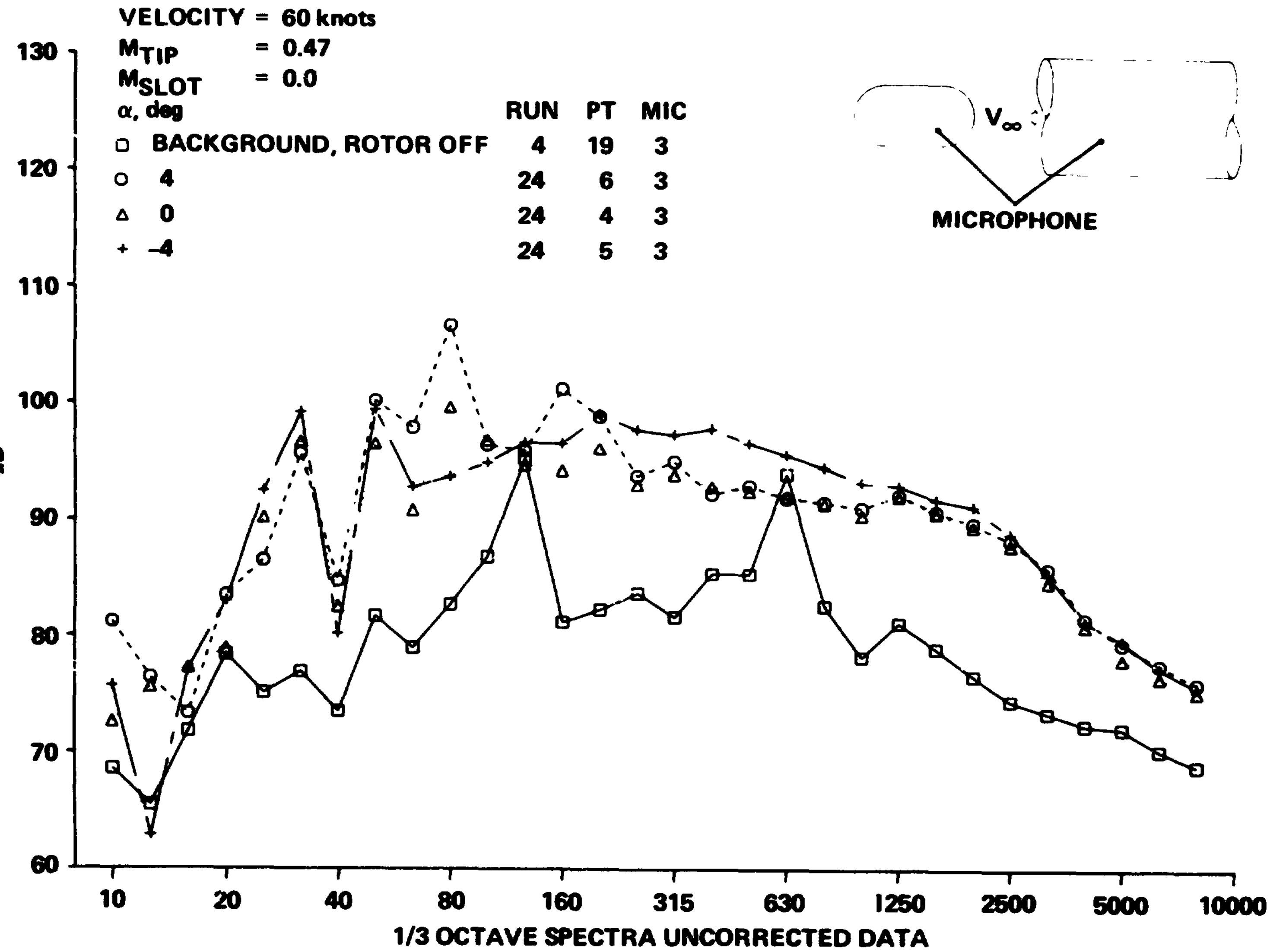

(a) V = 60 knots, M_{slot} = 0.

Figure 11.- One-third octave spectra as a function of α.

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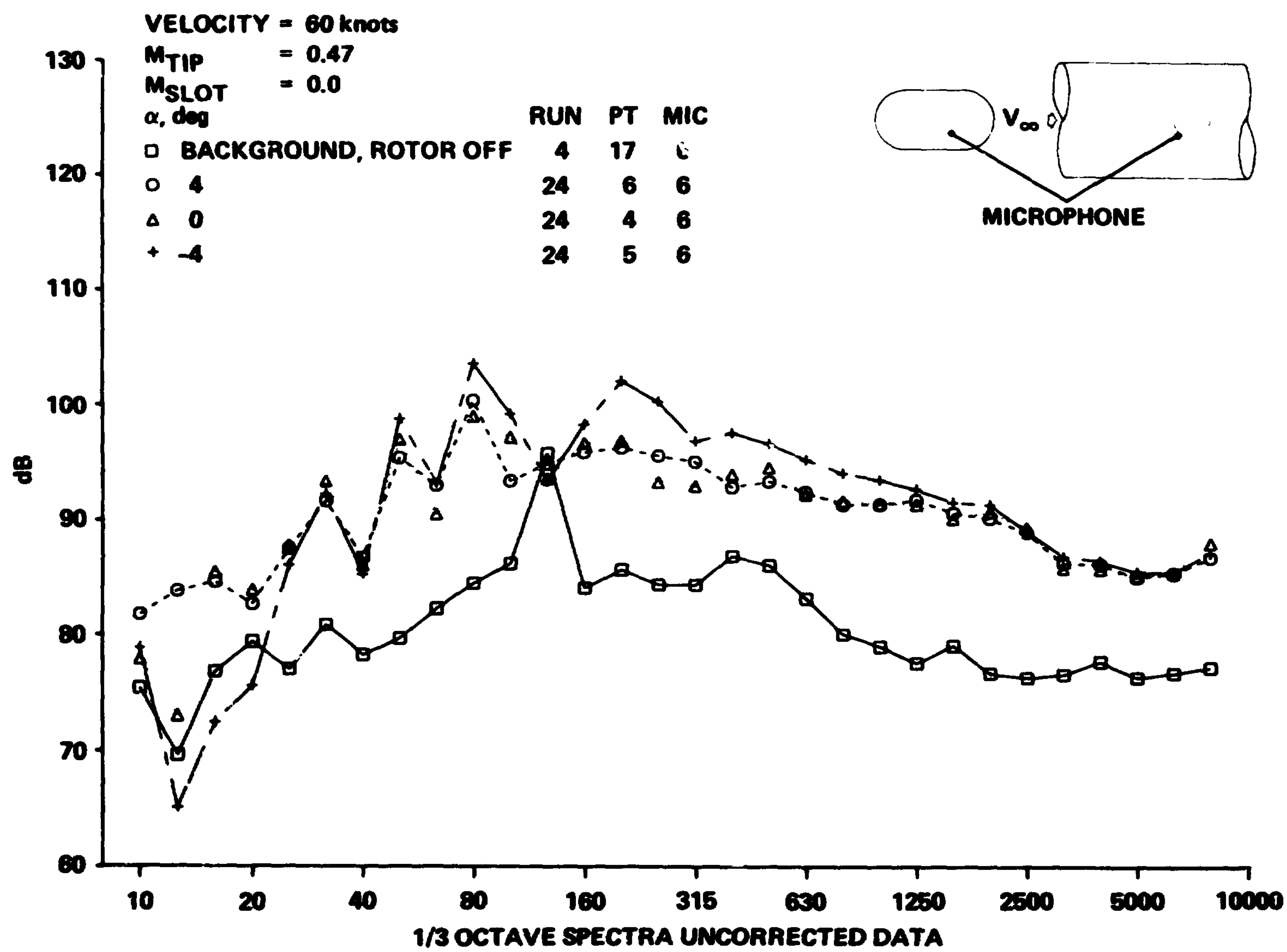

(b) V = 60 knots, M_{slot} = 0.

