Final Report--Objective H, Tasks 3 and 3a
Covering the Period 1 October 1986 to 30 September 1987

December 1987

A REMOTE ACTION EXPERIMENT WITH A PIEZOELECTRIC TRANSDUCER

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ABSTRACT

In FY 1986, a joint venture between SRI International and John F. Kennedy University was begun to examine possible remote action (RA) effects on piezoelectric transducers. Researchers from John F. Kennedy University recruited, evaluated, and trained participants. SRI International developed an experimental RA system and prepared a well-characterized environment for formal experimental sessions.

During the pilot experiment in FY 1986, transducer signals were observed under sufficiently controlled conditions to warrant continued investigation. After significant improvements were made to the protocol, system hardware and software, and control environments, another experiment was conducted in FY 1987. This report reviews the 1986 pilot study and details the elaborate and necessary precautions undertaken during the 1987 study to eliminate or understand the sources of artifacts. No evidence for RA was observed in the 1987 experiment.

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ILLUSTRATIONS

I INTRODUCTION

For over one hundred years, the literature on parapsychology has contained reports claiming human interactions with physical apparatus by mental means alone.*[1,2,3] In FY 1986 and FY 1987, SRI International and John F. Kennedy University (JFK) conducted two experiments to investigate these claims. This report reviews the findings of the 1986 pilot experiment and documents the 1987 experiment.†

The most direct way to examine this putative phenomenon was to attempt a replication of a claimed effect. We began the process of selecting a candidate experiment by first reviewing published laboratory research on remote action (RA)‡, placing particular emphasis on recent work that used modern instrumentation.

RA studies have traditionally been divided into two categories: statistical experiments (sometimes called micro-RA experiments), in which small effects are observed over many thousands of samples; and macro-RA experiments, in which large effects are claimed, usually on the basis of considerably fewer trials. Although the statistical experiments have generally been the more rigorous in both protocol and hardware design, interpretation of the results is difficult. In any study in which the test of the null hypothesis is statistical (e.g., $p \leq 0.05$), a causal relationship is not easily determined. As a consequence, we surveyed the literature on parapsychology for examples of nonstatistical effects in which the experimental protocol also appeared sufficiently rigorous to justify further study.

From our review of the literature, the most promising experiment was work claiming an interaction with a piezoelectric transducer (PZT).[4] The basis for our selection was threefold: (1) a nonstatistical effect was claimed (RA signal-to-noise [s/n] ratio of ~ 5:1), (2) effects were produced with the subject at a distance from the sensor (i.e., the subject did not touch the sensor), and (3) a method of subject selection and training was claimed.

According to the published reports, a piezoelectric crystal had been suspended several meters from the subject. The experimenter reported that several RA agents had, by mental

* References are listed at the end of this paper.

† This report constitutes the deliverable for Objective H, Tasks 3 and 3a.

‡ In the literature on parapsychology, such effects are usually associated with the term psychokinesis. However, to be consistent and parallel with remote viewing, we have adopted the term remote action.

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means alone, consistently produced signals that had been at least five times the background noise level. Occasionally signals as great as 100 times background had been observed.

We formed a joint venture with JFK to replicate these claims. The principal investigator at JFK, Dr. Julian Isaacs, and his staff agreed to screen, assess, and train promising RA subjects and make them available to SRI. SRI International retained the task of designing and constructing all experimental hardware for use both in screening and training at JFK and in trials at SRI.

II THE 1986 PILOT RA EXPERIMENT

In considering the problem of validating (or invalidating) controversial claims for the existence of RA, SRI recognized two distinct but related obstacles: (1) no single experiment, no matter how impressive the results, can prove or disprove the existence of RA, and (2) no single initial experiment can eliminate or control all possible sources of artifacts. For a pilot study, therefore, we adopted a cost effective and realistic procedure that was technically sound but somewhat incomplete. This section reviews the FY 1986 pilot experiment--including the event definition, experimental protocol, and results. Details of the pilot study can be found in Reference 5.

A. Event Definition

Other disciplines (e.g., nuclear physics) routinely require an s/n ratio of 6 to 8 standard deviations (σ) in order to accept the existence of a real event. If we assume in our system σ was approximately equal to the noise envelopes, then the s/n ratio for an RA event was 6:1. Specifically, our event threshold was equal to a system output of 25 millivolts (mV), where the system noise envelope was approximately 4 mV (full wave rectified) for a given sensor.

B. Experimental Protocol

Conceptually, the pilot experiment was as follows. Two PZTs (differentially connected) were electrically, mechanically, and sonically isolated. A participant's task was to effect a change in the differential signal; such a change was defined as an event. Control runs recorded the PZT outputs in isolation (i.e., no human observers). We required that the hardware and protocols be sufficiently rigorous such that the presence of any uncorrelated events would warrant continued investigations. Our null hypothesis was that no uncorrelated events should be detected. Known sources that could influence the PZT, resulting in artifacts, were minimized, controlled, or monitored. Examples of such sources of artifacts and the method of control are shown in Table 1.

Table 1
POTENTIAL SOURCES OF ARTIFACTS AND THEIR REMEDIES

SOURCE	REMEDY
AC-line transients	Battery power for critical components, fiber-optic signal links, shielded enclosures
Acoustic audible-frequencies	Sensor isolation in another room, enclosed sensors, audio taping of all sessions
Motor-frequency (30-hertz [hz]) mechanical vibrations	Three types of vibration-damping mounts for isolation above 10 Hz
Radio-frequency transmissions	Sensor enclosures and windows shielded from electromagnetic interference

C. Results

During September and October 1986 at SRI, five participants contributed a total of twenty experimental sessions, each lasting about 90 minutes.[5] The participants were recruited by the staff at JFK. Each participant was asked to influence one of a pair of PZTs operating in differential mode, so as to produce an event above a predetermined threshold. The last eight sessions were conducted under the most rigorous condition, in which the sensor enclosure was located in a locked laboratory adjacent to the room in which the participant was sitting. At that point, the participant was approximately 3 meters from the sensor pair, although the sensor enclosure was visible through a double-pane window.

Under those conditions, one participant produced a total of eleven events above the threshold, which were grouped in three series of four, four, and three events, respectively. Each group of events lasted approximately 1 second and was distributed in three separate effort periods over two sessions, with the sessions occurring on different days. The signals were not correlated with any of the sources of artifact we considered. In approximately 30 hours of control trials that were conducted under the same circumstances except for the absence of humans, no equivalent uncorrelated events were recorded. If we take a conservative view that each event series constituted a single event, then only three events occurred instead of eleven. If we further assume a Poisson distribution for these events, the probability that no events would be observed in 30 hours of controls is $p \leq 0.01$. Many more hours of control with and without participants present would be required to establish a meaningful baseline.

As indicated above, known sources of artifacts were considered and controlled, minimized, or monitored. However, some potential artifact sources such as cosmic rays, low-frequency magnetic fields, and subaudible acoustic and mechanical resonances below 30 hertz (Hz) were excluded from consideration in this initial series of experiments.

Our conclusion at the end of the pilot study was that the data were sufficiently interesting to warrant further investigation. The preliminary nature of those pilot sessions cannot be stressed too strongly, however, especially since all possible sources of artifact were not excluded. We shall see in Appendix B that an unshielded vibrational resonance at 8 Hz was the most likely source of the uncorrelated events found in the pilot study.

III THE 1987 RA EXPERIMENT

Encouraged by the results of the pilot study, we improved the protocol in order to conduct a definitive formal study during 1987. This section describes those improvements and details the formal experiment.

As in the pilot study, JFK personnel were responsible for the choice of participants, the means of enhancing and maintaining a minimum magnitude of functioning, and possible future methods for using psychological profiles as a basis for selecting participants. Their methods and results are reported in Appendix A.

A. Modifications to the 1986 Experiment

The 1986 pilot study was reviewed by the Scientific Oversight Committee (SOC) appointed to examine the work of SRI's Cognitive Sciences Program. Based on the review, we developed the protocol for the 1987 experiment by modifying the protocol for the 1986 experiment. These modifications are described in the following paragraphs.

1. Separation Between Participants and PZTs

The SOC's most salient criticism of the experiment focused on the relative proximity of participant to sensors and the opportunity thereby afforded for non-RA interactions. We concluded that the most effective method of meeting this criticism was to conduct all 1987 experimental sessions with the participants and sensors well separated. In the formal trials conducted at SRI International facilities, therefore, the PZT enclosure was located in a locked, sound-attenuating room approximately 15 meters from the participants' area, with two other rooms in between. The arrangement of rooms, apparatus, and individuals is shown in Figure 1.

To further protect against conscious fraud, the participants were permitted only one familiarization visit to the sensor room at SRI. At the time of the visit, no experimental sessions had been scheduled, so the participants were deliberately uninformed of the timing of future trials. During experimental sessions, the participants were never allowed to enter the sensor room. Contact with the system was established through the feedback mechanisms described in Appendix B.

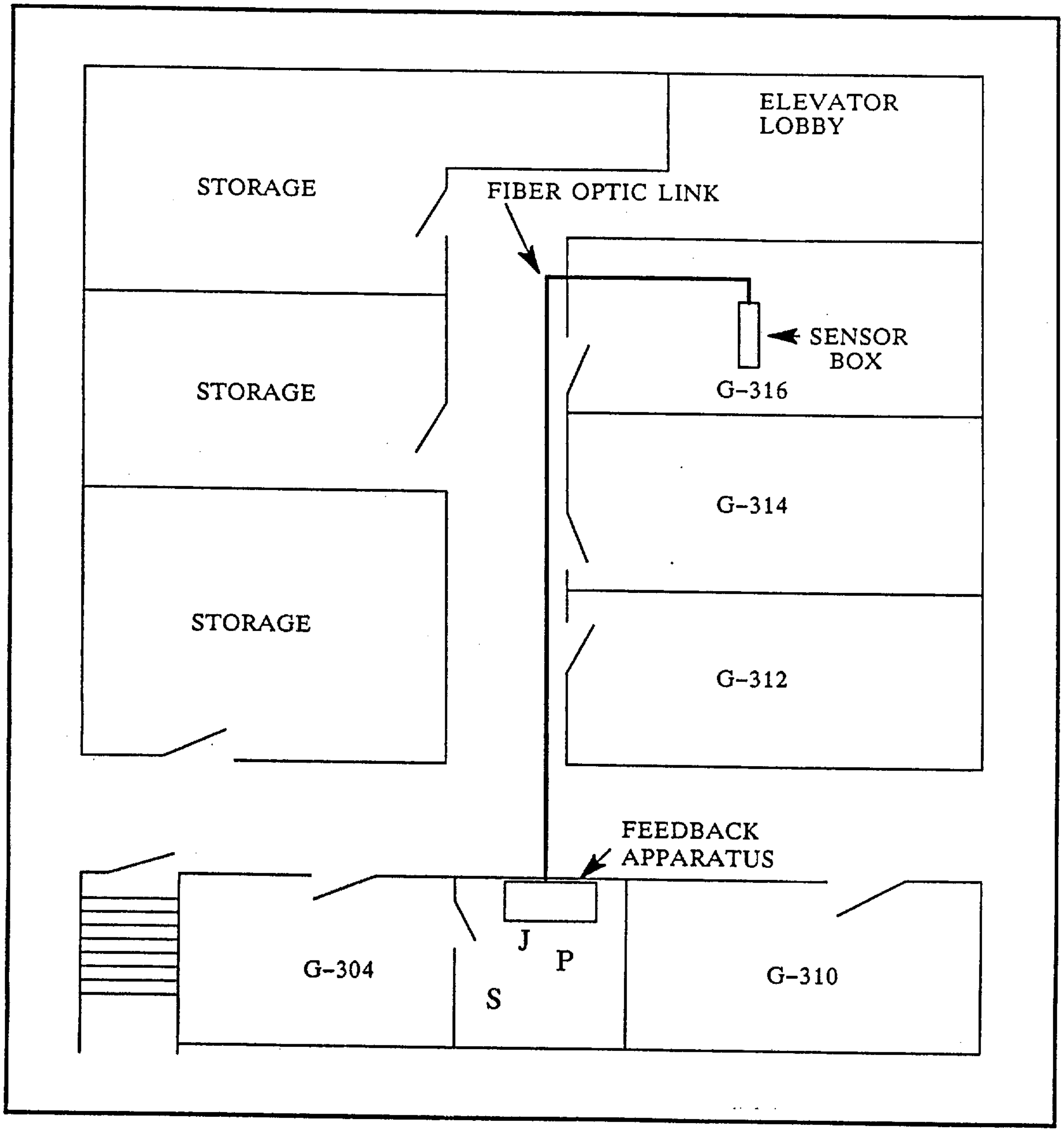

FIGURE 1 SCHEMATIC OF RA EXPERIMENTAL AREA. THE JFK EXPERIMENTER IS "J," THE PARTICIPANT IS "P," AND THE SRI EXPERIMENTER IS "S."

2. Task importance

Through discussions between JFK and SRI personnel, we recognized the role that task importance plays in obtaining maximum effort from the participants. Therefore, we constructed a sequence of steps in which participating in the SRI study was a goal to be sought by the successful individuals. An analogy to reaching the finals in a sporting event might be appropriate. In addition, visits and discussions with JFK staff sought to define the physical environment and psychological conditions at SRI that might be most conducive to the participants' success.

3. The Artifact Boundary

In order to facilitate the design of the PZT system, we found it useful to formulate a concept we term the "artifact boundary." In brief, the limits of the artifact boundary were defined by the location or characteristics of the most sensitive device or data that we wanted to protect. By examining each part of the PZT signal transmission system and establishing the artifact boundary for that component, we identified artifact-producing influences that had been overlooked.

In particular, this exercise helped us to recognize that in the 1986 study, even though the sensors were in a shielded enclosure 2 to 3 meters from the participant, the low-level (i.e., millivolt) PZT signals were being digitized very near the participant. Because the same signal line was being used for both participant feedback and the RA data record (computer output), the possibility existed that apparent RA effects on the PZT could be produced through more normal interactions with the digitizing and feedback apparatus. Our solution to this problem was to introduce a parallel set of fiber-optic transmitters in the PZT enclosure. These duplicate signals were sent directly to an instrumentation-grade tape recorder located in the same room as the sensors, 15 meters from the participant. By creating a source of redundant data, we could more easily verify that the proposed RA interaction actually occurred at the sensor location. Prior to any data collection, all experimental staff at SRI and JFK agreed that the tape-recorded PZT signals would be the only authoritative data for determining whether any anomalous events occurred.

4. Physical Security

The sensor box was located in a locked, sound-attenuating room approximately 15 meters from the participants' area. This room was secured by both a combination and cipher lock and was on SRI's general security system. Door sensors were installed such that the room could not be opened without alerting a 24-hour SRI security guard. Also, a passive infrared detector was placed in the room so that any unauthorized intrusion would be immediately detected. Finally, the facility was examined for signs of tampering by a roving security guard following an 8-hour inspection schedule. The building in which the experiments were conducted has limited access, requiring escort for any nonemployee.

5. Event Definition

The final substantive modification to the pilot experimental protocol was the definition of RA events. The digitized control trials were used to locate a critical voltage output (Vc) which was defined as the maximum voltage observed in any control trial, excluding voltages correlated to environmental events. After the effort tapes were digitized, a candidate RA event was one whose output voltage was at least 1.5 Vc (again, excluding voltages correlated to environmental events). Provided the system output was well behaved, this definition corresponded to an s/n ratio of approximately 5 to 6σ--roughly equivalent to the signals reported in the parapsychological literature and within the commonly accepted criteria for a real signal.

B. Design and Construction of the Laboratory Apparatus

This section generally describes the present RA system, although clearly several features were first designed in 1986 and subsequently modified. A schematic overview of the basic laboratory RA apparatus is shown in Figure 2. For visual clarity, we have omitted the environmental monitoring equipment.

The complete description of the hardware design and the artifact protection and system testing can be found in Appendix B. For this report, it suffices to say that extensive artifact detection and testing were employed in this experiment.

