U.S. Government

MEMORANDUM

Lyndon B. Johnson Space Center NASA

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TO: AL/Henry W. Flagg, Jr.

CC

FROM: CB/William E. Thornton

SIGNATURE W. E. Thornton
William E. Thornton, M.D.

SUBJ: Request for Waiver

Apropos our discussions, I am requesting a waiver be granted on the usual restrictions for recommendations of purchase from vendors with whom one has a financial interest. As you are aware, for many years I have had permission to perform consulting work for DelMar Avionics now located at 1601 Alton Avenue, Irvine, California 92741. This company is the world's leader in ambulatory monitoring; i.e., medical recording devices carried by the patient during his ordinary duties. While with NASA, my work with this company has been limited to technical advice primarily in the design and the development of new lines.

On STS we need a portable miniature recorded for ascent and entry monitoring of head and eye motion of selected crewmen. Similar recording is planned on later missions. There is currently no recorder designed for such use, however, slight modifications allow a high quality EKG (Holter) recorder to be used. The minimum requirements were: size and weight small enough to be carried in a crewman's pocket; a minimum of 8-hours recorder time with 24-hours desirable; two channels; capable of a system gain compatible with approximately 17 micro-volts per degree EOG signal at a nominal working range of 0 to 30°; and absolutely crucial to this effort, a record of absolute time on the tape. Equally important as the recorder is a practical means of playing it back; i.e., since hours of recording would be involved here a large storage CRT or other method with adequate definition to allow precise selection of portions of the tape and means of reproducing that exact portion is necessary.

To avoid any possible appearance of conflict of interest and the necessity for a waiver such as this, I made every attempt to find a recorder equivalent to the DelMar Avionics model 447 which has been demonstrated to be entirely adequate for the above purposes. After diligent search of the dozens of available ambulatory EKG (Holter) recorders currently on the market, four others could be considered as meeting the specifications in part: the Oxford Medilog, the ICR recorder, an American Optical recorder which has been through several owners and I believe is currently distributed by Picker, and a recorder which was just shown by the Zymed Company which will not be available for several months. Of these five available recorders, only the Avionics and Oxford have the time directly recorded on the tape such that they were suitable for the final data reproduction. It is my understanding that the other three recorders use a simple delta time record on the tape, not absolute time, and hence, should not be used with the available reproducers. In a continuing effort to use an alternative recorder, I borrowed a complete Oxford system of a medilog recorder and a CRT

playback unit and spent approximately 2 weeks recording and attempting to use the system. Unfortunately, the playback system was primarily designed for EEG and had totally inadequate low frequency response, approximately .3 Hz vs. the required .05 Hz. There were many other deficiencies including a small screen with limited display capacity and without time or other identification on the screen. The only recorder which I can find which will meet the requirements without major modifications to the system is the DelMar Avionics model 447 which I recommend for use on STS. These units are approximately $4,000 each and two each of the units should be purchased. In addition, the lease of a modified DelMar Avionics "heart screen" reproducer is recommended since this will meet all data reduction requirements with an off-the-shelf item which can be leased at a tiny fraction of the cost which would be involved in attempting to use either conventional manual or automatic data reduction systems involving a computer.

There is absolutely no financial benefit which will accrue to me for the sale of two additional recorders from a company which sells hundreds per month, however, as I indicated to you, if there appears to be any kind of impropriety I shall dissolve the consulting arrangement. I might add that it is precisely because of this consulting arrangement that I have been able to stay abreast of biomedical instrumentation and have been able to avoid the typical delays and costs involved with development of such space flight equipment. Unfortunately, industry is far ahead of us in this regard.