Figure 11.- Continued.

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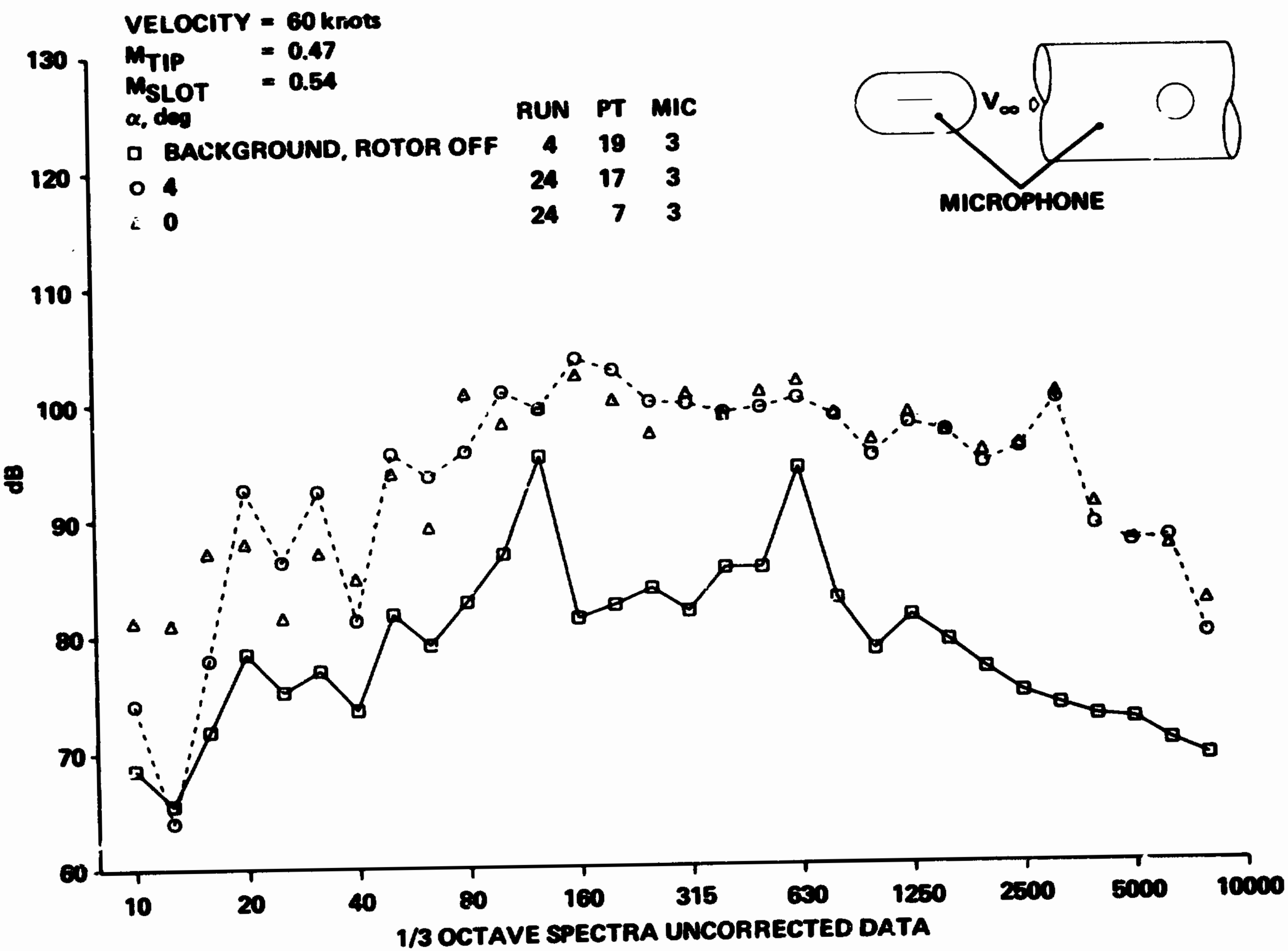

(c) V = 60 knots, M_{slot} = 0.54.

Figure 11.- Continued.

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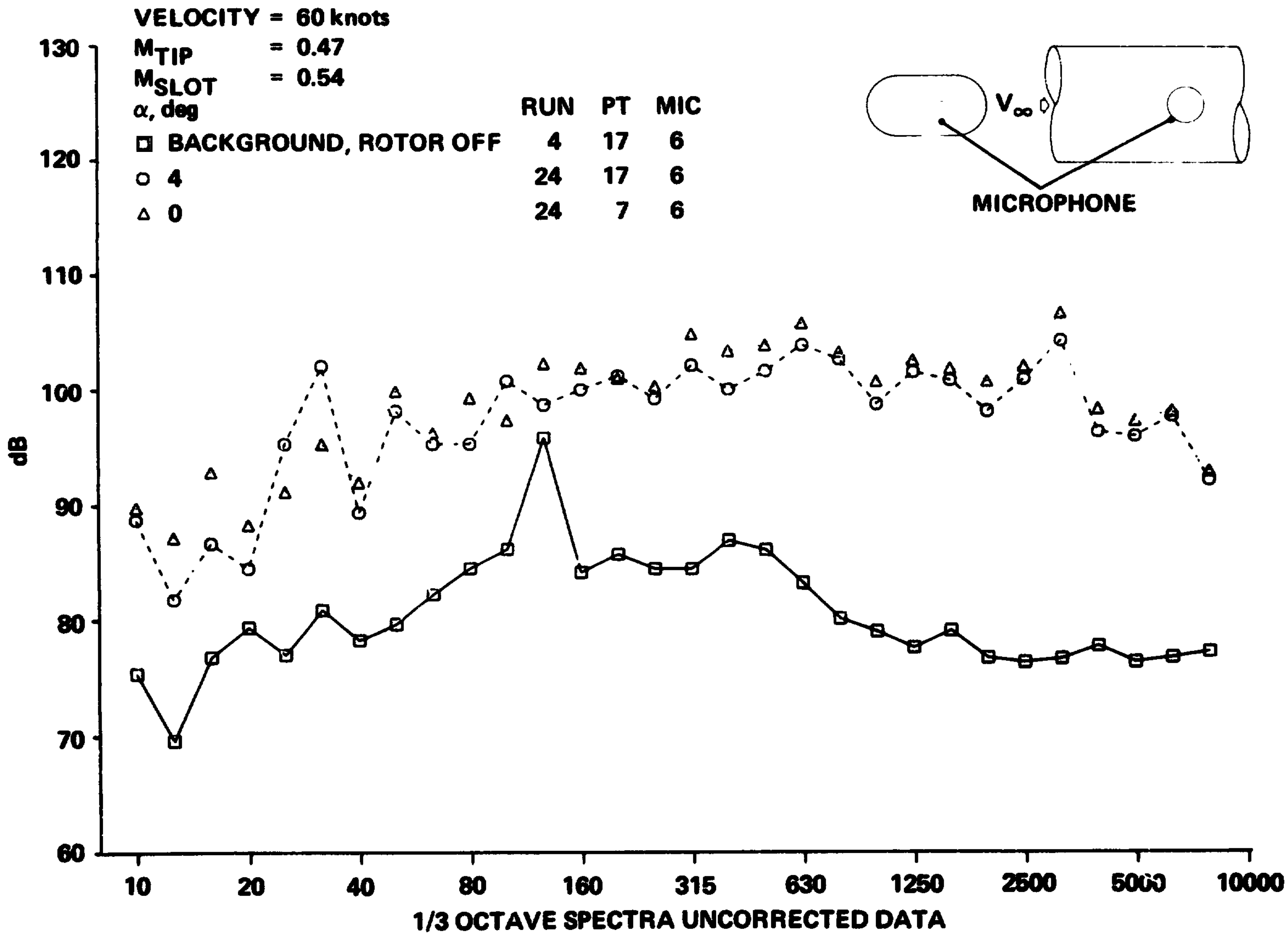