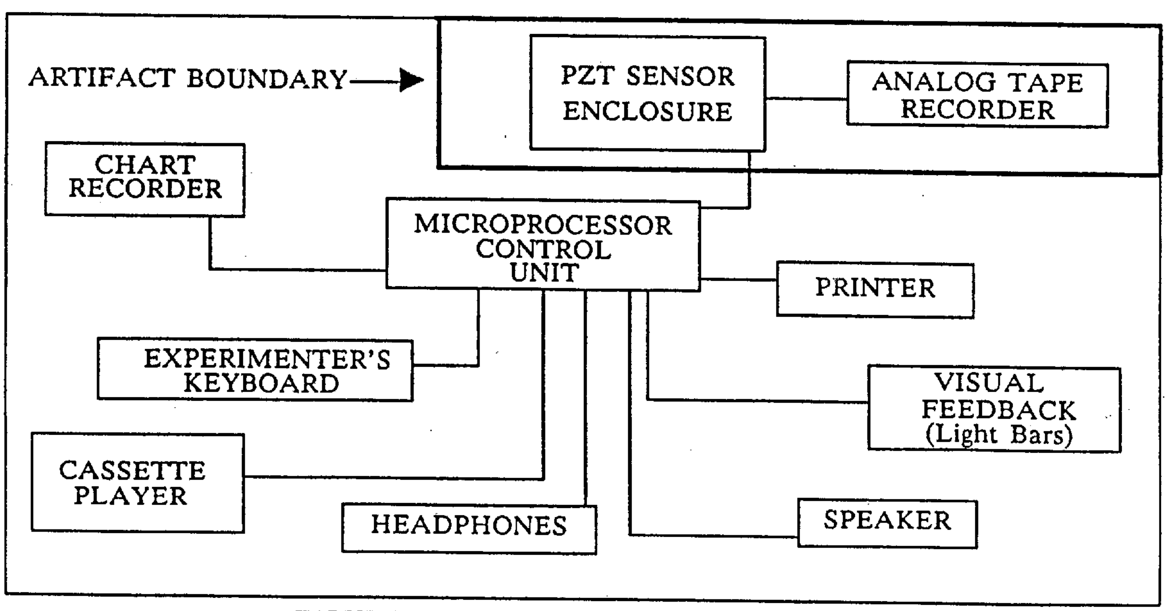

FIGURE 2 DIAGRAM OF RA APPARATUS

C. Experimental Protocol

1. Hypotheses and Variables

We postulated that selected participants would, in the absence of environmental interference, be able to modify the normal output of a PZT in a nonstatistical way. Assuming that a system is well shielded and well characterized, environmental monitoring of the system's susceptibilities can establish the source of some rare events (e.g., earthquakes, large AC-power fluctuations, and the like). Other sources of rare events are not as easily determined. For example, the fiber-optics transmission line is an electronic system containing components that may spontaneously emit noise bursts. These bursts can result from such mechanisms as microplasma discharge due to semiconductor defects, and minority carrier injection from contacts. Without a way to predict such events, the only method to distinguish candidate RA signals from noise bursts is through control trials. In the 1987 experiment, by collecting data when no participants were attempting to influence the PZT (non-effort periods), the frequency of occurrence and voltage amplitude of noise processes was established. Candidate RA events had to occur during effort periods and be significantly greater in amplitude than the control trial noise maximum.

The independent variable in this experiment was time. The dependent variable was the overall measure of an RA effect, as determined from the differential electrical output of the PZT. Although the participants were told to focus their attention on only one sensor, the experimenters agreed before beginning the experiment to define the RA record as the differential output. In principle, then, the sensor the participant actually affected would not be critical.

2. Data Collection

A formal data record was defined as a session in which the instrumentation tape recorder was recording both PZT channels and all environmental monitors. RA trials at SRI were conducted from May 28, 1987, to July 30, 1987. There were three types of formal data collection:

- Global Control Trials – Data collection for many hours when no one was focusing RA attention on the target element. This technique established the long-term performance of the system and determined the unperturbed artifact production rate. In practice the global control trials were conducted on alternate days from the effort sessions, at the same time of the day. That is, the usual schedule was to conduct global control trials on Monday, Wednesday, and Friday, and effort sessions on Tuesday and Thursday. In this way the effort trials were always bracketed by control trials.
- Local Control Trials – Data collection just before or just after an experimental session, with no one focusing attention on the target element. These trials were

intended to confirm the proper operation of the system immediately before or after an RA session. (Since both ordinary scientific experiments and RA literature contain evidence for "relaxation" or "linger" effects that persist after an interaction,[7] local control trials are sometimes separated into pre- and post-session control trials.[8])

- Experimental Trials - Data collection during an RA session when a participant focused on the target element. Periods of effort were interspersed with rest periods. Periods of effort in RA sessions were from 5 to 20 minutes long, ordinarily with no more than three effort periods in a session. The timing and spacing of RA sessions depended on the participant. The total duration of an RA session was always about 90 minutes.

Fifty-four formal, tape-recorded RA effort sessions and sixty-three equivalent control sessions were conducted. A typical experiment proceeded as follows. Before the participant arrived, the SRI experimenter entered the feedback and sensor room area and checked all equipment for proper operation. A local control trial was then conducted in order to record the baseline performance of the system. About 90 minutes later, the JFK experimenter and participant team arrived, and the experimental session was then carried out as previously described. During the periods of effort, the participant's task was to interact mentally with the PZT to produce an event above a preset feedback threshold. In practice, the participant's attention was focused on the audible and visual feedback.

During the period of rest, the participant was asked to direct attention away from the apparatus and engage in some other activity. Usually the participant and experimenters moved to the outer part of room G-304 for the duration of the rest period. At this point in the development of an RA protocol, however, we could not predict with any confidence the degree of control participants had over their RA ability. For example, some parapsychological literature reports that "release of effort" or "unintentional" effects may occur immediately after a period of effort.[1] We reported all data produced during the entire 90-minute experimental session, therefore, regardless of whether it was termed "rest" or "effort." In examining the data we found no evidence for the possible existence for such effects.

IV RESULTS AND DISCUSSION OF THE 1987 EXPERIMENT

A. Primary Data Analysis

From May 28, 1987, to July 30, 1987, six JFK participants (two male and four female) contributed fifty-four formal RA effort sessions at SRI.

As discussed earlier, the signal of interest was the digitized differential output of the PZTs. The RA claim was that the signal of interest would be a low-frequency transient in the range of 10 to 1,000 Hz. Nyquist's theorem states that in order to correctly sample a time-varying waveform, the sampling rate must be at least two times the highest frequency of interest. To meet this criterion and provide a margin of safety, we selected a 5-kilohertz (kHz) sampling rate. At a 5-kHz rate, digitizing over 100 hours of data presents substantial memory problems (1.8×10^9 data points). Fortunately, our RA event definition was concerned only with comparing the maximum control and effort voltages (Vc and Ve). Inspection of typical tape data showed that most of the signal was small amplitude noise (~ few millivolts). We set a lower level discriminator, therefore, to reject the bulk of the data points and store only the larger pulses. Three environmental variables (magnetic field, sonic intensity, and mechanical acceleration) were recorded as analog signals on a chart recorder. The PZT differential signal was recorded as an analog signal and digitized.

B. Environmental Exclusion

Any tape that exhibited a PZT output clearly above typical baseline response was set aside for careful examination. That tape was not included in the cumulative digital record at the time of internal inspection. Nine control session tapes and six effort session tapes were set aside.

The chart recorder was used to initially correlate the PZT signal on the fifteen tapes with the output of the environmental detectors. In four cases a PZT event was clearly correlated with an environmental detector output. Those environmental events could be separated into two categories. The first category was a PZT signal that occurred after a long (~ 10–20 seconds) low-frequency audio event. Our acoustic shielding fell away rapidly below ~ 500 Hz. And, as we note in the susceptibility testing section in Appendix B, a long low-frequency signal could most easily excite the PZT sensors. We hypothesize that a jet plane passing overhead could easily have generated such an artifact. The second type of environmental artifact was clearly electromagnetic in origin since it affected all sensors simultaneously. The artifact probably resulted from low-frequency radiation that coupled into all sensors or perhaps all inputs at the recorder.

As environmental artifacts were identified, the tape in question was added to the cumulative record. We elected to exclude the artifact, plus 1 minute of data record before and after the artifact to be certain that no spurious signals were digitized. Remarkably, out of 138 hours of recorded data, only four events were excluded due to environmental artifact. Since the duration of each event was less than one second, the actual artifact rate was only about 10^{-4} per second.

Those PZT events that were not clearly related to an environmental artifact using the processed signal and chart recorder were further reviewed using the precision signal analyzer (Scientific-Atlanta SD-380Z) employed in susceptibility testing. Each PZT event was then carefully compared to each environmental monitor output, using both time and frequency domains. Only PZT events displaying no correlation with artifact signals were included in the final record. No new exclusions were found with this added level of analysis.

C. Cumulative Data Record

After exclusion of all environmentally related events, the final voltage histogram was prepared. The comparison of all effort and all control sessions can be seen in Figure 3. We have shown only the extreme tail of the distribution in order to conserve space. Since Vc is defined by the maximum absolute voltage signal in the control sessions, the balance of the histogram can be ignored. We note that the shape of the two curves is essentially identical.

Figure 4 shows a typical session voltage distribution with the discriminator set at "0." In other words, all PZT signals were stored, including the electronic noise background. From inspection it appears that the total system noise was approximately normally distributed.

From the cumulative plot one can see that although the maximum voltage appeared in the RA effort data record, it did not substantially exceed Vc. The ratio of channel numbers (1652/1525) is 1.083, much lower than our criterion of 1.5.

D. PZT Signal Analysis

During digitization of the final tapes that contained the large amplitude PZT events, we noticed that the maximum channel number varied by a few percent when the digitizing

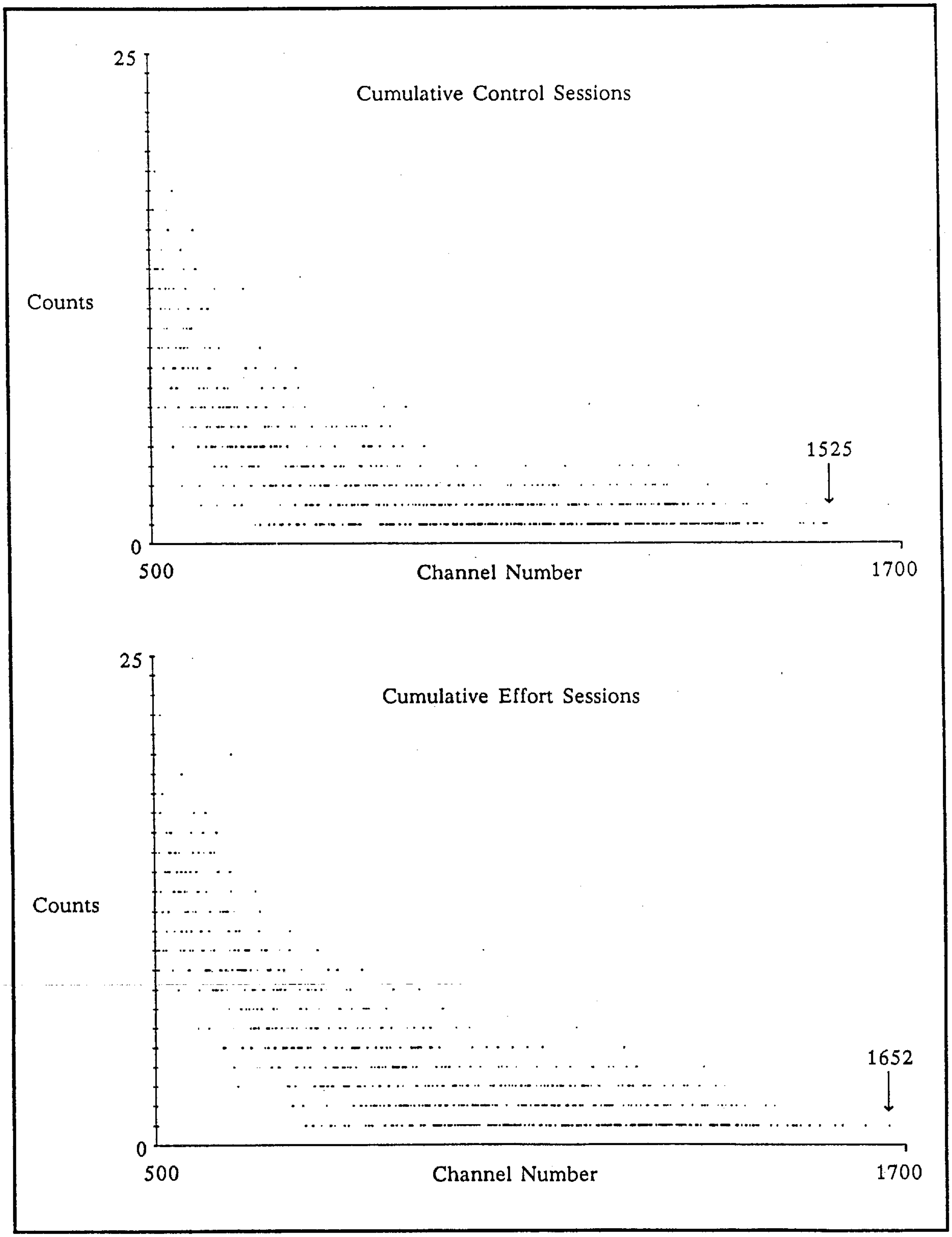

FIGURE 3 CUMULATIVE EFFORT AND CONTROL SESSIONS

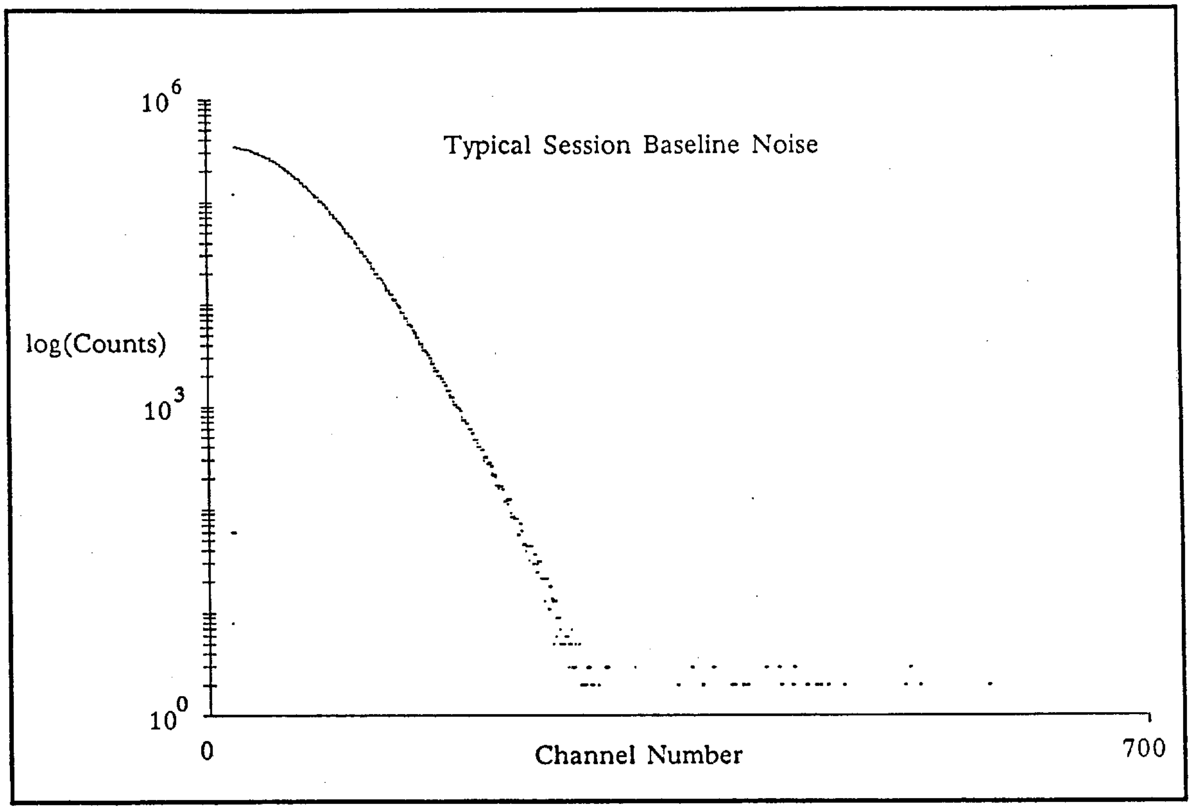

FIGURE 4 TYPICAL PZT VOLTAGE DISTRIBUTION FOR A SESSION

process was repeated. Our interpretation of this effect was that the signal contained frequency components that approached our sampling rate, thereby yielding some variation in the measured channel number due to aliasing.

In order to be completely objective in comparing Vc and Ve, we identified the largest control and effort events and compared their amplitude using the Scientific-Atlanta (SA) signal analyzer. That instrument can digitize signals up to 20 kHz. It is also possible that the signal processing we used in collecting the cumulative voltage histogram introduced some distortion into these large transients. Therefore, we used the unprocessed PZT signals in the SA analysis.

The largest RA event amplitude in the SA instrumental configuration was about 3.5 volts. The largest control event was 2.8 V using the same setup. This corresponds to a ratio of Ve/Vc = 1.25, still below our definition of a candidate RA event. As further evidence of artifact, the effort event and the control event had similar frequency characteristics.

