DEPARTMENTAL MEMORANDUM

DEL MAR AVIONICS

TO: B. Del Mar, C. Sanctuary, H. Russell, R. Cherry, D. Squires

NO.: Adm. 028-80

FROM: W. Thornton, M.D.

DATE: February 12, 1980

SUBJECT: BLOOD PRESSURE TRANSDUCERS

The heart of the blood pressure recorder is the transducer. There have been two recent serious failures in transducers. The first is an old failure mode which was supposed to have been cleared through improved techniques in fabrication. Failure in this mode is designated fatigue. Characteristically, it gives increasingly low erroneous systolic blood pressure and then increasingly high diastolic blood pressure such that first systolic blood pressure is decreased and then pulse pressure follows. Left alone, the transducer will regain its sensitivity over hours.

The first recent failure was on Serial No. ? which was used for three days continuously on one subject. It failed over a period of two to three hours, approximately 68 hours into the 72 hour period. Replacement in the same location by a second transducer without changing any other equipment immediately restored operation. The transducer later performed normally. On January 29, Serial No. 1245 failed in the same mode on the second leg of a flight after some 40+ cycles on the first leg, some as frequent as every minute.

1723	139/82	1728	111/89
1724	128/91	1729	115/88
1725	134/98	1732	122/85
1726	125/97	1748	103/98
1727	133/94	1750	119/106

Actual pressures were on the order of 135/90.

In the lab, the unit gave the following series:

	AUS	BPR
2020	121/78	117/79
2021	114/83	114/82
2024	121/80	116/80
2025	112/80	107/82
2032	118/80	106/78
2034	116/80	105/-

This unit was given to H. Russell for life testing, but it turns out that Del Mar Avionics has no way of cyclic testing short of putting it on a person!

I brought back two new transducers from a late production run and after repeated attempts by John Wallace and myself could not get them to correlate with actual systolic pressures. With difficulty, I convinced H. Russell that we had two bad units, and he shipped two additional new ones. They were no better than the first two, and systolic pressures were typically 10-15 mm low in normotensives and worse in hypertensives. I spent one night going through all four, and typical results are shown. An "old" transducer is shown under exactly the same circumstance for comparison.

NEW		OLD	
AUS	BPR with S/N 1245	AUS	BPR with S/N 1158
122/94	105/97	122/84	122/81
119/91	104/92	120/86	120/85
119/91	112/93	124/80	124/80
124/94	116/93	126/80	124/82
114/90	101/92	120/84	120/84
126/95	114/96		
124/97	109/99		

Both of these failure modes are particularly damaging to patient data and might well not be immediately obvious to a new user. In any event, you should (1) obtain a simple life cycle tester and (2) set and maintain transducer performance standards. Both of these problems are at least two years old. If any of the new batch of transducers were shipped, you should recall and test them. Howard Russell has all of the ones I tried.

Sincerely,

W. Thornton /dw

W. Thornton, M.D.

WT:dw