(d) V = 60 knots, M_{slot} = 0.54.

Figure 11.- Continued.

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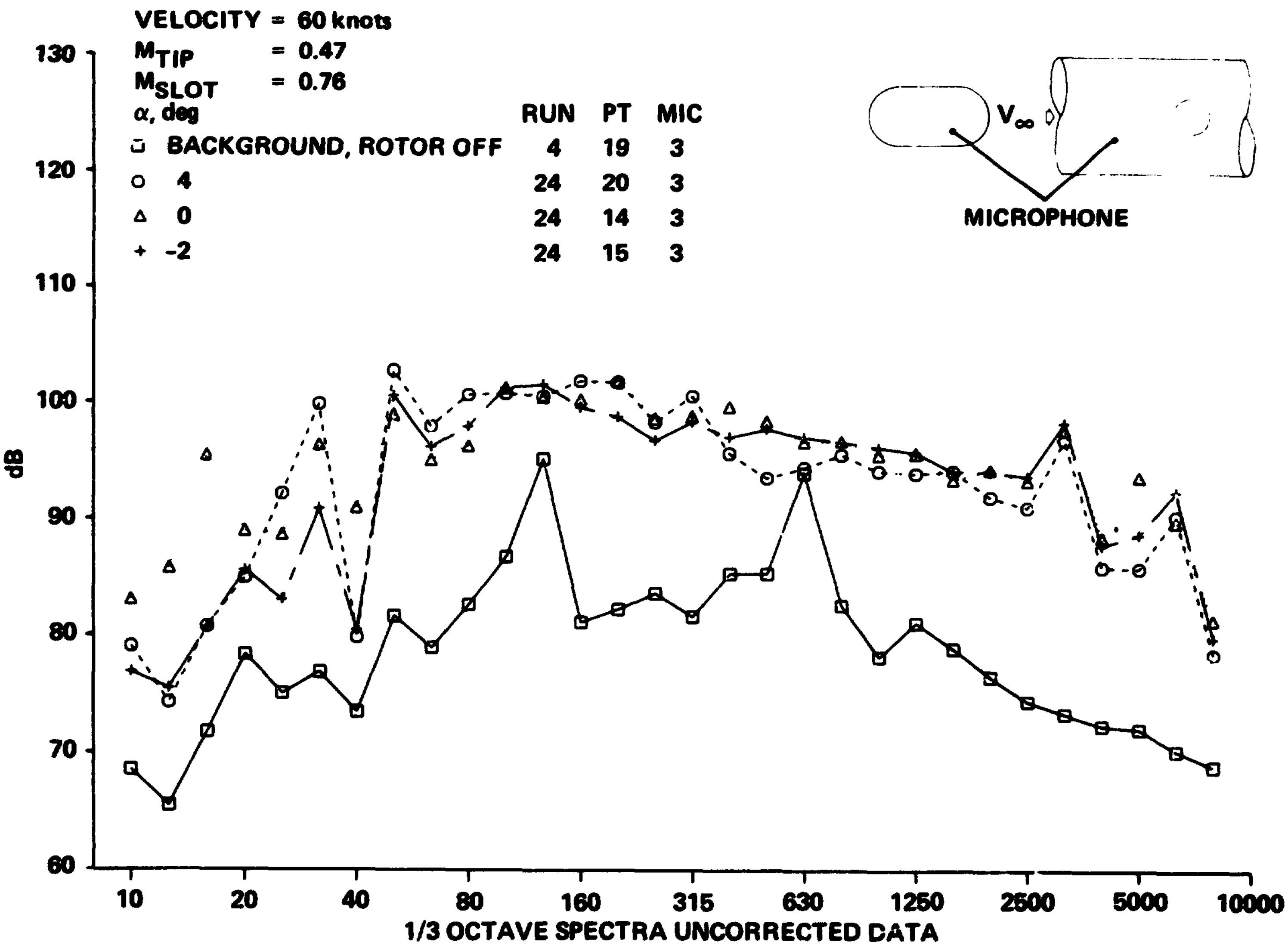

(e) V = 60 knots, M_{slot} = 0.76.

Figure 11.- Continued.