V CONCLUSIONS

We believe that this joint effort has produced the most elaborate and exhaustive RA experiment ever conducted with PZTs. By whatever measure we apply, Ve did not equal 1.5 Vc. The SA spectral analysis indicated the nearest approach was 1.25 Vc.

In conclusion, we found no evidence for an RA effect on a PZT.

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APPENDIX A

JOHN F. KENNEDY UNIVERSITY FINAL REPORT

FINAL REPORT

1987 REMOTE ACTION RESEARCH ACTIVITIES

AT JOHN F. KENNEDY UNIVERSITY

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Principal Investigator

With: Ruthann Corwin Ph.D.

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FINAL REPORT

JFKU 1987 REMOTE ACTION RESEARCH ACTIVITIES

1. INTRODUCTION

Following the SRI-based Piezo Remote Action (Piezo-RA) pilot study performed in 1986, the tasks set for activities at John F. Kennedy University (JFKU) in 1987 were to recruit and train a number of potential Piezo-RA agents in preparation for a fully formal Piezo-RA evaluation study to be performed at SRI. The best Piezo-RA agents originating from the JFKU-based training phase were to be made avai.able for participation in the SRI-based evaluation study. The instrumentation at SRI and JFKU was to be developed further, with the SRI instrumentation being brought to the level required to eliminate or monitor all known causes of effects. A new protocol was to be utilized which would effectively preclude accidental or fraudulent interference with the instrumentation by subjects, both at SRI and JFKU. In order to accomplish this task, trainee selection procedures and Piezo-RA training sessions were to be performed at JFKU. Consulting support for the modification of the instrumentation for the SRI-based evaluation study was also to be provided to SRI.

In 1987, as in 1986, the highest priority was assigned to the maximization of results at SRI, since the evaluation study was being performed at SRI. It was agreed in advance that in order to maximize the resources which could be applied to the SRI-based system within the operating budgetary contraints, the two systems at JFKU would not be instrumented to the degree necessary for a proof-of-principle study. The instrumentation at SRI was equipped to detect evironmentally occurring potential causes of artifactual response by the piezo strain-gauge sensor system, being equipped for the detection of low level acoustic noise, vibration, magnetic field fluctuations, ionizing radiation etc. and was located on a vibration attenuating support within an acoustically shielded room. By contrast, the JFKU-based instruments were not equipped with environmental monitoring systems, and the two JFKU-based instruments differed in their noise characteristics quite substantially, as is described in section 4 and Appendix I detailing the control run results. It was therefore understood in advance that the results from the JFKU systems would not be equivalent to the results obtained with the SRI-based system, in terms of their evidentiality.

Given this constraint on the JFKU-based systems, and given that the highest priority goal was the supply of Piezo-RA agents to SRI, it was decided that the JFKU-based training phase would operate on the principle of maximizing the Piezo-RA performance of trainees.

This made it impossible to run the training phase as a formal study, for several considerations, three primary reasons being outlined below.

(i) The formalization of the training phase at JFKU would have prevented the development of the most promising trainees' performance to the highest level possible. In a formal study, equal machine time and trainer attention would have had to be given to all trainees.

(ii) Since it was impossible to predict in advance whether any given trainee would suddenly improve or temporarily decline in performance, it appeared to be prudent not to deselect trainees whose performance was at a lower level than the best trainees', just in case their performance improved greatly, and in order to provide a second cohort of "backup" participants if any members of the leading group should drop out or decline temporarily in performance. This prohibited the option of spliting the participant group into continuing and deselected groups at an arbitrary point.

(iii) Since the noise characteristics of the two JFKU-based Piezo-RA detection systems differed, generating a difference in feedback properties and hence perceived lability, and participants were scheduled according to the availability of the systems, trainees performed differing numbers of training sessions with each instrument. It could therefore be expected that between-subjects differences in performance would be generated from this source too.

The training phase activities should therefore be viewed as being non-formal in character, and as being directed to the maximization of trainees' performance, rather than as being a formal study. Nevertheless, several psychological features emerged which suggest possibly useful hypotheses to be tested in formal training studies of Piezo-RA performance.

2. TRAINEE SELECTION AND RECRUITMENT

It was originally intended that participants in the 1987 research activities would be recruited from two sources, one being from the small group of the three most successful participants in 1986, the other being via a recruitment drive targeted on the individuals obtaining the best ostensible RA results and highest PIF scores in the 1986 screenings (Isaacs 1986a). As events transpired, trainees for the 1987 research were recruited from four sources. Two (42 & 43) were retained from the 1986 trainee group (the third member relocated away from the Bay Area). One (41) was recruited from the only screening (Isaacs 1981) performed in this research cycle. Two (45 & 49) were recruited through the recruitment drive based on the screening results of the

1986 research cycle. The remaining trainees (44, 46, 47, 48, 50) were recruited by contacts.

The selection of individuals identified by screening had been performed by first ranking the screenees on the basis of two measures: their ostensible RA performance during the screening they attended, and their PIF scores. During the screening, each screenee had been given a brief (30 seconds to 2 minutes) trial on a strain-gauge based screening device (Isaacs 1986a) and had been given an informal test of ostensible paranormal metal-bending ability. The experimental personnel present at the screenings had monitored the strain gauge device and had witnessed most of the metal-bending, and had annotated the scores from the screening device and comments about the metal-bending onto the screenees's PIFs. If screenees had either produced an effect likely to be over the noise level of the screening device, or had bent metal, their PIF was then evaluated for its total score and put into the group to be ranked. It should be noted that the screening procedure is not claimed as in any way producing definitive evaluations of RA ability (Isaacs 1981), the presumption being only that some subset of the gro[illegible] at the screening actually possessing RA ability will be present in the group showing ostensible success at one or the other or both of the screening tasks.

For the purposes of a comparative analysis, the PIF scores of the 1987 trainee group were merged with those of the 189 PIFs derived from the 1986 screening activities (Isaacs 1986a) and a ranking of PIF scores for the total group (1986 screenees and 1987 trainees) was derived. The analysis of the rankings obtained by the 1987 trainee group within the total group of PIFs clearly must be regarded with caution because of the small number of individuals involved.

Two results emerge from this analysis. One is relatively unsurprising. The individuals recruited by contact (by experimental personnel blind to PIF, but not, of course, blind to the potential participants' informal verbal reports of spontaneous psi functioning) scored high on PIF. PIF scores for the individuals recruited by contact strongly resemble those of the screened individuals who would be targeted for recruitment, based on their ostensible RA performance at the screenings and high PIF scores.

Second, somewhat unexpectedly, the scores of the 1987 trainee group on PIF strongly suggest the presence of two rather different groups among the recruited trainees. The possible discovery of two seemingly distinct trainee populations is an interesting finding, since it has direct relevance to the further development of strategies for trainee recruitment and selection.

To contextualise the second finding, it is necessary to describe the PIF and the way it has been used for trainee selection. The criteria used for the selection of prospective Piezo-RA trainees from the PIF data recovered from the 1986 screenings were based on three measures which were used in a convergent fashion. These were described in more detail in the 1986 Final Report (Isaacs 1986). The first was the screenee's responses on the PIF. The second was their performance at an instrumented RA task, and the third was their macroscopic metal-bending performance.

The PIF is an inventory of ostensible psi-related experiences which has been formulated specifically to focus on spontaneous psi experiences thought to involve elements of spontaneous Remote Action effects. The first seventeen questions of PIF are directed to eliciting information about spontaneous psi experiences. Responses are categorised into four types, "no" indicates that the screenee has never had the experience cited in the question, "1" indicates that the experience has occurred once, "2" indicates "more than once, several times", and "3" indicates "often, frequently". Eight of the seventeen psi experience (Psi - "P") questions are RA-specific (questions 1, 2, 3, 4, 5, 6, 8 and 14).

Question 18 is intended to sample the respondent's general belief in the reality of Remote Action (Belief 1 - "B1"). Question 18 asks "Do you think it's possible to affect physical objects without touching them ?". Question 19 is intended to sample the respondent's specific belief about whether they themselves could produce RA effects (Belief 2 - "B2"). Question 19 asks "Do you think that you can affect physical objects without touching them ?". Question 20 (Mental Skills - "S") requests information about the screenee's prior practice of mental skills of various sorts (eg. meditation, visualisation etc.).

The analysis of the PIF questionnaire data used for targeting individuals for recruitment was organised around three concepts. The first was the measure of frequency of various spontaneous ostensibly psi-related experiences. This measure was taken by summing the scores for the P questions on the PIF (the first 17 questions). If the respondent replied "no" to any of the questions, for those answers they scored zero. If they checked the "1" answer they scored 1, if "2" they scored 2 and if "3", they scored 3. The summed score for the 17 psi experience questions constitutes their "P" score. The responses to questions 18 (B1) and 19 (B2) are listed separately. The two belief questions offer a scale of 1 to 5 to be checked, value 1 being "definitely no", value 5 being "definitely yes". The scores for these questions were the raw score responses checked by the respondents.

For question 20, the number of separate mental skills for which practice was claimed constituted their "S" score, thus if the respondent checked three skills they obtained a score of 3. The total score was computed by summing the P, B1, B2 and S scores. Table 1 shows the participants' PIF scores, ranked by their totals.

Trainee I.D No.	PIF Rank	PIF Score	P	B1	B2	S
47	1	64	45	5	4	10
45	2	61	41	5	5	10
49	3	59	41	5	5	8
42	5	53	39	5	5	4
46	7	51	33	5	5	8
43	9	47	31	5	5	6
41	10	44	26	5	5	10
48	13	42	22	5	5	10
50	45	28	14	5	5	4
44	48+	22	10	5	5	2

Table 1. 1987 Trainees Ranked by PIF Scores

The trainees appear to split into two groups. The majority have high P scores and high S scores, representing a high frequency and wide range of reported spontaneous ostensible psi experiences and a wide experience of mental disciplines. All but one of this group of eight are professional or semi-professional psi practitioners of various sorts. The PIF rankings of this subgroup are, as can be seen, consistently high. The eight members of this group are distributed in only the top thirteen PIF scores. It will be remembered that these are the highest scores from the complete set of 189 PIFs collected during the 1986 and 1987 screenings. This group could be described as having a "psi practitioner" profile.

In contrast to this group, trainees 50 and 44 have much lower rankings, 45 and 55 respectively, in the PIF scores, representing lower P and much lower S scores. These scores do, however, seem likely to be above the norm for the unselected general population.

Participant 50 was recruited because she had contacted JFKU for assistance regarding the ostensible recurrent spontaneous psychokinesis (RSPK) events which she reported. These events were reported as involving the occurrence of ostensibly paranormal knocking sounds and movements of objects. In parapsychological terminology, participant 50 is a poltergeist focus, and reports RSPK events as still occurring in her home.

Participant 44 was recruited because she was originally the "confidant" of participant 49 and asked for a trial on one of the Piezo-RA detection systems, when she produced an event of magnitude 17. Participant 44 claims to have caused spontaneous and deliberate RA events of RSPK type during her childhood. Participants 44 and 50 do not appear to have experienced the very wide range of ostensible psi experiences reported by the practitioner group, and apparently have not practised the mental skills of the practitioner group.

The principal characteristic leading to 44 and 50 being recruited were their claims of the occurrence of spontaneous RA events in their presence. They could be described as having "RSPK" profiles, rather than practitioner PIF profiles. However, of the eight practitioner trainees, only two appeared to cause events above the noise threshold on the SRI-based instrumentation, whereas both of the two RSPK profile participants appeared to cause events above the noise threshold on the SRI-based instrumentation. Although the sample sizes are far too small to justify more than a very tentative hypothesis to be formulated, these results are certainly not inconsistent with the hypothesis that RSPK profile individuals may be especially worth training in hopes of producing an RA capacity for experimental purposes.

3.(i) INSTRUMENTATION: MODIFICATIONS FOR 1987 RESEARCH

The 1986 final report outlined a number of improvements which were suggested should be made to the JFKU-based computerized Piezo-RA instrumentation. The modification of the software, in particular the removal of fixed periods of feedback and later in this research period, the increase of gain programmed into the audio feedback function, greatly improved the performance of the JFKU-based devices, making them psychologically more suitable for RA training purposes. All scoring units referred to below and elsewhere in this report are quoted in units of the analog to digital converter counts used in the Piezo-RA detection systems, which were 410 to the volt, making each unit (= 1 count) equivalent to about 2.5 mV.

As in 1986 (Isaacs 1986a), the two RA detection systems produced immediate audio and visual feedback. Events above a software selectable lower threshold were recorded by means of a printer. A software selectable upper threshold defined the range of magnitude between which the audio and visual feedback systems operated, except for the lowest range audio feedback which operated from below the lower threshold (putatively from the system noise floor) up to the lower threshold. Recording of above-threshold events was performed by means of a printer which recorded the outputs of both Piezo strain sensitive elements. In addition, in training sessions, but not during control runs, two channel chart recorders were used to continuously record the output of both Piezo elements.

The two Piezo-RA detection systems used at JFKU differed substantially in their instrinsic noise level, as can be seen in the control run responses of the two systems. System 1 is substantially quieter than system 2. This created a definite difference in psychological conditions for trainees using the two different systems.

To compensate for the difference in noise level, which was not immediately apparent in the earliest phase of training because of the high threshold level used (20 units, see section 5.(v)(a), the software selectable lower threshold levels at which scores were recorded which came to be used were generally much lower for system 1 than for system 2. Even when the system 1 lower threshold was at the minimum level possible for that system, it was markedly less labile (i.e. spontaneously active in producing purely noise-driven printed score outputs via the data recording system) even at the lower threshold than was system 2.

This feature had the effect of making the two systems seem rather different from each other to the trainees, who had little comprehension of technical matters and therefore wondered how it could be that it appeared to be easy to get scores of 5 or 6 from system 2, yet it appeared to be much more difficult to get scores of 2 or 3 from system 1. This situation clearly demonstrated the desirability, for psychological reasons, of making all the RA systems closely comparable in sensitivity, noise level, and hence feedback properties.

3.(ii) ARTIFACT SOURCES: ELECTRICITY SUPPLY TRANSIENTS

The shielding of the Piezo-RA transducers and their associated signal conditioning and preamplifier units within electromagnetic interference (EMI) attenuating enclosures and the electrical isolation of this instrumentation by the use of battery power and electrically non-conducting fiber optic data output leads presumably is effective in preventing the ingress of EMI to that part of the Piezo-RA detection instrumentation enclosed in the attenuating enclosures. The fiber optic leads convey the output signal from the front-end instrumentation to the feedback and data recording units.

Tests at JFKU disclosed that despite the EMI filters on the AC electricity supply to the computerized Piezo-RA feedback and recording equipment (STD box, computer terminal and printer) transients on the electricity supply could trigger large (>1000 units) artifactual responses from the system. A readily performable test to demonstrate this was to pull the plug of a functioning piece of mains-powered equipment (e.g. a cassette player/radio) out of an electricity supply socket in the same room in which the Piezo-RA equipment was functioning. It was known in advance that this was a possible source of artifactual signals for the JFKU-based systems. This source of artifact should have been eliminated from the SRI-based system because data recording was performed not by the computerized feedback system, but by means of an FM tape recorder. However, since the JFKU-based systems showed a clear susceptibility to this form of artifact, this generates a concern as to whether the FM tape recorder used SRI for data recording was indeed adequately protected from the ingress of electricity supply transients (see section 6.(ii) for a brief discussion of this source of artifact).

Naturally, trainees were prohibited from switching mains-powered equipment during RA training sessions. However, the JFKU laboratory suite is located in a building, parts of which are used as a high school, and the possibility that switching of mains powered equipment in the school section could create artifactual signals must be born in mind. Despite this, it appears from tests performed at the laboratory site that the RA system is not affected by transients created more than about 5 metres distance from the RA detection equipment. Nevertheless, the results of one of the control runs for system 1 suggest that on rare occasions EMI may have penetrated the feedback and data recording systems (see sections 4.(i) and 4.(ii)).

3.(iii) ARTIFACT SOURCES: ACOUSTIC NOISE AND VIBRATION

The RA sensor enclosures of two JFKU-based RA detection systems were placed in separate rooms located some 20 metres from each other. Both rooms were in the rear section of the laboratory suite, which is separated by a small hallway and passages from the front section of the laboratory. The two feedback and recording systems of the instruments were located in separate rooms in the front section of the laboratory. During RA training sessions, trainers and trainees would be located in the rooms in which the feedback and recording apparatus was located, and no personnel would be present in the rear part of the laboratory suite.

The two environments in which the RA target systems were located were not wholly free from acoustic noise and vibration. The rear section of the laboratory is separated by a single wall from a set of rooms in the building which is used as a high school. The teenagers attending the high school were noisy and sometimes films would be shown at quite loud sound levels in the high school section of the building. With both systems, the slamming of doors in the nearest rooms to the RA equipment within the section of the building used as a high school produced small outputs, not above the two thresholds (1 for system 1, 5 for system 2), but definitely visible as deflections in the pen trace of the chart recorded output from the systems. Slamming the doors of the rooms in the laboratory suite next to the room in which the system 1 sensor assembly was located was definitely capable of generating artifactual above threshold (of magnitude 1) signals. This was found out by testing. Control runs 3, 4, 5 and 6 for system 1 had to be discarded because of activity during the control runs in the room next to it (see section 4.(ii)).

Except for a few sessions (see section ..(ii) below) RA training sessions were held while the laboratory was empty of other personnel than those involved in the RA sessions. Quite often both RA systems would be in use simultaneously, but once the systems were running, no personnel would be present in rooms immediately adjacent to them. During set-up periods when the experimenters were switching on and preparing equipment, their movements were quiet, and no artifactual effects from the activities of experimental personnel were recorded.

4.(i) CONTROL RUNS: INTRODUCTION

It should be born in mind from the comments made in the introduction and in sections 3.(ii) and 3.(iii) above, that:

(a) no artifact monitoring systems were installed in the instrumentation supplied to JFKU and,

(b) artifactual events due to EMI ingress had definitely been established as possible with system 1 (section 3.(ii)) and,

(c) probably, particularly loud noises originating from the high school suite could contribute to the noise level intrinsic to system 2 by additive summation with the electronic noise.

These factors taken together mean that the control run data does not represent just the intrinsic noise of the two detection systems, but includes also signals above the noise level due to the two possible sources of artifact already described.

Control runs were of variable length and the majority were run during the daytime when the high school was in operation. It was decided to set the thresholds of the two systems as low as possible during control runs, consistent with the collection of manageable amounts of data. The threshold referred to is that which defines the operation of the recording of signals at the occurrence of signals of magnitude one unit above the threshold level. Setting the threshold level at 5 would cause the systems to record all events of 6 or greater magnitude; setting a threshold level of 1 would cause the recording of all events of magnitude 2 or greater. The use of the lowest possible threshold in control runs ensured that the noise floor was accesssible to inspection. The two thresholds used for control runs were lower than, or the same as, those in use for experimental runs.

During the most intensive training phase it proved very difficult to gather large amounts of control run data because of the extensive use of the systems during the daytime for training purposes. At this period too, the use of replacement batteries had not been put into operation, so that after use for experimental purposes, the systems were generally put on charge sometimes during the day and usually during night in preparation for the next training session. The majority of those control runs performed after the period of intensive training were done when the high school was in operation during the day and would therefore sample the normal daytime noise levels.

The control run data for both systems is present in appendix I.

4.(ii) SYSTEM ONE CONTROL RUNS

System 1 was, as will be seen by comparision of the twenty control runs for this system with those of system 2, much less noisy than system 2. A higher threshold (5 units) was used for the first eight control runs and for the tenth control run (3 units being assigned by mistake for control run 9) than for all of the subsequent control runs, 11 through 24, which were set at a threshold of 1.

Control runs 3, 4, 5 and 6 had to be discarded because of artifacts deriving from door slamming in the room next to the system 1 sensor system. A JFKU student was performing some experimentation during this period which was conducted exclusively in the evening (when training sessions using system 1 were NOT held). Despite requests to move around quietly, this student persisted in slamming the door of the room immediately next to the system 1 RA sensor unit. Signals were generated in these control periods which were very much larger than the signal levels characteristic of normal control runs. Rather than attempt to partition out those signals in these runs which were due to the student's activity from those which were not, it was decided to discard this data from the control run dataset and perform more control runs to bring the total to twenty. The distance between system 1 and system 2 sensor units provided adequate protection of the system 2 sensor unit from artifactual outputs due to activities in the vicinity of system 1 sensor unit.

It will be seen that in general, system 1 has a well bounded noise distribution, with the cutoff being at 4 units. Two unusual events are recorded however, one being an event of magnitude 6, occurring at 3.07 pm in control run 18 (9/8/'87), and one of magnitude 9 at 3.06 am (7/21/'87) in control run 16. These two events may simply be characteristic of the distribution of the noise, but the fact that there are no events atall of intermediate magnitudes (ie of magnitudes 5, 7, or 8) recorded in any of the control runs suggests that perhaps these two events may be due to rare electrical transients caused by the switching of automatic equipment. It is difficult to imagine loud percussive n ses occurring at 3 am at the JFKU laboratory site, unless some the high school students broke in to their school, or unless there was an earthquake. An earthquake would be more likely to produce a series of signals (because of the rocking of the RA detection systems on their passive air suspension systems), and would presumably produce signals on both systems. System 2 shows no signal recorded during a period from 1 hour 18 minutes before the system 1 event of 9 units to 49 minutes after the event. For the system 1 event of magnitude 6, there is an event of magnitude 8 units at 3.05 pm on system 2. Given the fact that timing was performed by software clocks this may correspond to the event on system 1 at system 1's recorded time of 3.07 pm, but in the absence of environmental monitoring of both systems, further hypothesising regarding the causes of these two unusally large magnitude events in the system 1 control run data would be unfruitful.

4.(iii) SYSTEM TWO CONTROL RUNS

System 2 shows very much more spontaneous activity than system 1. However, the noise distribution seems quite well bounded, no events being recorded above 9 units magnitude in any of the control runs. The threshold used was 5 units for all control runs except for control run 12 which was discarded because the threshold had been set at 6 for this control run by mistake. It will be seen (appendix I) that system 2's event count in control runs is somewhat variable, presumably representing the effect of the high school as a nearby source of vibration. System 2's variable noise performance was puzzling because it did not seem to reflect ambient acoustic noise levels as peceived by the experimental personnel.

5.(i) TRAINING SESSIONS: PRELIMINARY ORIENTATION OF PARTICIPANTS

A total of some twenty-five individuals were invited to each participate in one of two separate day-long orientation sessions which were described to participants as being RA training preliminary "workshops". Invitees to the workshops were selected by the methods outlined in section 2, above.

The individuals invited to the first workshops had been found from three of the four sources mentioned in section 2 above, viz. retained participants from 1986, individuals found by contacts and individuals selected from the PIF records generated by the 1986 screenings. The screenees selected by the procedure described in section 2, above, were then contacted by telephone, starting from the first ranking, and going down the list until sufficient willing individuals were invited (16).

The "workbook" prepared for the orientation workshop is included in appendix IV. There were four main goals of the preliminary workshop:

(i) To allow the experimental team to assess participants, in an informal setting, for their suitability for RA training.

(ii) To provide potential RA trainees with sufficient information regarding the RA experimental activities and commitments to allow them to make an informed judgement regarding their willingness to participate in the study.

(iii) To elicit the reactions of participants towards RA performance and RA training, allowing opportunity for the discovery of negative attitudes towards RA, RA training, and possible blocks to performance.

(iv) To provide a thorough orientation towards the goals of the research, to initiate the process of participants developing RA facilitation strategies, to give them some initial experience with RA detection systems and to initiate the bonding of participants as a group.

The workshop appeared to be quite successful in achieving the four sets of goals. One problematical occurrence was that one of the participants aroused the group's fear of the destructive use of RA by recounting her claimed semi-intentional use of RA when a teenager to negatively affect other people. This initiated a lengthy discussion regarding the ethical issues involved in training RA ability which consumed rather more time than desirable, but which was unavoidable, given the situation. This workshop participant declined to participate in the study. A later, second-level orientation workshop was run for all the participants selected for RA training after their first few training sessions. The content of the second workshop was very similar to the first, although it also contained content from the mental skills training procedures (see Appendix V).

After the preliminary workshop, the willing individuals who were evaluated as being promising potential RA trainees were then interviewed and, if they had not already done so, completed the PIF and signed the statement of consent. The decision as to which individuals were to be interviewed was based on several criteria. One was their ostensible RA performances to date. Others were their personality characteristics and general stability and attitudes towards experimentation and RA. The potential trainee's willingness to participate, freedom to schedule training sessions during the weekdays, place of domicile (and hence journey time to the JFKU laboratory in Walnut Creek), and general attitudes, were all non-RA factors which pragmatically impacted the probability of their selection.

The approach of the JFKU based research group towards participant selection and training appears to be very similar to that developed at SRI. Since a long term stable commitment to participation is required, adult participants who are in stable social and domestic situations are preferentially selected. This approach contrasts greatly with the one-shot use of college students which seems very common in psychology and many psychoenergetic studies.

5.(ii) THE PARTICIPANT EVALUATION SESSION

In order to provide more data to constrain the selection of trainees, it was decided that all potential trainees would be run in a single 1 hour long evaluation session, with the threshold of the RA detection system set at a level of 20 units. Nineteen potential trainees had reached this stage of the selection process and were run in an evaluation session. The decision regarding which individuals were to be selected for training was arrived at by a convergent process, with data inputs from their screening performance, PIF scores, behavior in the first workshop and results in the evaluation session. The facilitation of the trainees' optimum RA performance in the evaluation session and early training sessions was hampered by three important inhibitory factors which were not fully appreciated at the time (see section 5.(v)(b) below).

The results of the evaluation session are counted as training session 1 in the RA training results (Appendix II). As wi be seen, three participants (Nos. 44, 48 and 50) did manage to create effects substantially above the noise floor of the detection system during their first session with the instrumentation. However, the majority did not, and the chart reco resulting from the session (see section 3.(i)) was there re used as a guide to participant evaluation, together with the judge nt of the experimenters who ran the participants and their scree ing results. The first serious encounter with the RA detection system seemed to have a highly motivating effect for some participants, as will be noted in sections 5.(v) and 5.(vi). Seven of the group of nineteen individuals evaluated by this convergent process were selected for RA training.

5.(ii) MENTAL SKILLS TRAINING

During the training phase of the previous research cycle it had been observed that certain participants used RA facilitation and elicitation techniques which seemed in some cases to assist the participants in a number of ways, including positive mood shift, orientation of attention towards the RA task, relaxation, and the induction of positive belief states regarding the RA task. It was decided that in 1987 an effort would be made to try to compile and document a collection of such techniques, to be offered to trainees on an optional basis.

A difficult decision was faced regarding the stage at which to teach trainees to use these techniques, which had either been identified as possibly helpful to RA facilitation in the previous research cycle, or which it was decided to introduce because they had been used with apparent success in other areas of psychology, notably in sport psychology (Straub 1980, Williams 1986) and behavioral therapy (Gambrill 1977).

Prior to the initiation of the training phase of the 1987 activities, Dr. Corwin, a member of the JFKU research team, undertook to perform a survey of the RA elicitation techniques used by participants in the previous cycle, together with a limited survey of elicitation techniques described in the literature on RA-like effects (see Appendix V). In addition to these sources, techniques deriving from sport psychology and behavior therapy were surveyed. The resulting eclectic selection of elicitation and facilitation techniques was written up in the form of three "Mental Skills Acquisition" (MSA) workbooks by Dr. Corwin, with consultation from the other members of the RA experimental team. The three MSA workbooks are included as Appendix V.

The decision when to teach participants the MSA techniques was difficult to take, because little hard data exists regarding the effects of such action and its interaction with RA training. Ideally, an independent groups design of training study should be performed to investigate the relative effects of starting MSA training at different points in the RA training process. The factors involved in the decision were complex.

First, since the training session length had been defined as being no more than 90 minutes, the taking of time for the teaching of MSA techniques to trainees would reduce available machine time during the session. Second, the learning of MSA techniques might become a higher priority than RA performance, so that decrements in RA performance and motivational conflicts might result from attempts to perform both activities in the same sessions. Third, it seemed likely that the mental set needed for learning of much of the MSA material would be analytical, rather than non-analytical and global. This might decrement RA performance, which appears to be a right-hemispheric function. Fourth, if the acquisition of MSA techniques might improve trainees' performance markedly, there was a case for starting MSA training early in the RA training process.

It was decided to encourage trainees to learn some of the MSA techniques during 60 minute periods taken in the first three 90 minute sessions. The underlying motivation was to equip trainees with possibly useful techniques early in their training process. It rapidly became apparent that this strategy was not optimal, because trainees reported that learning the MSA techniques during the training sessions did indeed divert them from the RA task too much and shift them towards an analytical frame of mind, which they perceived as being detrimental to RA performance. Trainees also reported frustration at being denied potential machine time for RA practice. The learning of MSA material was therefore dropped from the sessions, the MSA techniques being made available to participants on a pick-and-choose "menu" basis. Some of the participants continued to use the MSA techniques in sessions and the MSA workbook materials were incorporated into the second workshop attended by participants.

5.(iv) USE OF "CONFIDANTS"

It was noticed in the previous research cycle that some RA trainees appeared to suffer a slight sense of isolation with respect to the awareness and appreciation of their RA training activities shown by their families or friends. This seemed particularly so when close family members were indifferent or even slightly hostile towards their participation in RA training. It was therefore decided to institute an extra system of support for participants by recruiting "confidants" for them. The role and duties of the confidant were described in detail in the protocol description document (Isaacs 1987b) describing the proposed 1987 research activities which was submitted to the JFKU Committee for the Protection of Human Subjects (CPHS) as part of its approval process. The relevant section is included below.

> To promote the maintenance of high motivation, each participant will be requested to nominate a "confidant". The role of the confidant will be multifunctional, the overall purpose being to provide the participant with support of their RA training in their own social environment. Where possible, family members will be chosen as confidants, otherwise close

friends will be selected. The confidant will be chosen on the basis of their concern for the participant, and their wish to assist the p ticipant in his or her RA training process. Participants wi.. be requested to discuss each RA training session with their confidant, and to actively brain-storm and p:oblem-solve with them regarding problems, blocks or limitations encountered. The confidant will provide an additional feedback path for any problems which may arise during the participant's training process to be communicated to the RAP research team. Confidantes will be encouraged to maintain close contact with the participant's experimenter/trainer, to ensure that this function is fulfilled.

Another important function performed by the confidant will be to assist in the goal setting process by discussing goals, giving encouragement and praising good performance. The confidants will be oriented in their duties by the RAP research team, at a separate half-day meeting held when the participants have all been recruited. Confidantes will be invited to all the meetings of the participant/experimenter group.

The confidant system appeared to work well and trainees reported that they received significant benefit from having someone with whom they could discuss their progress and brainstorm with regarding problems. The confidants also fulfilled a useful purpose in providing an extra route for information to flow between participants and the experimenter group. The confidants reported enjoying their role.

5.(v)(a)PIEZO-RA TRAINING SESSIONS: INTRODUCTION

The first session was the evaluation session and ran for 60 minutes. A gap of approximately two weeks occurred between the first session and the second, due to the fact that nineteeeen participants had to be given a first session before the selection process could be completed. From then on, 90 minute sessions were performed at the rate of two a week for some six weeks, then in general at a rate of three per week for the rest of the training period. It was planned that sessions two through four would be split between tuition of MSA techniques (60 minutes) and RA training proper (30 minutes). However, trainees showed a strong preference not to devote so much training time to MSA activity, so that this was in general ended before session four. Some trainees recommenced limited MSA training later in the training phase, at their option.

Starting at the first (evaluation) session, the threshold was 20 units. It was rapidly found that this was demoralizing to the trainees, and after the first few sessions (the number varying between trainees) the thresholds were reduced to 5, and some weeks later the system 1 threshold was usually set below 5. The system 2 threshold was held at 5 because of its greater noise characteristic. It must be stressed that just as in athletics training, where the degree of difficulty and challenge of the task must be carefully matched to the individual athlete (Williams 1986) in RA training it appears that to obtain maximum performance, the trainees must be treated as individuals, with the feedback characteristics of the RA system being adjusted for each trainee. The imposition of a totally uniform threshold setting would have restricted this option.

5.(v)(b)INHIBITORY FACTORS EARLY IN TRAINING

Three major inhibitory factors created by the experimental protocol were encountered in the early part of the RA training phase. The first factor was generated from the somewhat overconfident assumption by the JFKU research team that the threshold of the RA detection systems could be set at 20 units for beginning trainees. It will be recalled that the evaluation session and first two or so subsequent training sessions were run with this threshold level in operation. This decision was later suspected to have created significant inhibition, since it presented beginning trainees with an apparently non-responsive RA detection system.

Batcheldor's theory of RA facilitation (Batcheldor 1984) and the principles of operant conditioning (Gambrill 1977, Isaacs 1986b) clearly state that in order for responses which it is desired to condition not to be extinguished, from the very earliest occurrence of the responses, reinforcement is necessary. In the RA training context this implies that RA responses of very small magnitude must be reinforced, for the shaping of the response towards the production of larger RA effects to be successful (Gambrill 1977). In practice, this means that the RA detection system noise floor must be sensorially discrimminable and that the system should provide some form of apparently positive response to the trainee to suggest that they are succeeding from the very start of the training process.