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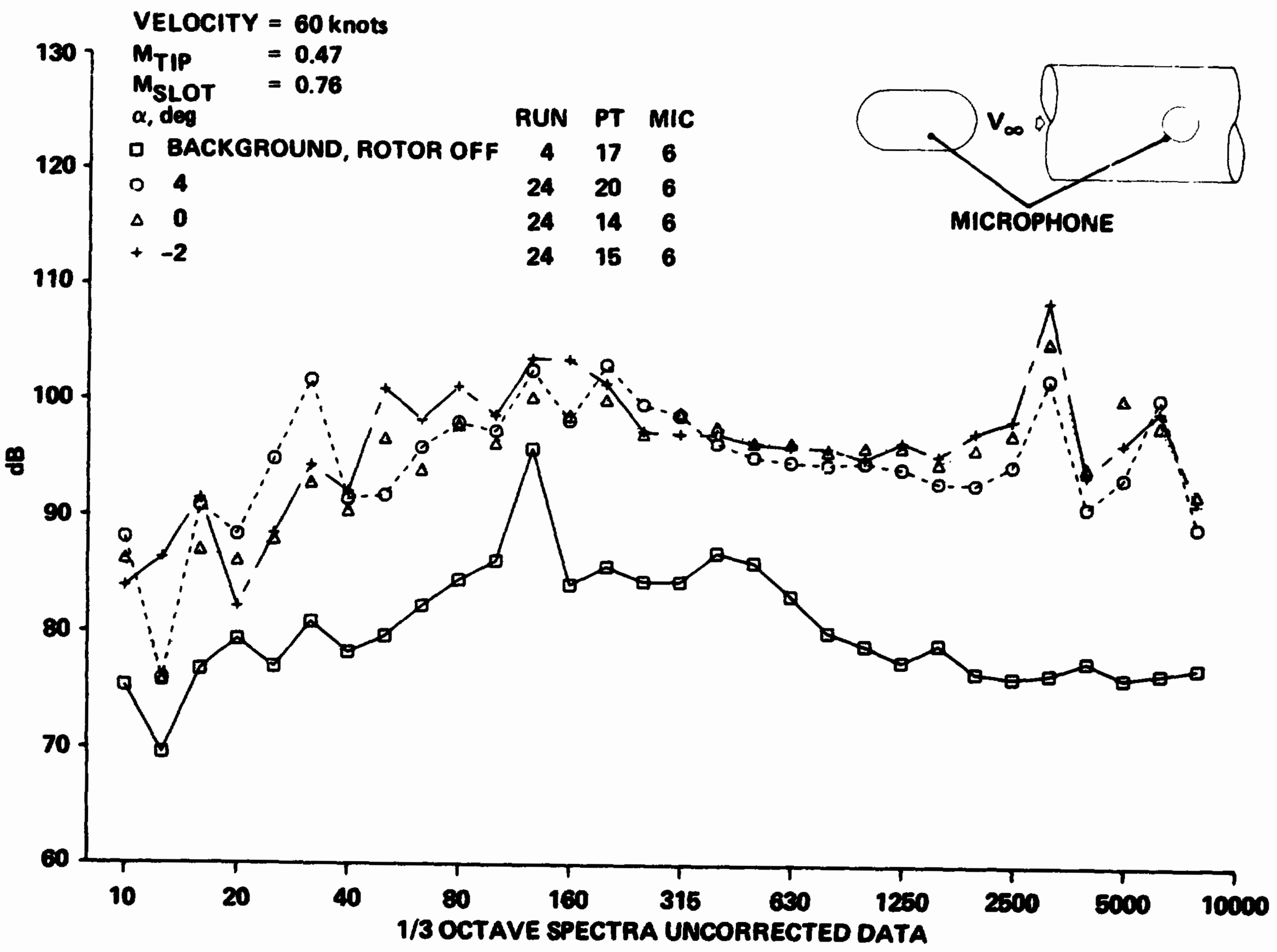

(f) V = 60 knots, M_{slot} = 0.76.

Figure 11.- Continued.

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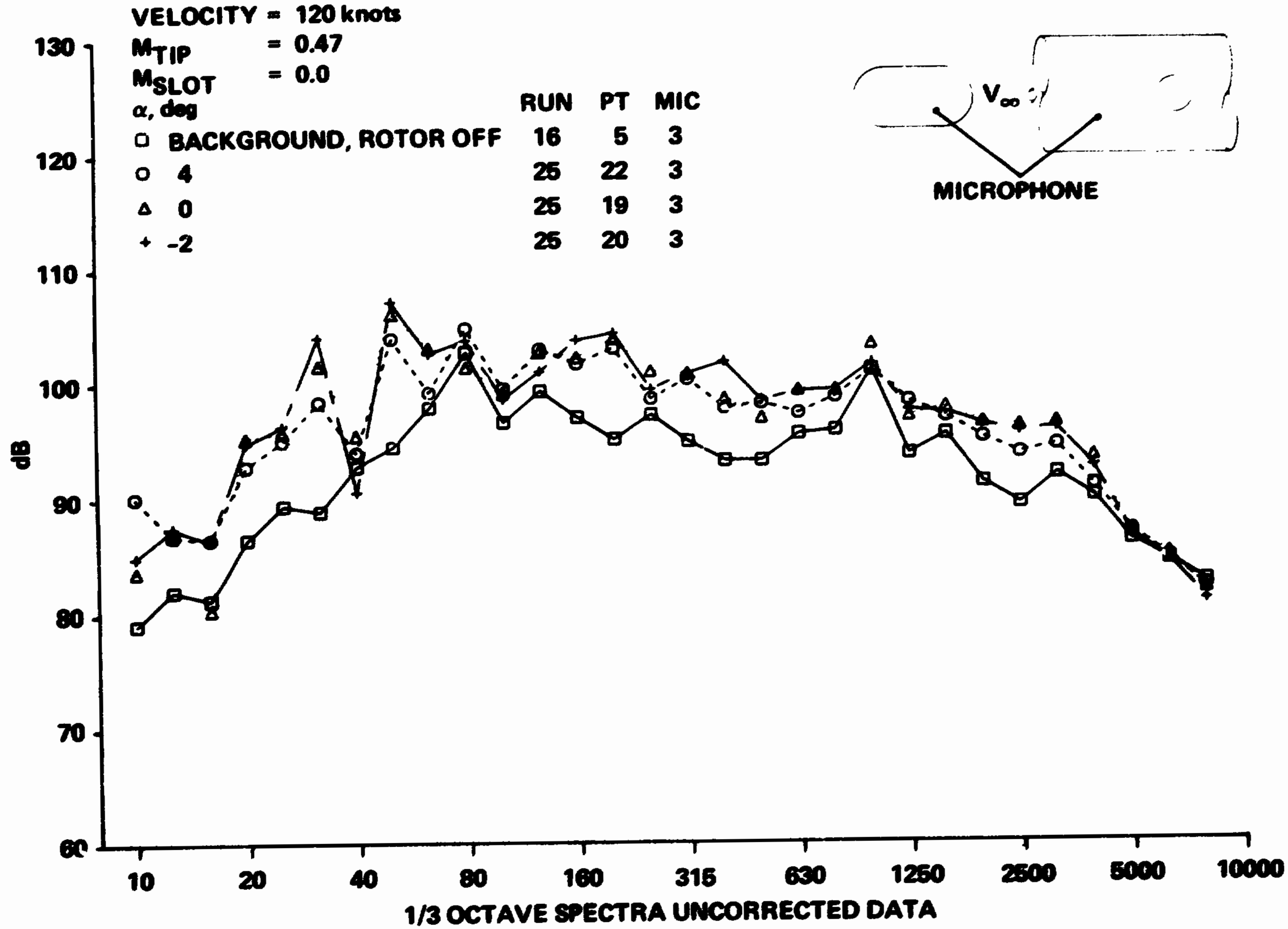

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(g) V = 120 knots, M_{slot} = 0.