Setting the threshold of the RA instrumentation at 20 units created a situation where unless the potential trainee created rather large effects (more than twice the largest noise signals (9 units) occurring in the control runs), they would essentially receive the impression from the RA detection system that they could not produce RA effects. If beginning trainees could only produce signals near noise level and well below the 20 unit threshold, which is likely for novice trainees, this meant that for the sessions run with this threshold in operation an extinction paradigm was being operated, which could be expected to negatively affect the potential trainees' RA responses.

This effect would have been reinforced by the fact that the audio feedback system was at first not sufficiently sensitive to very small signals to track the noise floor of the RA detection system. Some 6 or so sessions into the training phase, a sensitive supplementary audio feedback device was added to each RA detection system which provided good audibility of the noise floor by means of a voltage controlled oscillator which produced a changing frequency of output in response to the noise floor.

In addition, a final software modification made the computer generated audio feedback sufficiently sensitive at low levels of signal to track the noise floor :ith moderate sensitivity.

However, the problems of the high threshold's effects and the insufficiently sensitive audio feedback were not fully appreciated during the earliest stage of the training process. The instrumentation had been returned to SRI for modification during the interim period before the renewed recruitment of participants for the 1987 cycle. It had been returned from its modification a month later than planned. Since there was a danger of the training phase falling behind schedule, the RA detection systems were put into service immediately, before the JFKU experimental team had sufficient familiarity with the newly modified systems to have fully assessed them. Careful assessment would probably have led to the decision to use a threshold just above most of the noise floor from the start of training, and to use a supplementary, sufficiently sensitive audio feedback device from the beginning.

This situation provides an important, if obvious, lesson, which is that in exposing participants to RA instrumentation, it is essential to first carefully evaluate the instrumentation before exposing them to it, because the initial setback created by unsuitable feedback properties may damage the prospects of RA trainees. Unfortunately, since a formal study using independent groups would be necessary to prove this point, this strong suspicion remains as yet an hypothesis, but the literature of the conditioned reflex would certainly underpin this hypothesis (Gambrill 1977). To somewhat substantiate the hypothesis that apparently non-labile feedback properties of RA target systems inhibit RA, the events during the SRI sessions provide an instructive although unintentional example. The first 11 sessions of the evaluation series held at SRI were run under similar conditions of non-labile feedback, with null results. Changing the feedback characteristics of the SRI system appeared to dramatically facilitate the production of RA events. The hypothesis that this factor is real was supported at least informally by this unintentional use of an inhibitory condition at SRI followed by its being made less inhibitory by the introduction of apparent lability. Although no controlled study of the effect of discouraging feedback has been performed to date with the Piezo-RA effect, it is this author's strongly held view that in both instances this condition (non-labile feedback) severely reduced the RA performance which was obtained and reduced the yield of data recovered from the SRI-based evaluation study.

What is doubly frustrating in retrospect is that the JFKU experimental group strongly believes that this condition is inhibitory of RA performance, yet allowed the two incidents to occur. In both cases there seemed to be good reasons to pursue the policy followed at the time. In the case of the over-high threshold used at JFKU early in the training phase, it was the group's over-optimistic belief that trainees would succeed in producing events of magnitude 20 early in their training process which was responsible for the initial use of this threshold level. The provision of appropriate supplementary audio feedback devices by Dr. Isaacs was done only when it had become clearly apparent that the computerized audio feedback was not sensitive enough, and when it was recalled that some equipment brought from England could be modified to serve as supplementary feedback units.

5.(v)(c) ADJUSTMENT TO REMOTE RA TARGET SYSTEM

The third inhibitory factor is of considerable relevance to the future of RA studies and deserves investigation in its own right. It was decided early in the protocol design stage that JFKU participants and experimenters would not be allowed into the room at SRI in which the Piezo-RA equipment was located once the study had been started. This would provide security against the possible charge by critics of subject or experimenter fraud on the part of JFKU personnel. This condition was an essential feature of the protocol because it protected against fraud and allegations of fraud. In addition, the isolation of the Piezo-RA sensor system from the acoustic noise and vibration and possible local electrostatic and other fields which may exist in the vicinity of personnel was also clearly essential.

However, the distancing of the Piezo-RA target system from the individuals attempting to cause perturbations of the sensor system is probably strongly inhibitory of effects. Within the parapsychological literature, distancing the RA agent from the system to be affected, especially if the target system is placed outside the room in which the putative RA agent is located, has been notoriously inhibitory of RA performance (Batcheldor 1984). Batcheldor (1981) asserts that the mechanism of this inhibitory effect is via the negative impact that distance from the RA target has on the belief of the putative RA agent. Since for methodological reasons, the putative RA agent must be separated from the target system, the optimization of RA agent performance under this condition deserves investigation.

The choice faced by the JFKU investigators was between three alternative means of adapting trainees to the remote location of the RA target system. Each method of dealing with the inhibitory effects of distance on RA is associated with risk of inhibition.

One solution would be to start with the target system at a distance, located outside the trainee's room, so that the participant has to deal with the most inhibitory condition from the start. This approach runs the risk that the conditions of training might be so inhibitory as to constitute an extinction paradigm. The extinction paradigm is a conditioning situation where responses are never reinforced, so that the responses in question decline in frequency to zero (Gambrill 1977). If the initial conditions are so inhibitory that no RA responses are ever generated, no opportunity for reinforcement is produced, so that after a period under these conditions, the likelyhood of an RA response drops to zero. On the other hand, if trainees do manage to produce effects under this condition, the dividend is obtained that no subsequent major change of distance is necessary.

The second option would be to start the training with the RA target system in the same room as the trainee. This minimizes inhibition, but at the cost of making results less certain, because of the possibility of artifactual outputs being created by the activities of the trainer and trainee. It also only defers the possible inhibition created by the removal of the target system to a location outside the room. However, the rationale for this approach is that initial inhibition is minimized and the trainee's belief in their RA ability is established by experience (assuming that they are successful in the "close" condition) prior to the distancing of the target system.

The third option is a variant of the second option. It would be somehow to phase the removal of the RA target system, taking it away from the RA trainee in stages, so as to retain the occurrence of RA effects at each step, thus maintaining a positive expectation. Batcheldor hypothesizes (1984) that this incremental grading of the difficulty of an RA task is maximally effective in promoting RA performance. Practical difficulties involved in this process, and the continuing temptation of the RA trainee/trainer pair to regress back towards a closer condition would have made this option very difficult to execute.

The only way in which the decision regarding the imposition of the distant-target condition could be satisfactorily motivated would be by data derived from experimental studies investigating the outcomes of training independent groups where the distancing of the RA target system was performed in the three ways described above. In the absence of these results, the decision had to be taken on purely pragmatic grounds, and the first option, of starting in the distant condition, was chosen. One factor motivating this decision was that since the trainees would have to adapt to working in a different environment (SRI) from that in which they trained, the imposition of yet another change in conditions due to removal of the target system at JFKU would have been adding to the changes in conditions. The 1986 research cycle amply demonstrated the negative impact of frequent changes in conditions and equipment on the performance of RA trainees. In retrospect it is of course easy to provide reasons to doubt that this decision was the best one, but in the absence of hard data it was necessary to take it on the best available information.

A possible further inhibitory condition may have been the introduction of MSA training early on in the training process. It is a reflection of the early stage of research in this area that so many decisions in training procedure are unconstrained by experimental data, and in this situation decisions have to be taken on the best available information.

5.(vi)(a) BRIEF REVIEW OF INDIVIDUAL RESULTS

Since the performance of trainees was highly individual, the training process of each of the participants will be briefly reviewed. It will be recalled that the training results of each participant are included in Appendix II.

Participant 41

This participant was the only one recruited by the 1987 screening. He started producing signals clearly outside the noise floor in session 5 and in sessions 11 and 13 produced a total of 8 signals outside the noise level. As a result, he was then submitted to 5 sessions at SRI. Unfortunately the first of this group of SRI sessions were performed prior to the modification of the SRI RA detection system's feedback characteristics, so that the SRI system showed no lability. Participant 41 produced no over-threshold effects at SRI. Since he was observed to suffer from considerable shyness, it might be hypothesised that the combination of inhibition due to his shyness and the non-labile characteristics of the SRI system affected his performance.

Participant 42

This participant was retained from the 1986 research cycle, where she had performed quite well. She had not maintained her practice of RA training between the 1986 and 1987 cycles. Only in training session 10 did she start to produce clearly over-noise effects, and in sessions 11, 13 and 15 produced quite large numbers of over-noise events. She subsequently performed 4 sessions at SRI, without producing clearly over-noise events. Unfortunately this participant had commenced a form of employment during the period when the SRI sessions were run which occupied her time so much and fatigued her so severely that her RA performance drastically declined and she was dropped from further training in the 1987 cycle.

Participant 43

This participant was retained from the 1986 research cycle, where he had produced the majority of effects recorded. On resuming RA practice, it took until the 6th session for him to produce a clearly over-noise event. He produced a single further over-noise event in session 12, in the context of a rather disappointing overall training performance. It seems likely that this resulted from this participant's clearly stated preference for working at SRI where the "real" experiment was conducted. The problem of this motivational aspect of the JFKU training phase is reviewed briefly in section 6.(i). At SRI, 43 performed 17 sessions, 11 of them conducted under the extinction paradigm condition created by the non-labile feedback characteristics which the SRI system displayed at that time. It is remarkable that 43 then succeeded in producing some ostensibly over-noise effects at SRI, despite the discouraging regime of null results for 12 or so previous sessions.

Participant 44

This participant was recruited late in the course of the experimentation. She had been the confidant of one of the already-recruited participants and while attending one of her trainee's training sessions, requested a short trial on the RA instrumentation, to experience the training situation. She produced an event well over the noise level of the system and was immediately recruited into training where her overall performance was disapppointing, since she produced no further over-noise events. She performed 3 sessions at SRI and produced at least one ostensibly over-noise event.

Participant 45

This participant started producing over-noise events in session 5 and produced further such events in sessions 7, 12 and 14. Starting at session 15 she performed 11 sessions at SRI and was the best performer there, in terms of the magnitude and numbers of her effects. She is an experienced psi practitioner and has much experience of informal self-regulation disciplines.

Participant 46

Participant 46 claimed to have created macro-RA effects previously and had a high PIF score. In training his performance was almost uniformly disappointing, except for a period from session 15 through 20. He was not selected for SRI sessions and it was not understood why he did not achieve his apparent RA potential.

Participant 47

Participant 47 was another trainee who had high PIF scores (she was in fact the highest scoring PIF respondent) but did not produce any putative RA events which were clearly above the noise level.

Participant 48

This participant too, did not produce any clearly over-noise events except for two very large events in her first session (of magnitude 112 and 113 units). She was retained in training because of her initial performance. Her training performance has some interest because at session 16 she was transferred to a different trainer because of her poor progress. She then greatly improved in event number production until session 24 when she and her trainer had a severe conflict. This negatively impacted her scoring, from which it recovered only slightly in session 30. The difference in scoring between session 23, the last of the run of improving scores, and session 24 and later sessions could be hypothesised as illustrative of the effects of interpersonal dynamics on RA production.

Participant 49

Participant 49 did not achieve the promise implied by her PIF scores. She produced no clearly over-noise events in training and during the training period suffered various stressful personal events in her private life.

Participant 50

Participant 50 was one of the three individuals to achieve an over threshold event (magnitude 23) in her first RA session. She reported the occurrence of RSPK events in her home to the Graduate Parapsychology Program at JFKU and was consequently recruited by contact. She took until session 14 to start producing event numbers which seem to exceed the noise characteristics of the RA system. He performance improved irregularly from then on and after her 20th JFKU-based training session she performed 7 sessions at SRI where she produced several ostensibly over-noise events.

5.(vi)(b)OVERALL TRAINING RESULTS

The overall results of the JFKU RA training phase, despite the presumptively inhibitory effects of the early training conditions, compare very favourably with the English RA training studies. In the two formal longitudinal training studies employing multiple subjects performed in England (Isaacs 1984) a much lower proportion of subjects achieved an even relatively consistent RA performance. In the first study, only one of the five subjects achieved a satisfactory performance, and in the second study only one of nine subjects performed similarly. In the currently reported work, six of the ten participants achieved over-noise effects at JFKU and of these six, four produced ostensible over-noise events at SRI. This improvement over the previous results may be due to the use of a larger population from which the trainees were drawn, the elaborate multi-stage selection procedure employed, and possible consequent superiority of the individuals selected for training. Quite possibly the improvements in training skills of the research personnel also contributed to the outcome. The basic learning hypothesis - that RA performance in selected subjects improves with practice also seems to have been confirmed once again.

6.(i) SRI EVALUATION SESSIONS: MOTIVATIONAL AND INHIBITORY FACTORS

The design of participant orientation sessio... by the experimental group included elements specifically intended to positively motivate participants towards the SRI sessions, performance of which was presented as the goal of the training phase. This treatment appeared to be very successful, since all trainees expressed a strong desire to be selected for participation in the SRI-based evaluation sessions. To some extent, this motivation towards the performance of sessions at SRI may possibly have been detrimental to maximizing performance at JFKU. This certainly appeared to be possible for trainee 43.

Certai· inhibitory dynamics also operated with regard to the SRI sessions. First, having to perform at a different, rather non-familiar site could be expected to be inhibitory. Second, for RA performance, the theoretician Batcheldor holds that "crucial test" conditions are maximally inhibitory, because they minimize belief and maximize doubt and "resistance" to RA (Batcheldor 1984). These factors may be mediated by their effects on mood (Isaacs 1987a). Participants reported that they felt somewhat intimidated by the alien and rather impersonal characteristics of a professional research institute, despite the efforts of Mr. Hubbard to provide a friendly reception.

Third, and crucially, the SRI RA detection system's feedback properties were such, for the first eleven sessions, that the system showed no apparent lability, its output not seeming to fluctuate atall. This was interpreted by participants as the system being "dead", rather than "alive" and responsive to their attention, and "resistant", rather than "compliant" to their intention to affect it. As has been described before, in the behavioral shaping of conditioned responses, if no reinforcement of initial responses is given, the response will be extinguished, rather than increased in frequency (Gambrill 1977). Exposing participants to an RA detection system which provides insufficiently sensitive feedback to enable sensory monitoring of the noise floor to be performed prohibits the sensory detection of small RA responses and provides no take-off points for a positive belief and expectation of further success.

Eleven days of experimentation were performed under this extinction paradigm. This clearly impacted the participants who were run under this condition, and the rest of the JFKU group of participants and experimenters as the news of the absence of results spread through the group. The SRI RA detection system's feedback properties were then modified by increasing the gain of the feedback channel, making it appear labile. This was followed by the occurrence of over-threshold events in sessions, in increasing numbers and magnitudes. It is this author's opinion that had the feedback properties been of the higher gain from the start of the SRI sessions, very many more RA events would have been recorded in the study, and their magnitude would have increased beyond the levels produced. It was extremely unfortunate that the SRI system's feedback properties were incorrectly perceived as being unalterable and non-negotiable by the JFKU personnel, as was much else of the protocol (for good reason). This was an unfortunate communication failure which probably lost the study a substantial amount of results.

The effects of the first eleven sessions' null results were compounded by the funding situation of the JFKU-based group, which was dependent on success in the SRI study for it_ future funding. This situation was highly motivating for the group, but was conducive to stress and anxiety, particularly on the part of the principal investigator, who, not being a US citizen, was dependent for continued residence in the US on the flow of research funding. Since psi-mediated experimenter effects appear to strongly impact psychoenergetic research (White 1977, 1978), it seems quite likely that this situation may also have added to the inhibitory factors at work during the SRI-based sessions. In addition it was suspected that it must have been difficult for the principal technical monitor of the SRI psychoenergetics group, Mr. G. Scott Hubbard, to maintain a positive attitude, both because of the well known doubt of the existence of RA present in the SRI group, and because of the period of eleven days of running participants prior to the obtaining of results and consequent recording of fewer events than were expected. This too could have produced an experimenter effect of reducing the numbers and magnitude of putative RA events recorded.

What is remarkable is that so many of the participants who performed at SRI during the non-labile period of the RA detection system's feedback still managed to achieve over-threshold results on the device in sessions after the eleventh. The occurrence of the first over-threshold event significantly affected the participants, encouraging a belief that it was possible to succeed at the task, a belief which Batcheldor takes to be crucial to the occurrence of RA in experimental settings (Batcheldor 1984).

6.(ii) <u>INSTRUMENTAL CONSIDERATIONS</u>

In the evaluation of the results of the control runs performed at SRI, there is a concern which arises as a result of the inspection of JFKU control run data for system 1. The concern is that since all of the data from the SRI sessions, including control runs, was collected by means of an FM tape recorder, it is crucial that the tape recorder's rejection of electrical transients occurring in the electricity mains should be good.

The algorithm which will be used in the evaluation of the results will be that the largest magnitude noise signal occurring in the control runs in the absence of above-noise signals occurring in any of the environmental monitoring channels will be taken as a criterion level. Putative RA events occurring in experimental sessions will be compared to a magnitude equivalent to 1.5 times the criterion level. RA events occurring in the experimental sessions with a magnitude of 1.5 times the criterion level and above, in the absence of above-noise signals in any of the environmental monitoring channels, will be considered as genuine events. The occurrence of four or more such events will be considered as good evidence for the Piezo-RA effect.

The FM tape recorder's immunity from mains-born electrical interference is clearly crucial to the proper conduct of this experiment. If a single, extremely rare occurrence of electrical interference should create a single large signal in one of the control runs, under the algorithm used for evaluation of the results, this could cause the RA results in the experimental sessions, which may not be comparable in size, to be considered null. The relative length of the control runs compared to the experimental sessions may render the occurrence of such an event as more probable in a control run than in an experimental session, so that the interference rejection characteristics of the FM tape recorder are of crucial important to the results. It is to be hoped that this feature of the tape recorder's performance will have been carefully checked.

7. CONCLUSIONS AND RECOMMENDATIONS

Given the results of the 1987 training phase, the selection process appeared to function quite well, implying that the components of the selection process are effective. The selection process could be improved further, possibly by the addition of more psychometric measures, especially of neuroticism and extraversion, since these appear to affect ESP performance significantly and this effect may carry over for RA training (Palmer 1978).

There were slight but definite indications that two trainee populations may exist, one having a "psychic practitioner" profile, the other having a "RSPK" profile. This has several implications, one being that individuals reporting RSPK events should be recruited as RA trainees for evaluation, another being that some form of extra sorting procedure for splitting a population having the "practitioner" profile into RA-capable and non-capable groups could usefully be developed. In this connection it is interesting to observe that all of the participants who were successful at producing over-threshold events at SRI had earlier produced over-noise events within six training sessions or fewer at JFKU, suggesting that it may be useful to utilize evaluation series of sessions of some six sessions length and then deselect participants who show no over-noise events by the sixth session, replacing them with fresh trainees.

Several factors were encountered which are strongly suspected of being inhibitory. These may have considerably impacted trainees' RA performance by introducing inhibition in the early stages of training. The first was the initial use at JFKU of a feedback threshold for registering events which was too far above the system noise level to provide the encouraging recording of events which are in fact driven by noise, or in which the noise which has been slightly incremented by RA. This is the feedback-lability requirement for the successful "shaping" of RA responses, referred to earlier in section 5(v)(b). The second is the use of audio feedback which did not at first, but should, make the noise floor accessible to sensory discrimination. The third is the problem of the distancing of the RA target from the putative RA agent, unavoidable for methodological reasons, but which should be investigated so as to constrain training decisions regarding target system placement on the basis of experimental evidence. The fourth was the probably inadvisable timing of mental skills training, which was seemingly administered at the wrong stage of training, although the decision as to when these skills should be taught in the process of RA training is a difficult one to constrain in the absence of the proper studies. Finally, the SRI RA detection system's feedback was insufficiently labile for the first eleven sessions, as described above in section 6.(i).

Nevertheless, the RA training hypothesis appears to have been confirmed again, since the scores of trainees who produced over-noise events were concentrated in the latter portions of their training process. Apparently showing a reversal of this trend, however, three individuals produced events of over-noise magnitude in their first session. One participant produced no further over-noise RA events after the two she produced in her first training session. Perhaps the "first time" motivation factor is an important datum indicating that novelty and high motivation are possibly important elements in RA performance. This implies that motivational techniques may have fruitful application in RA training.

The stress of working in a "reward by results" research environment was felt by all members of the JFKU research team and may have negatively impacted results, because of the anxiety it produced. It was made clear that refunding for the 1987/88 research cycle depended on the results from the present cycle. The experimenter and participant group showed striking resilience and good morale in the context of this uncertain and stressful research environment, and achieved over-threshold and ostensibly over-noise results under very tightly controlled conditions at SRI.

The subsequent cut in funding of the SRI psychoenergetics group has made certain the non-refunding of RA training research from this source. The study of psychoenergetics needs to be put onto an assured, stable basis, since no long term research of magnitude can be based on unstable funding resources. It should be pointed out that the SRI psychoenergetics group has an excellent standing within their peer group of professional researchers in psychoenergetics, and a reduction in their funding must be very impactful to their efforts. Psychoenergetics research could lead to important discoveries in physics, particularly from RA inquiry, and the current instability of funding will slow the development of better RA target systems, training procedures and development of possible applications. Although the identity of the funding source for the SRI RA psychoenergetics research is not publicly known, it is obvious that public domain research of this kind must be subject to monitoring by the defence community. It is a somewhat bleak consolation to the JFKU research team to think that the cessation of this line of research at SRI will probably delay the development of RA training for destructive military purposes, since the JFKU team is the only group known to be currently in existence which is pursuing the kind of RA investigations which may possibly lead to applications of RA for non-monitorable signalling, systems control and other purposes.

Thanks are due to the members of the John F. Kennedy University Remote Action Project research team, Dr. Ruthann Corwin, Martha Mikova M.S., Diane Moore and Jo-Ann Jones. The research team performed a demanding and difficult job in connection with the activities reported here, and did so with great skill, dedication, professionalism and understanding.

Finally, (unsolicited) tribute must be paid to Mr. Hubbard, technical project monitor, who performed a difficult and complex function in collaboration with the JFKU group of researchers. His professionalism, thoroughness and competence, as well as his positive personal qualities were extremely valuable and greatly appreciated in the research which is reported here.

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APPENDIX I

SYSTEM ONE CONTROL RUNS

RUN NO.	THRESH	DURATION	EVENT MAGNITUDES 2	3	4	5	6	7	8	9
1	5/300	14h 0m								
2	5/300	19h 16m								
7	5/300	23h 50m								
8	5/300	14h 36m								
9	3/300	15h 0m			2					
10	5/300	15h 0m								
11	1/300	14h 17m								
12	1/300	5h 25m	4		1					
13	1/300	7h 21m								
14	1/300	4h 14m								
15	1/300	8h 26m								
16	1/300	23h 33m		1	1					1
17	1/300	20h 11m	1		1					
18	1/300	10h 29m	1		1		1			
19	1/300	30h 1m	3							
20	1/300	24h 8m	3							
21	1/300	28h 7m	4	1						
22	1/300	19h 40m	3	2						
23	1/300	26h 17m	2							
24	1/300	23h 22m	2							

Each control run occupies one row. Figures listed under the event magnitude figures heading the columns are the numbers of events of the integral magnitudes recorded in each control run. Durations are given in hours (h) and minutes (m). An explanation of the threshold figures is given at the beginning of Appendix II.

SYSTEM TWO CONTROL RUNS

RUN NO.	THRESH	DURATION	EVENT MAGNITUDES 6	7	8	9
1	5/300	15h 23m	11	26	3	
2	5/300	43m	7	4		
3	5/300	16h 23m	40	34	6	1
4	5/300	13h 34m	24	16		
5	5/300	7h 1m	32	23	1	
6	5/300	3h 0m	9	4		
7	5/300	5h 31m			1	
8	5/300	30h 45m	20	13	5	1
9	5/300	1h 37m	2			
10	5/300	11h 54m	31	35	6	2
11	5/300	11h 59m	24	19	2	
12	6/300	19h 49m		3	1	
13	5/300	10h 25m	90	57	12	3
14	5/300	33h 54m	35	21	4	
15	5/300	24h 1m	86	56	16	1
16	5/300	29h 29m	14	14	2	1
17	5/300	19h 13m	26	27	1	
18	5/300	26h 33m	3	11		1
19	5/300	19h 9m	6	4		
20	5/300	22h 34m	4	3		

Each control run occupies one row. Figures listed under the event magnitude figures heading the columns are the numbers of events of the integral magnitudes recorded in each control run. Durations are given in hours (h) and minutes (m). An explanation of the threshold figures is given at the beginning of Appendix II.

APPENDIX II

RA TRAINING SESSION DATA

The results are given separately, one page or more for each trainee. The scores achieved in the RA training sessions are tabulated in rows. Each session occupies one row. Session data is scored with respect to two parameters, magnitude and event number.

The first parameter, magnitude, represents the peak signal of each event detected by the RA detection system. Magnitude scores are expressed in integer units (counts of the analog to digital (A/D) converter). One count is equivalent to approximately 2.5 mV (410 A/D counts per volt). For scores of magnitude 3 through 10, for each magnitude integer specified at the top of a column, the number of events of that magnitude occurring in the session are entered into the appropriate column. Session scores of zero occurrences of events of any particular magnitude are represented by spaces in the column where the number of events of that magnitude would be entered. Null sessions therefore have no associated scores. Scores in the "over 10" section are given individually in parentheses, thus, (1 x 12), with the number of events of each magnitude given first, e.g. (1 x 29) being the occurrence of one event of magnitude 29 units, (3 x 14) would represent 3 events each of magnitude 14.

The legend "Sess. No." is the session number. "RA Syst." is the identity of the RA detection system used (systems 1 or 2). "Thr. Set." are the values of the two feedback threshold settings. The instrumentation incorporated two software selectable thresholds. The lower threshold was the criterion for entry of data into the printed record generated by the RA detection system. The upper threshold defined the signal level which activated the highest discrete feedback state, leading to generation of the highest pitched feedback tone and activation of the highest value feedback light. The first figure of the two figures under "Thr. Set." represents the lower threshold, the second figure is the higher threshold, i.e. figures of 5/300 would represent a lower threshold of 5 and an upper threshold of 300. Scores were recorded by the system for all signals 1 or more units above the lower threshold setting, i.e. a threshold setting of 5 would permit scores of 6 or more to be recorded.

Due to the difference in system noise characteristics between RA detection system 1 and 2, the threshold settings were generally set at different levels on system 1 from system 2. It should be noted from the control run data (APPENDIX I) that system 1 noise signals seldom exceeded 2 units, whereas system 2 frequently produced noise signals of 6 units. The largest noise signal recorded on either device in control runs was 9 units.

Sessions attended at SRI are labelled "SRI SESSION" and scores are not given for these sessions.

RA TRAINEE SESSION DATA

PARTICIPANT: 41

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	1	20/300									
2	2	5/50				4	1				
3	2	5/50				1	1				
4	1	5/50									
5	1	5/100				4			1	1	
6	1	5/100									
7	2	5/12				1	4				
8	1	5/12									
9	1	5/12									
10	1	5/12					2				
11	1	5/12				1					(2 x 12)
12	1	5/12									
13	1	5/12					1		1		(2 x 11) (3 x 12)
14	SRI SESSION										
15	1	3/12		9	4	1		4	9		
16	SRI SESSION										
17	1	3/12									
18	SRI SESSION										
19	SRI SESSION										
20	SRI SESSION										
21	1	1/7									

RA TRAINEE SESSION DATA

PARTICIPANT: 42

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	1	20/300									
2	1	20/300									
3	2	20/300									
4	2	20/300									
5	2	20/300									
6	2	6/40					3	1			
7	1	5/20									
8	2	4/20			2						
9	2	5/20				4	3				
10	2	5/20				11	4	5	2	1	
11	1	3/14		10	1	4	1				
12	2	3/14		3	4	1					
13	1	3/64		7	2	1					
14	2	5/64				2	4				
15	1	3/64		3	3	2	1				
16	2	5/20									

17 - 20 SRI SESSIONS

RA TRAINEE SESSION DATA

PARTICIPANT: 43

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	1	20/300									
2	1	20/300									
3	1	20/300									
4	1	20/300									
5	2	5/50				4	1				
6	2	5/50				2	1				(1 x 51)
7	2	5/50				3	4				
8	2	5/50				5	3				
9	1	10/80									
10	2	10/80									
11	2	10/80									
12	2	5/15				2					
13	2	10/20									(1 x 14)

14 - 31 SRI SESSIONS

RA TRAINEE SESSION DATA

PARTICIPANT: 44

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
0	2	5/10									(1 x 17)*
1	2	5/300				9	1				
2	2	5/300				3	1				
3	2	5/300				8	7				
4	2	5/300				9	2				
5	2	5/300					2	2			
6	2	5/300				16	6				
7	2	5/10				12	1				
8	2	5/10				19	1				
9	2	3/10 **				23	4				
10	2	3/10 **				6					

11 - 13 SRI SESSIONS

* 44 was a "guest" in a session run for trainee #49 when she obtained this score

** events below 6 deleted from record of scores

RA TRAINEE SESSION DATA

PARTICIPANT: 45

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	1	20/300									
2	1	10/30									
3	2	5/15									
4	1	5/50									
5	1	5/100				2	2	1			
6	2	5/100				9	2	2			
7	1	5/12									(1 x 11) (1 x 15) (1 x 17
8	2	5/12				12	17	3			
9	2	5/12				10	10	6			
10	1	5/12									
11	2	5/12					1				
12	1	5/12									(1 x 16)
13	1	5/12									
14	1	5/12				1					(1 x 11) (1 x 12)
15	SRI SESSION										
16	1	5/12									
17	SRI SESSION										
18	1	5/12									
19	SRI SESSION										
20	2	5/12				4	4				
21	SRI SESSION										
22	SRI SESSION										
23 - 28	SRI SESSIONS										

RA TRAINEE SESSION DATA

PARTICIPANT: 46

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	2	20/300									
2	2	5/11				4	2				
3	2	6/11									
4	2	5/11									
5	2	5/11				4	1				
6	2	5/11				4	8				
7	2	5/11				1					
8	2	5/11				10	6				
9	2	3/11				108	29				
10	2	5/11				2	6				
11	2	5/11				3	1				
12	2	5/11									
13	2	4/11				30	5				
14	1	3/11									
15	1	3/11		6	3						
16	1	3/11		5	2						
17	1	3/11					1				
18	1	2/11	3								
19	1	2/11	4	4	1						
20	1	3/11		14	4						
21	1	3/11									
22	1	3/11									
23	1	3/11									
24	1	3/11									

RA TRAINEE SESSION DATA

PARTICIPANT: 47

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	2	20/300									
2	2	20/300									
3	2	20/300									
4	2	20/300									
5	2	5/300				12	5				
6	2	5/300				1	2				
7	2	5/300									
8	2	5/300									
9	2	5/300				11	7	1			
10	2	5/300									
11	2	5/300				3	1	2			
12	2	5/300				6	7				
13	2	5/300				4	2				
14	2	5/300				3					
15	2	5/300				2					
16	2	5/10				12	5				
17	2	5/300				18	12				
18	2	5/10				16	13	3			
19	2	5/300				10	5	2			
20	2	5/10				9	12	2			
21	2	5/10				4					
22	2	5/10				7					
23	2	5/10				2					
24	2	5/10				7	6	3			

RA TRAINEE SESSION DATA

PARTICIPANT: 48

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 10
1	1	20/300									(1 x 112) (1 x 113)
2	2	20/300									
3	1	5/10									
4	1	5/10									
5	1	5/10									
6	1	5/10									
7	1	5/10									
8	2	5/10				10	5				
9	1	5/10									
10	2	5/10									
11	2	5/10									
12	1	5/10				1					
13	1	5/10									
14	2	5/10				5	1				
15	1	5/10									
16	2	5/300				12	3				
17	2	5/300				8	7				
18	2	5/300				14	3	1			
19	2	5/300				12	7	1			
20	2	5/300				20	5	1			
21	2	5/300				17	9				
22	2	5/300				14	9	1			
23	2	5/300				45	9	2			
24	2	5/300				8	5	1			

RA TRAINEE SESSION DATA

PARTICIPANT: 48 (Continued)

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 1(
25	2	5/300				7	3				
26	2	5/300				6	4				
27	2	5/300				4	6	1			
28	2	5/300				4	3				
29	2	5/300				3	2				
30	2	5/300				11	2				
31	2	5/10				4	4				
33	1	5/10									

RA TRAINEE SESSION DATA

PARTICIPANT: 49

Sess. No.	RA Syst	Thr. Set.	Scores (in A/D counts) 3	4	5	6	7	8	9	10	Scores Over 1(
1	1	20/300									
2	2	5/300				11	4	1			
3	2	6/15									
4	2	5/15				8	1				
5	2	5/20					1				
6	2	5/10				2	1				
7	2	5/20				3	2				
8	2	5/20									
9	1	5/20									
10	2	5/12				3	8				
11	2	5/14				8	6				
12	2	5/20				6	2				
13	2	5/12				1	1				
14	2	5/13				14	6	1			
15	2	5/12				11	17	2			
16	2	5/15				10	4				
17	1	2/10	19	5							
18	2	5/12				21	7	3			
19	2	5/12				3	4		1		
20	2	5/12				17	9				
21	2	3/20				6					
22	2	4/12				10					
23	1	2/16									
24	1	1/10									

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RA TRAINEE SESSION DATA

PARTICIPANT: 50

Sess. No.	RA Syst	Thr. Set.	3	4	5	6	7	8	9	10	Scores Over 10
			Scores (in A/D counts)								
1	2	20/300									(1 x 23)
2	2	5/11				2	3				
3	2	5/11									
4	2	5/11					1				
5	2	5/11									
6	2	5/11				1	3				
7	2	5/11					3	1			
8	2	5/11				1	1				
9	2	5/11				8	6	1			
10	2	5/11					4	3			
11	2	5/11									
12	2	5/11				3	3				
13	2	5/11					3	1			
14	2	5/11					7	8			
15	1	3/11		8	3						
16	1	3/11		7	3	1					
17	1	3/11									
18	1	2/11	1300	134	11						
19	1	2/11									
20	1	2/11									

21 - 29 SRI SESSIONS

APPENDIX III: PARTICIPANT INFORMATION FORM

Thank you very much for aiding our study ! Please answer all the questions on the top half of this page and on the other pages now. Your answers are strictly voluntary and will be kept confidential - no information you have given will be released without your written permission. If you have any questions, please feel free to ask.