Figure 11.- Continued.

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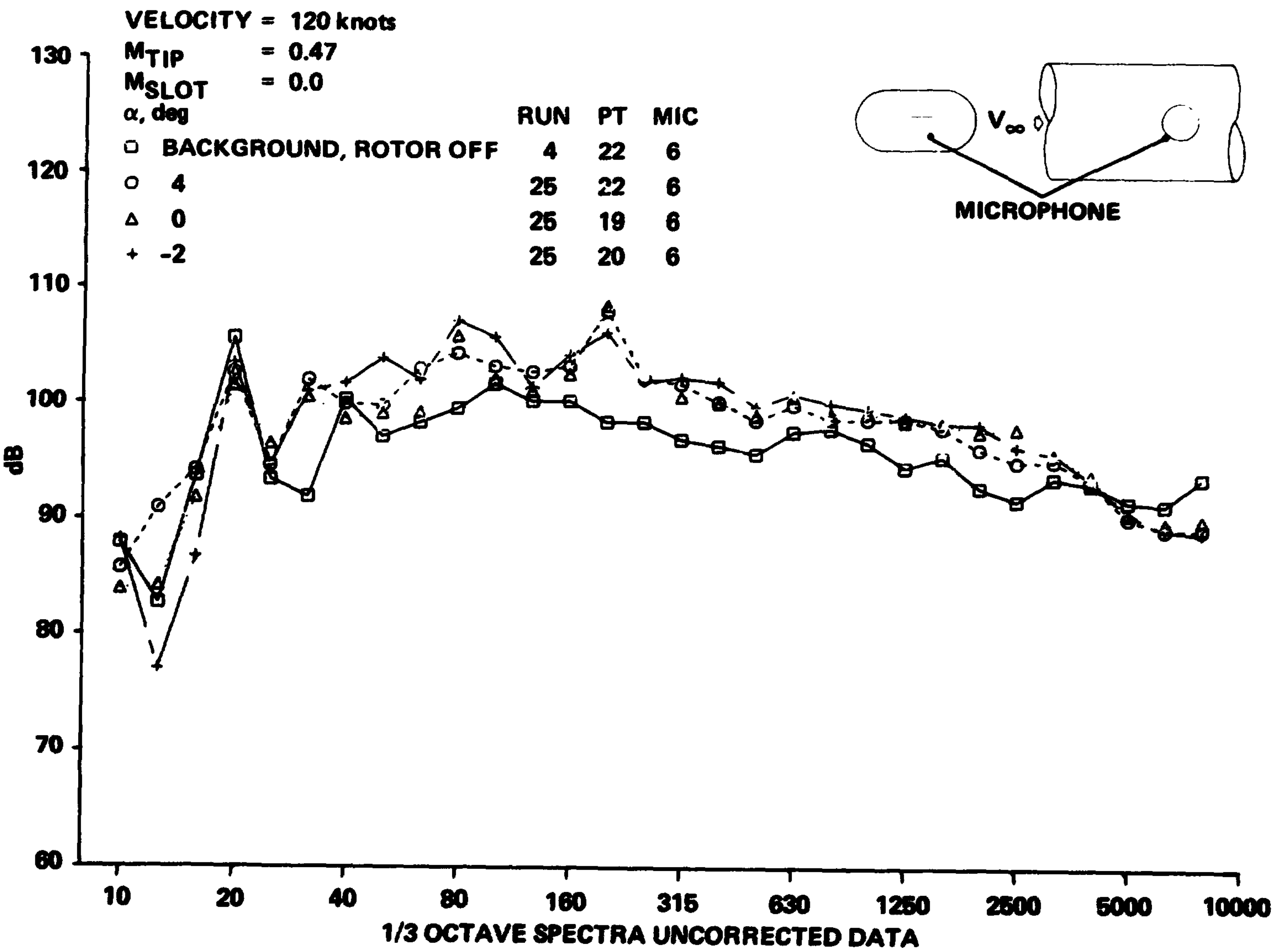

(h) V = 120 knots, M_{slot} = 0.

Figure 11.- Continued.