Name ______________________________ Date ______________

Address ______________________________

____

Phone Number(s) ______________________________

31. If you are unsure whether to answer the question below "yes", please answer this question after you have heard the presentation, and participated in the remote action session. Please don't forget to answer.

    May we have your permission to contact you regarding participation in the Remote Action Project or other parapsychology studies at John F. Kennedy University? ___ YES ___ NO

Please indicate your Availability ______________________________

NOW TURN OVER THE PAGE AND PLEASE CONTINUE TO ANSWER THE QUESTIONS

ANSWER THIS SECTION AFTER THE METAL-BENDING AND REMOTE ACTION SESSIONS

Please check the appropriate answers.

	NO	YES
Did you bend any cutlery ?	___	___

If yes, how much physical force did you have to use to make it bend ?

Great ___ Moderate ___ Little ___ None ___

Did you experience any of the following while bending ?
Metal getting hot ? ___ Suddeness of bend ? ___ Metal going soft ? ___
Feelings of bodily heat ? ___ Tingling in hands or body ? ___
Was your attention on the metal when it happened ? On ___ Off ___
What was your mental state when the bending occurred ?
Laughing ? ___ Distracted ? ___ Concentrating ? ___ Other ______________

-------------TO BE FILLED OUT BY THE EXPERIMENTER-------------

Screening: ____ Screener: ____________ Referral/Other: ______________

Machine No. ____ Macro Events ______________________________

Machine Results ______________________________

Intuitive Hit/Impressions:
HAVE YOU EVER EXPERIENCED ANY OF THE FOLLOWING PHENOMENA ?

If "NO", place a check mark on the line under "no":

If "YES", please circle how often:

1 equals 'once',
2 equals 'more than once, several times', or
3 equals 'often, frequently'.

	NO	YES
1. Have you ever tried to do anything physical with the power of your mind?	____	1 2 3
2. Have you ever had raps, bangs, footsteps, or other unusual noises occur ?	____	1 2 3
3. Have you had doors or windows open or close, or lights turn on or off without physical cause ?	____	1 2 3
4. Have you ever had objects disappear or appear in new places when you were certain of their location or have you ever felt that they moved without physical cause?	____	1 2 3
5. Does normally functioning equipment occasionally fail to operate for you or does malfunctioning equipment work unexpected., for you ?	____	1 2 3
6. Have clocks or watches stopped or changed speed,or have metal objects bent without physical force in your presence ?	____	1 2 3
7. Have you ever felt that you had received information about a person or event from touching an object ?	____	1 2 3
8. Have you ever had an unusual strength experience ?	____	1 2 3
9. Have you ever had any of the following experiences while awake: The feeling or thought that an unexpected event a) had happened, b) was happening, or c) was going to happen - and later learned that you were right ?	____	1 2 3
10. Have you ever felt that you received information about something which happened before, during, or after a dream which you did not know about or did not expect at the time of the dream ? (veridical dream, symbolic dream)	____	1 2 3
11. Have you ever had an experience while awake in which you felt you were located outside of or away from your physical body ?	____	1 2 3
12. Have you ever felt you have seen a location or event at a distance ?	____	1 2 3

13. Have you ever had, while awake, a vivid impression of seeing or being touched by another being, or a sensation of cold, which you felt was not due to any external physical or natural cause ?	____	1	2	3
14. Have you ever practiced or felt that you have benefitted from spiritual or psychic healing ?	____	1	2	3
15. Have you had an experience when you were thought to be dead and them came back to life, and had memories of experiences such as voices, light, other beings ?	____	1	2	3
16. Have you ever experienced unusual ectasy,"oneness with nature", or the phenomenon of "unity" ?	____	1	2	3

17. Have you had any other unusual experiences you feel might be of interest to us ? Please briefly mention the type:

____

____

Please circle the numbers on the scale, from 1 equals 'Definitely No' to 5 equals 'Definitely Yes', that best represents your answers to the two questions:

	Definitely No				Definitely Yes
18. Do you think its possible to affect physical objects without touching them ?	1	2	3	4	5
19. Do you think that you can affect physical objects without touching them?	1	2	3	4	5

20. Please check the mental techniques which you have used, if any:

____ affirmations ____ concentration ____ meditation ____ biofeedback

____ relaxation ____ visualization ____ hypnosis or self-hypnosis

____ yoga ____ bodywork therapy ____ psychotherapy or counseling

Other ____________________________________

____

21. In what sport, dance, or martial art do you actively participate, if any:

____

22. To which religion do you feel closest? ______________________________

23. Date of Birth (Month, Day, Year) ____________________ 24. Sex ___M ___F

25. Place of Birth ____

26. Native language if not English ______________________________________

27. Occupation ___________________________ 28. Education _________________

29. Marital Status ______________________________

30. Have you ever been involved as a participant or experimenter in a research project? ___ No ___ Yes. Please briefly mention the type:

____

THANK YOU FOR YOUR HELP IN TELLING US ABOUT YOUR EXPERIENCES !

PIF1 Version 3, 7/10/86

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APPENDIX IV: PRELIMINARY ORIENTATION WORKSHOP

REMOTE ACTION INTRODUCTORY WORKSHOP

RECORDS AND NOTES

FEBRUARY 20TH & 21ST 1987

NAME: ______________________________

ADDRESS: ______________________________

____

PHONE: ______________________________

THE REMOTE ACTION PROJECT

GRADUATE SCHOOL OF CONSCIOUSNESS STUDIES

JOHN F. KENNEDY UNIVERSITY

REMOTE ACTION PROJECT INTRODUCTORY WORKSHOP

Friday 7:30PM - 10PM

I. Introduction to the Remote Action Project
   a. Meet the research team
   b. Introduction to the RA project (Julian Isaacs)

II. Sharing of Psychic Experiences (Ruth Corwin)
   a. Self-introduction by participants and sharing of PK/psi experiences.
   b. Sharing goals about the Remote Action Project (RAP).

III. Self-evaluation questionnaire. (Martha Mikova)

Break

IV. Dyad I
   a. Explanation and role modeling
   b. Dyad Exchange
   c. Participants to take notes on key issues
   d. Discussion of dyad

V. Closure

Saturday 9:30AM - 4PM

I. Opening (Chris Rossi)

II. Manifestation discussion (Julian Isaacs)

III. Introducing the Strain Gauge Equipment (Diane Moore, Jo Ann Jones)
   a. Introduction
   b. Strategies
   c. 5 minute Practice Sessions & Break (total 20 minutes for practice session)
   d. Group Discussion

LUNCH

IV. Dyad II
   a. Dyad
   b. Participants to list key issues regarding Dyad
   c. Discussion / Whole Group

Break

V. Piezo Equipment (Julian Isaacs)
   a. Practice Sessions 1:1 (Jo Ann Jones)
   b. Strategies / Open Discussion
      (Martha Mikova, Ruth Corwin, and Diane Moore)

VI. Dyad III/Co-Counselling Exercises: Challenges & Strengths
   a. Dyad: Challenges
   b. Participants note key issues.
   c. Explanation of co-counseling (Julian Isaacs)
   d. Co-counselling Session: Strengths
   e. Discussion of above exercises

VII. Closing

VIII. Evaluation Comments:

PK RESEARCH GROUP: MISSION STATEMENT

The PK Research Group's mission is to:

(i) Promote the spiritual, psychological, psychic, intellectual, and financial, growth and wellbeing of its members, and of the individuals who participate in the group's research.

(ii) Pursue a deeper understanding of reality.

(iii) Promote high quality, imaginative, spiritually informed, and pioneering, research into psychic functioning, by the group and its individual members, with an emphasis on the study of mind/matter interactions.

(iv) Promote the understanding and acceptance of, psychic functioning, within the academic community and generally within Western culture.

(v) Promote the beneficial and fulfilling development of the psychokinetic abilities of individuals participating in the group's researches.

(vi) Promote the development of applications of psychokinetic ability which meet real needs and which are positive and life-enhancing.

FIRST DYAD: PERSONAL PSYCHOKINESIS GOALS

TELL ME WHY YOU ARE HERE

NOTES ON RESPONSES EVOKED BY DYAD:

DREAM SETUP: DREAM GOALS

SHARING DREAM EXPERIENCES: NOTES ON DREAM EXPERIENCE AND INTERPRETATION DYAD

PRACTICE SESSION ONE

Before the Practice Session

How confident do you feel right now that you can affect the instrumentation ?

Low				High
1	2	3	4	5

HOW DO I FEEL ABOUT THE PRACTICE SESSION ?

After the Practice Session

SCORE: ______________________________

COMMENTS:

DYAD TWO: ATTITUDES TOWARDS MANIFESTING PSYCHOKINESIS

TELL ME HOW YOU FEEL ABOUT MANIFESTING PSYCHOKINESIS

NOTES ON RESPONSES EVOKED BY DYAD: KEY ISSUES

PIEZO EQUIPMENT PRACTICE SESSION

1. HOW DO I FEEL NOW, BEFORE THE SESSION ?

PLEASE CHECK ONE RESPONSE

How confident do you feel right now that you can affect the instrumentation ?

Low				High
1	2	3	4	5

2. HOW WAS THE SESSION FOR ME ?

3. WHAT DID I LEARN FROM THE SESSION ?

THIRD DYAD: CHALLENGES IN MANIFESTING PSYCHOKINESIS

TELL ME WHAT CHALLENGES YOU ARE LIKELY TO ENCOUNTER IN MANIFESTING PSYCHOKINESIS

NOTES ON RESPONSES TO THIRD DYAD

FOURTH DYAD: STRENGTHS I BRING TO MANIFESTING PSYCHOKINESIS

TELL ME WHAT STRENGTHS YOU BRING TO THE MANIFESTATION OF PSYCHOKINESIS

NOTES ON RESPONSES TO FOURTH DYAD

WORKSHOP EVALUATION QUESTIONNAIRE

1. How well did you meet your personal psychokinesis goal(s) ?

2. How do you feel about what you have learned of your psychokinesis ability ?

3. Evaluation of some of the components of the workshop:

Please circle 1, 2 or 3 where 1 represents "of high value to me personally in helping me develop my PK ability", 2, "of moderate value..." 3, "of low value.." for each of the items below:

Meeting & Sharing Experiences	1	2	3
Dyad One	1	2	3
Dream Setup and Recall	1	2	3
Dyad Two	1	2	3
Dyad Three	1	2	3
Talk: Approaches to Manifesting Remote Action	1	2	3

5. Please give some comments about the instrumentation and how you related to the machine(s).

6. Please suggest any improvements which could be made to the introduction to the machines or to the practice sessions.

7. Please note any comments on the psychic experiences questionnaire, the belief questions or this booklet as a whole.

8 What personal strategies did you find most effective for obtaining PK ?

9. Please share any comments on the workshop components listed in Question 3, or any other general comments regarding the workshop.

10. Please give any comments on the workshop leaders which you would like to share

Workshop Booklet 2. 2-20-87.

APPENDIX V: MENTAL SKILLS ACQUISITION WORKBOOK

****

PSYCHOKINESIS SKILLS WORKBOOK I

****

BASED ON APPROACHES USED IN
THE REMOTE ACTION TRAINING PROJECT

UNDER THE DIRECTION OF DR. JULIAN ISAACS
GRADUATE SCHOOL OF CONSCIOUSNESS STUDIES
JOHN F. KENNEDY UNIVERSITY
ORINDA, CALIFORNIA

WRITTEN BY DR. RUTHANN CORWIN
WITH DR. JULIAN ISAACS, MARTHA M. MIKOVA,
DIANNE MOORE, AND JOANN JONES

REMOTE ACTION PROJECT
GRADUATE SCHOOL OF CONSCIOUSNESS STUDIES, JOHN F. KENNEDY UNIVERSITY

WORKBOOK FOR MENTAL SKILLS ACQUISITION SESSIONS
SESSION ONE

________ Participant Consent Form Signed

Participant: ______________________________

Trainer/Experimeter: ______________________________

Date: ______________________

________ Beginning Self-Evaluation Questionnaire completed

I. Discussion of Motivation, Goals, and Rewards (about half an hour)

A. Discussion of personal goals:

1. What are your major life goals?

2. How does participation in the Remote Action Project and exploring your psychokinesis abilities fit into your major life values?

B. Review of experimental goals

1. General experimental goals:
   a. Physicist demonstrations
   b. Proof of PK learning
   c. Methodological exploration
   d. Piloting mental skills techniques

2. Session experimental goals for each individual: PK performance learning and improvement over sessions

   1) Threshold concept in DDPK sensors (Directly Detectable PK)

2) Session performance goals:
   a) Building number of effects over threshold per session - note that Julian's participants in England went from 1 event/ session...2..3...10...20!!
   b) Increasing the magnitude of your largest effect - 10...20...100...1000 ...2000! (Max)

3) Formal project goals:
   a) One event over 10 in the first three sessions
   b) Three events per session of 20 or over (or the equivalent) to go to SRI...
   c) At SRI....go for it!

4) Informal project goals:
   Twenty events per session or magnitudes in the 1000's by the 20th session......

3. What will be your personal goals for how you are going to surpass the formal goals of the experiment? What goals specific to the project do you want to set for yourself?

4. Indicate your first decisions about goals per session on this outline of the project calendar...

C. Discuss your kinds of rewards.

1. Questions to think about:

a. What forms of achievement are really rewarding for you?

b. Are thefrom achievement experiences for you that can be applied to PK production?

c. What symbolic rewards do you like? (ie certificates, medallions. etc.)

d. What social rewards do you like?

e. What material rewards do you currently give yourself?

f. What do you consider as luxury items? as enjoyable activities?

g. What do you use for yourself as statements that express self-satisfaction?.

2. Please check these suggestions from discussions so far

Intrinsic rewards

- _____ Meeting personal goal.., pride of achievement
- _____ Improved personal control over or better relationship with your psychic functioning
- _____ Personal growth and development, self-exploration
- _____ Self-management, self-regulatory ability
- _____ Improving performance ability
- _____ Improving coping skills for daily life situations and for specific task demands
- _____ Service, benefit to others
- _____ Increased knowledge
- _____ Opportunity for group activities, lectures, etc.
- _____ Sharing with confidante, others in group
- _____ Meeting others with like interests
- _____ Others (please specify) _____________________
- _____ _____________________
- _____ _____________________

Extrinsic rewards

- _____ Feedback from equipment that you're succeeding
- _____ Positive feedback and regard from training group
- _____ Confidante support
- _____ $10 success rewards from project for achieving each of the two formal project goals - you can take as lunch with your confidante, a book, etc.
- _____ Payment for sessions at SRI
- _____ Others (please specify) _____________________
- _____ _____________________
- _____ _____________________

Notes:

II. Releasing Problems or Clearing - Introduction and Practice. (about half an hour)

A. Why bringing up and letting go of problems is important.
1. Discussion of changing state to do PK work.
2. Amount depends on your individual needs, methods.
3. Releasing or clearing lets go of present state, other strategies allow you to go into PK-producing state ("eliciting strategies", more later)
4. Relation to coping strategies - more later.
5. Selecting techniques of clearing, coping, or rehearsal to use during first half hour of each session.
6. Role of experimenter as trainer to aid and support in this process.

Notes on your initial feelings about what you might need:

B. Use of State Self-Evaluation Questionnaire, (optional Shealy life stress evaluation).

C. Methods to discuss and try (after each, space is left for your reactions to these approaches, and which you use or would like to try.)

1. Talking techniques with your trainer:

a. Informal review - talk over state questionnaire responses, talking about how you are doing, what's happening in your life, important events or changes, or any problems happening for you.

Notes on current issues:

b. Problem-solving approach, coming up with solutions
1) Identifying problems, accepting them as norma
2) Generating alternatives, strategies
3) Evaluating strategies
4) Generating and deciding on specific tactics
Continue problem-solving after the session:
5) Acting and assessing effectiveness of action. (assessment can be done next session).