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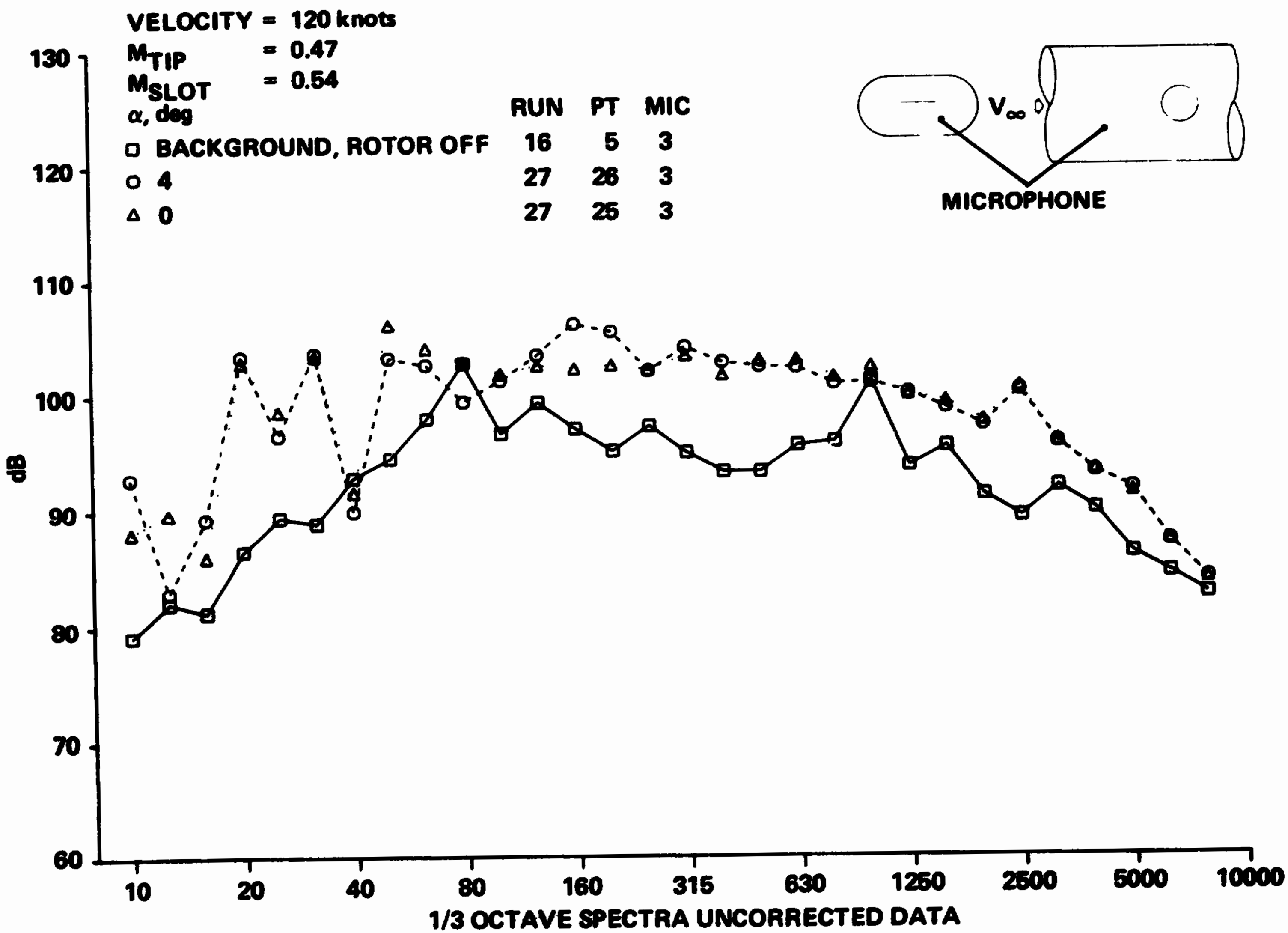
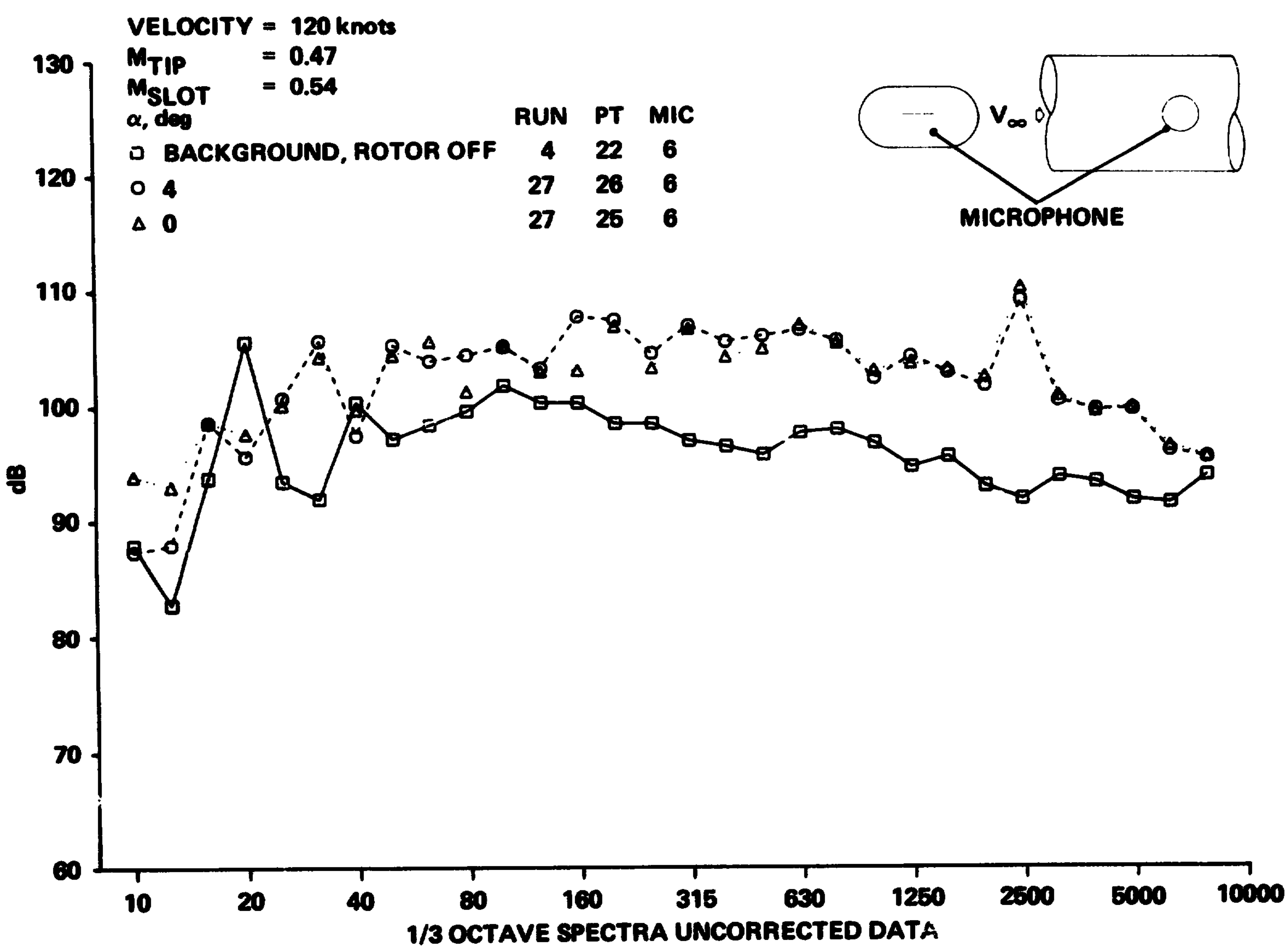


(i) V = 120 knots, M_{slot} = 0.54.

Figure 11.- Continued.



(j) V = 120 knots, M_{slot} = 0.54.

Figure 11.- Continued.

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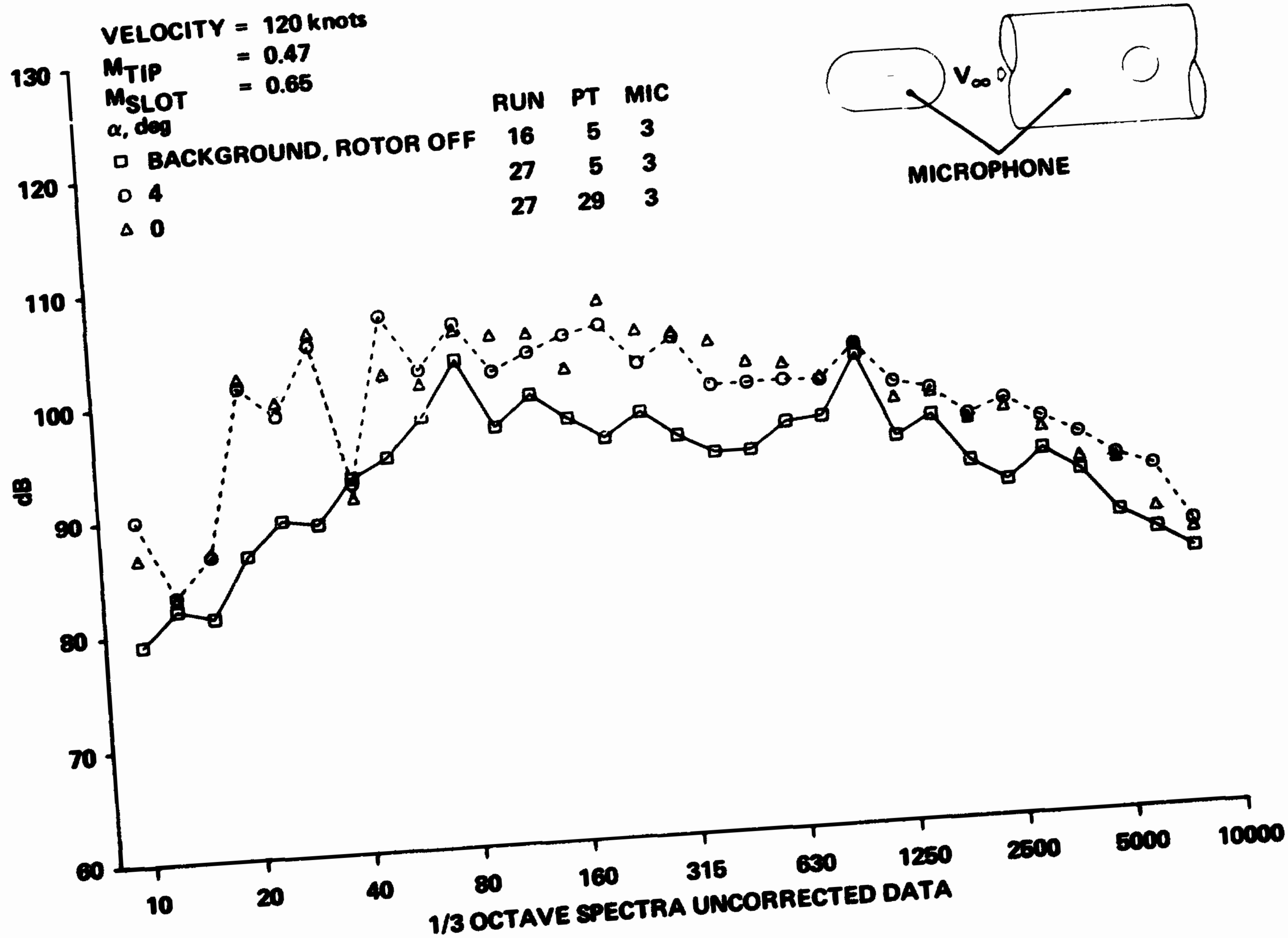

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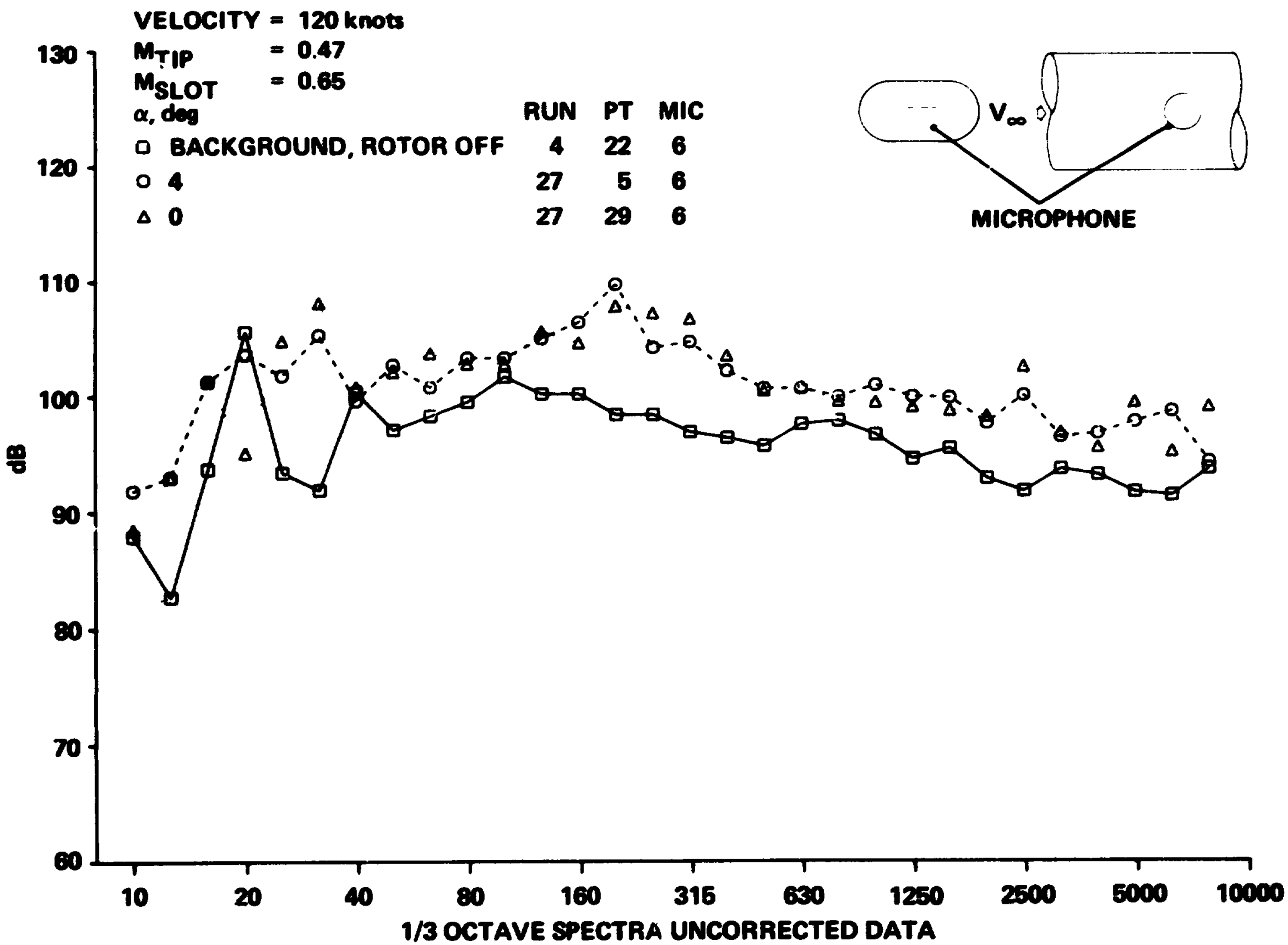
(k) V = 120 knots, M_{slot} = 0.65.

Figure 11.- Continued.



(ℓ) V = 120 knots, M_{slot} = 0.65.

Figure 11.- Continued.

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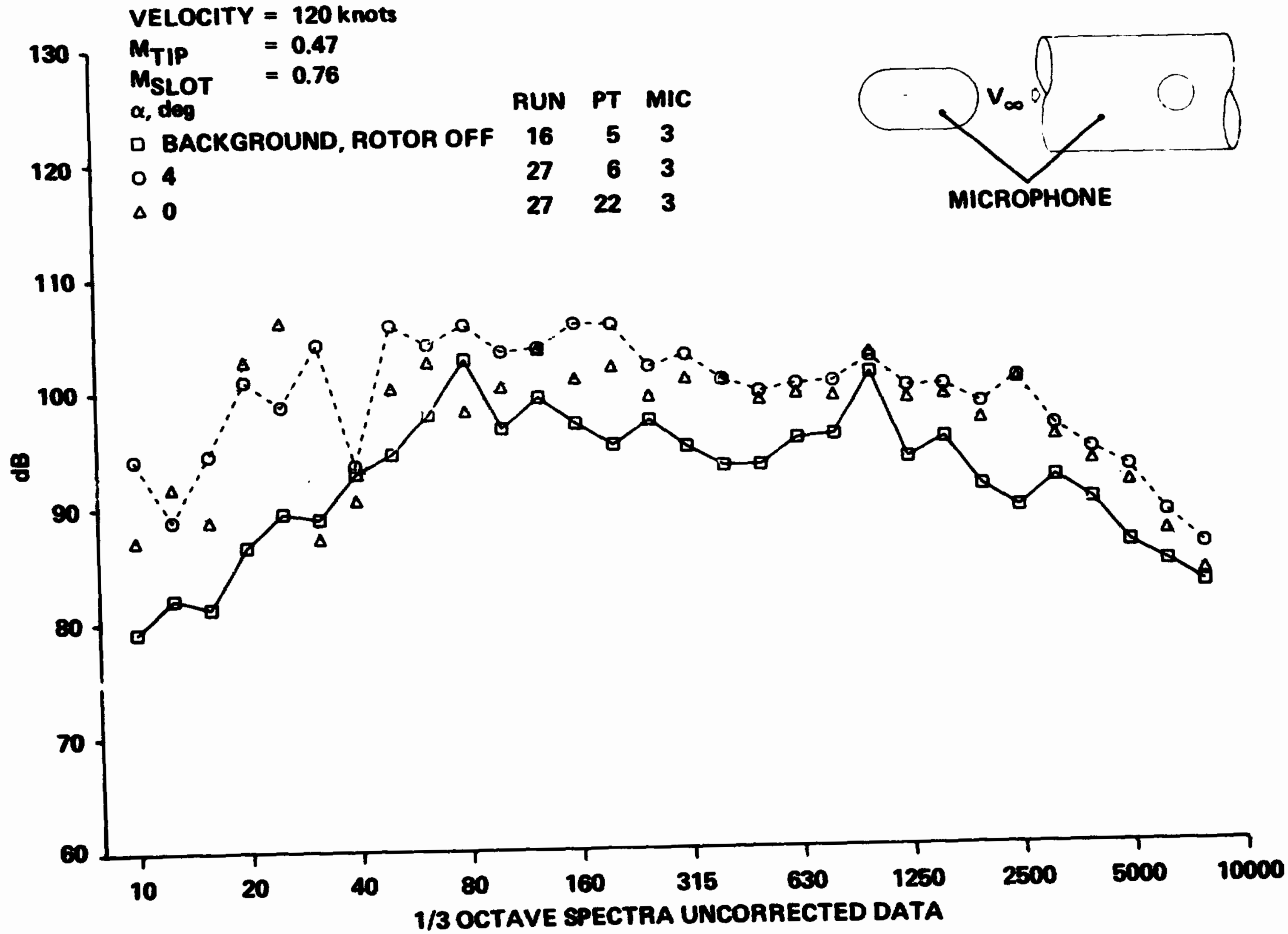

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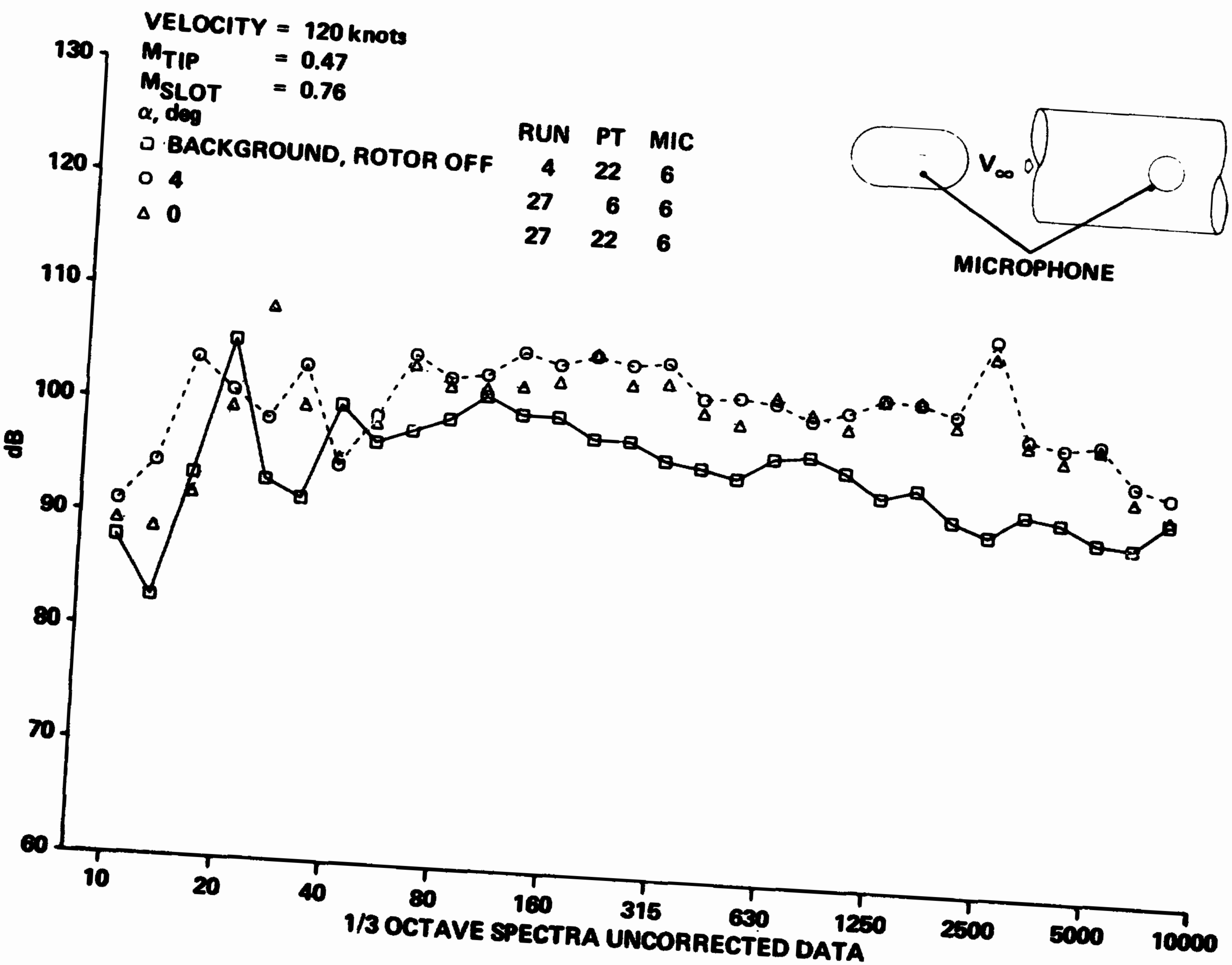
(m) V = 120 knots, M_{slot} = 0.76.

Figure 11.- Continued.



(n) V = 120 knots, M_{slot} = 0.76.

Figure 11.- Concluded.

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