Notes:

c. Using the speaker-witness dyad approach to an issue framed as a question. This approach involves one person in 'higher self' as neutral witness repeating the question, the other reply ng No touching or reply is involved, just listening. Each thanks the other and switches roles for several repetitions, trying to come closer to what is important for them in the question each time.

Possible dyad questions:

d. Co-counseling on problems. In co-counseling, the listener role is not neutral, but very supportive and affirming. The approach is cathartic, looking for discharging emotion locked into neurotic or compulsive behavior. 'What would you like to work with today?' is the initial question. Each individual is responsible for his own direction; the counselor aids in the discharge by asking such things as 'How do you feel about...? some aspect that the client appears to be blocked on, and by having the client repeat affirmations around such emotions or situations.

Notes on topics to work on:

2. Practice in letting go of mental or emotional problems or physical discomforts:
   a. Accepting, acknowledging problems as having something to teach us.
   b. Affirmations, positive thoughts about self and ability to cope.
   c. Seeing or defining yourself as separate from your problems.
   d. Setting problems aside, making a separate time and space for this PK work.
   e. Redirecting your attention, focusing on alternativ activities, tasks.

Notes:

3. Relaxation techniques
   a. Goal of relaxation with alertness
   b. Relaxing body parts in stages
   c. Relaxation with breath
   d. Self-hypnosis, self-suggestion
      ie Cindy Seigal's tapes
   e. Listening to music
   f. Active relaxation techniques such as physical or mental activities, refocusing energy
      1) Frisbee, boomerang, ping-pong
      2) PK-related toys or games
      3) Exercise, stretching, Tai Chi movements, etc.

Notes:

4. Meditation techniques
   a. Focusing on breath/pause between breaths
   b. Observing thoughts without following them
   c. Focusing on the space between thoughts
   d. Concentration (one-pointed) upon:
      1) an object - real or imagined
      2) physical sensations in your body
      3) mantra or affirmation
   e. Mindfulness - non-specific awareness
   f. Other...

Notes:

5. Visualization techniques
   a. Using nine breaths, inhaling five colors of light, exhale greyish smoke of negativities (Tibetan, from Ruth)
   b. Creative Visualization color breathing (Wendy)
   c. Guided imagery such as "Cleaning the Rooms of Perception" (Houston)
   d. Purification prayers
   e. Other ______________________________
      ____
      ____

Notes:

6. Shamanic techniques to find clearing methods that work for you (also for PK eliciting methods)
   a. Going on a seeking journey
   b. Contacting your inner guide/wi dom
   c. Asking for clearing technique, or method of requesting permission or opening session that will be effective for you
   d. Dreaming answer - hold question in mind before falling asleep and seeing if a dream brings an answer

Notes:

Reading suggestions:

Herbert Benson	The Relaxation Response
Shakti Gawaine	Creative Visualization
Jean Houston	The Possible Human
Michael Harner	The Way of the Shaman
Larry LeShan	How to Meditate
Mike and Nancy Samuels	Seeing with the Mind's Eye

Many others: ____________________

______ Second Self-Evaluation Questionnaire completed

III. Practice PK session

A. ______ Second Self-Evaluation Questionaire completed

B. PK Session (15 minute maximum).

C. Comments on results, what happened for you:

IV. Coping Strategies - Introduction (fifteen minutes).

A. Importance for performance anxiety and fear of success.
   1. Awareness of responses to anxiety
      a. Body responses
      b. Mind responses
   2. General anxiety or fear issues.
   3. Situation-dependent anxiety or fear issues.

B. Discussion of importance of these for you.
   1. Your feelings about:
      a. Performance anxiety
      b. Fear of success
      c. Fears around use of PK
      d. Other personal anxieties that might affect PK performance, effectiveness
   2. Use of anxiety hierarchy or questionnaire for more definition.

Notes (which to focus on for next session):

C. Review list of strategies trainer can help you with:
   1. Talking it out
   2. New information
   3. Desensitization
   4. Breathing and deep relaxation techniques
   5. Physical exercise, movement
   6. Modelling and self-modelling, rehearsal
   7. Speaker-witness dyad or co-counseling exchange
   8. Stress inoculation and self-management handout - review for next session.

Notes (which interested in working with next session?):

END SESSION ONE

****
PSYCHOKINESIS SKILLS WORKBOOK II
****

BASED ON APPROACHES USED IN
THE REMOTE ACTION TRAINING PROJECT

UNDER THE DIRECTION OF DR. JULIAN ISAACS
GRADUATE SCHOOL OF CONSCIOUSNESS STUDIES
JOHN F. KENNEDY UNIVERSITY
ORINDA, CALIFORNIA

WRITTEN BY DR. RUTHANN CORWIN
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DIANNE MOORE, AND JOANN JONES

REMOTE ACTION PROJECT
GRADUATE SCHOOL OF CONSCIOUSNESS STUDIES, JOHN F. KENNEDY UNIVERSITY

Approved For Release 2002/11/18 : CIA-RDP96-00787R000300300001-7

WORKBOOK FOR MENTAL SKILLS ACQUISITION SESSIONS
SESSION TWO

Participant: ____________________

Trainer/Experimeter: ____________________

Date: ____________________

________ Beginning Self-Evaluation Questionnaire completed

Depending on what you feel you need or could use, and what your trainer-experimenter suggests, split the time between coping strategies and eliciting strategies, and a 15 minute PK trial (with second self-evaluatio questionnaire completed).

I. Coping Strategies - Review and Practice.

A. Review Julian's lists of helpful and non-helpful factors in PK production.

1. Helpful factors:
   a. Feeling good, having money in the bank or a good job, having good events in your life, a general lack of anxiety.
   b. Confidence, expecting to be successful, belief.
   c. Motivation, connection of PK with meaning in your life, PK task mattering at a fundamental level for you.
   d. Rested, feeling well.
   e. Relaxation (not low arousal) with alertness.
   f. Supportive strategies for eliciting PK.
      1) Those which suggest PK to the sub-conscious,
      2) which suggest power,
      3) and/or which suggest support, as a guide, channel for energy, earth energy, unconscious or higher mind.
      4) Release on the egocentric level, intention and surrender: you must really want it to happen and you don't 'try' at all.

Notes on your strengths:

2. Non-helpful factors:
    a. Fatigue, illness.
    b. Severe life impacts - death in family, legal case, loss of job, etc.
    c. Lack of committment and motivation.
    d. Fear of effects, of success, of things that go bump in the night.
    e. Depressed mood from daily events, menstrual cycle for women, diet.
    f. Doubt about task possibility from cultural negativity:
        1) officially debarred
        2) not taught in schools, no training
        3) associated with madness
    g. Trying too hard!

Notes on what might be problems for you:

B. Discussion of moving through states.
    1. Wanting a smooth series of successful sessions for best training reinforcement.
    2. Cancelling sessions if negative factors really overwhelming.
    3. Not cancelling sessions if you can change and move out of non-helpful state.
    4. Using clearing/meditation/problem-solving techniques to have successful sessions.
    5. Using stress inoculation and rehearsal so you can work successfully here and with the scientific establishment

C. Review physiological and cognitive aspects of stress
    1. What does stress feel like for you?

    2. How have you dealt with fears in the past?

D. Review panic reaction compared to a phased approach:
   1. Preparing for the stress
   2. Confronting and coping with it
   3. Dealing with temporary difficulties in coping
   4. Assessing one's performance
   5. Reinforcing oneself for successful coping

Notes:

E. Learn or practice deep relaxation, breathing, affirmations, or other strategies from list.

Choice(s):

After:
Assessment of possible effectiveness for you:

II. Eliciting Strategies - Introduction and Practice.

A. Roles of direct strategies
   1. Using your established methods, existing preferences.
   2. Adding or trying possibilities.
   3. Role of your trainer.
   4. Discuss idea of state changing, clearing and beyond.
   5. Discuss idea of 'not trying', intention and release.

Notes:

B. Establishing opening routines, personal ritual
   1. Asking permission
   2. Use of artifacts: crystal(s), bell, smoke, etc.
   3. Poetry (e.g. Chris R's poem), music
   4. Other ______________________________

Notes:

C. Discussing, selecting eliciting strategies. These are not mutually exclusive categories, but ways of describing various methods people have successfully used. Please add others...

1. Shifting state of awareness
2. Affirmations
3. Energizing, feeling energy flow
4. Imposing an action from self - energy in, energy out
5. Physical motion
6. Relaxing, opening
7. Concentrating, focusing
8. Letting go
9. Sensory imagining
    a. visualizations - energy shower, glow; dancing with crystal, playing with it; relating in a personal way to the crystal to evoke a response
    b. auditory - hearing the tones, a tune, etc.
    c. tactile, feeling, whole body sensations, etc.
10. Guided imagery
11. Suggestion, autosuggestions, hypnosis
12. Energy channeling, sending
13. Contact with guides, power animals, spirits...
14. Reading, listening to key passages, poems
15. Songs, music
16. Connecting - Universal Mind, Oneness, fusion with the crystal, enclosing it within own body or larger reality
17. Specific rituals
18. Other mental practices ______________________
19. Other ______________________________

Selections (for now), questions:

D. At-home practice
   1. At home PK devices
      a. small container to roll
      b. cork in water
      c. cigarette paper under glass
   2. Mental rehearsal
   3. Tapes, readings, etc.

Notes:

E. Practice session at modelling success - hearing, seeing, etc. external feedback, feeling internal sensations, as a result of using one of the above strategies.

Notes after modelling visualization:

III. Prac ice PK session

A. ______ Second Self-Evaluation Questionaire completed

B. PK Session (15 minute maximum).

C. Comments on results, what happened for you:

"THE GAME IS WITH YOU, NOT WITH THE MACHINE"

****
PSYCHOKINESIS SKILLS WORKBOOK III
****

BASED ON APPROACHES USED IN
THE REMOTE ACTION TRAINING PROJECT

UNDER THE DIRECTION OF DR. JULIAN ISAACS
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REMOTE ACTION PROJECT
GRADUATE SCHOOL OF CONSCIOUSNESS STUDIES, JOHN F. KENNEDY UNIVERSITY

WORKBOOK FOR MENTAL SKILLS ACQUISITION SESSIONS
SESSION THREE

Participant: ______________________________

Trainer/Experimeter: ______________________________

Date: ______________________

________ Beginning Self-Evaluation Questionnaire completed

I. Review session process and set goals for upcoming sessions (25-30 minutes):

A. Discuss sequence of session events:
1. Self-evaluation questionnaire
2. 25 minutes of clearing, reaffirming goals for session, letting go, etc.
3. Second self-evaluation questionnaire
4. One hour PK feedback session

B. Consider this suggested process from Julian's notes:
1. Acknowledge secular concerns, use talking out, problem-solving, dyad or co-counseling to gain insight, other techniques to let go of concerns.
2. Prepare for task - do opening, ask permission, select state.
3. Do PK task.
4. Use coping strategy if you don't get immediate success: relax your body, assure yourself that it's all right, flow into your intuitive side, practice letting go.
5. Go back into strategy.
6. Encourage yourself, acknowledge yourself in coping.
7. Close - change state, thank or acknowledge yourself or the power working for you, close down.

Notes, comments:

C. Review your preliminary goal/reward plan from session one. Set specific goals for first session or first three sessions

D. Thoughts about how you want to review goals at beginning of session:

E. Establish how you want to use the opening 25 minutes in the first full hour PK session.

II. Review and practice stress inoculation or coping strategies that you want to use in your first full session (20-25 minutes).

Choices:

Notes:

III. Review and practice modelling or rehearsing eliciting strategies (20-25 minutes).

Choices:

Notes:

IV. Practice PK session

A. ______ Second Self-Evaluation Questionaire completed

B. PK Session (15 minute maximum).

C. Comments on results, what happened for you:

V. Note any changes in the above about how to proceed for next session, preparation at home, etc.:

APPENDIX B

PZT EXPERIMENT SYSTEM DESCRIPTION AND TESTING

PZT EXPERIMENT SYSTEM DESCRIPTION AND TESTING

The following is a complete description of the PZT hardware and system testing.

A. Design and Construction of the Laboratory Apparatus

1. Sensor Pair and Shielded Enclosure

Because it was impossible to anticipate every source of artifacts, we initially elected to use an anti-coincidence sensor design commonly used in experimental physics. We used two PZTs with differential signal processing, where the output signal was the absolute value of the difference between the two sensor voltages. An event of interest was then defined by a differential signal that exceeded a predetermined voltage threshold. The original intent of this approach was to assist in rejecting any large-area, unshielded transients (e.g., low-frequency magnetic fields or building movement) that might influence the sensors in a manner nearly equivalent to RA events.

Since we were unable to guarantee complete differential balance for all possible artifacts, we were unable to rely on common-mode rejection as the sole means of artifact suppression. Although the operating characteristics (charge-to-voltage conversion, etc.) of one sensor were balanced to within 10 to 15% of the other sensor's characteristics, a localized source of excitation (e.g., acoustic energy) would obviously induce a larger response in the nearer sensor. Therefore, our characterization and shielding effort focused on the response of the individual sensor. Since a candidate RA event also had to exceed the differential threshold, this worst-case approach was the more conservative.

The sensors were a version of a standard commercial piezoelectric ceramic element offered by several manufacturers in a variety of shapes, sizes, and configurations for applications ranging from high-voltage generators to low-level sound pickups. Typically these devices are composed of lead, zirconium, and titanium oxides fired into a ceramic at very high temperatures. The piezoelectric quality is induced by applying a polarizing field to the element at its Curie temperature. For this application, we selected Piezoelectric Product R101S, having dimensions of 1 x 0.125 x 0.005 inches. Its construction is that of a bimorph—essentially a sandwich of two ceramic slabs and a brass divider, separated by insulating epoxy. This particular PZT is designed to produce an electric charge when it is flexed laterally.

The sensor has natural fundamental and harmonic resonance frequencies that can be calculated if the physical dimensions are known. Using the dimensions from the preceding paragraph, the fundamental nodal-support frequency is about 85 kHz. However, it is of no importance to this application because the expected duration of an RA event ranges from a few milliseconds to a few tens of milliseconds. Thus, the sensor appears as a virtual flat-amplitude charge generator with respect to the frequency bands of interest (10 Hz to 1 kHz).

Because the sensor was a charge generator having essentially a pure capacitive source impedance (well below resonance), the most appropriate signal amplifier was an operational amplifier configured as a charge amplifier. In addition, use of a high-gain, charge-sensitive preamplifier eliminated the necessity to transmit very low-level signals over an appreciable distance, thereby eliminating another potential source of artifacts. The feedback elements in the charge amplifier were chosen to produce both the low- and high-pass filter corner frequencies of 1 kHz and 10 Hz, respectively. Because the charge quantities involved were very small, the amplifier input bias and noise currents were minimized. From the fundamental operating characteristics of the circuit elements, we calculate that the minimum detectable charge was 2.50×10^{-16} coulombs. Because the flexure-mode element had a mechano-electrical transfer constant of about 4 microcoulombs per millimeter, the equivalent motion for a minimum detectable signal was about 6×10^{-12} centimeters.

Each of the two piezoelectric crystals was suspended from a housing that contained the charge-sensitive preamplifier that drove a fiber-optic link. The initial sensor physical mount employed a spherical lead mass suspended by a coil spring, with the PZT attached to the bottom of the sphere. This mount was very sensitive to rotational oscillation (wobble) at a frequency of about 8 Hz. The configuration was changed, therefore, to the cage mount shown in Figure B-1. In the cage mount, the RA sensor was at the center of gravity of the mass, reducing greatly the sensitivity to wobble. However, this configuration was the one most easily excited by any lateral shock applied to the enclosure box.

The mount provided several levels of mechanical isolation. The first level of mechanical isolation was a sensor-enclosure shock mounting of four commercial elastomeric support pads. Our enclosure weighed about 75 pounds, including the internal batteries. The weight of the mount, its resonant frequency, spring rate, static deflection, and isolation efficiency entered into the selection. The resulting combined enclosure/mount resonance frequency was no more than 10 Hz to assure reasonable isolation from any nearby machinery components rotating at 30 Hz.

The next level of isolation was the sensor suspension system, which was a spring-mass type with a much lower resonance frequency than the enclosure. As shown, the sensor was attached to a mount that was suspended from the top of the enclosure on a spring. The weight was about 2 pounds; the spring rate was selected to provide a resonance frequency of about 2 Hz. This provided an additional isolation factor of 12 decibels (dB) (6 dB/octave) at the enclosure/mount resonance frequency of about 10 Hz. Above 10 Hz, the overall isolation was the sum of the two.

Considerable isolation from low-frequency vibrations (such as those induced by footsteps and vehicle road "rumble") was provided by a commercial vibration isolation table.

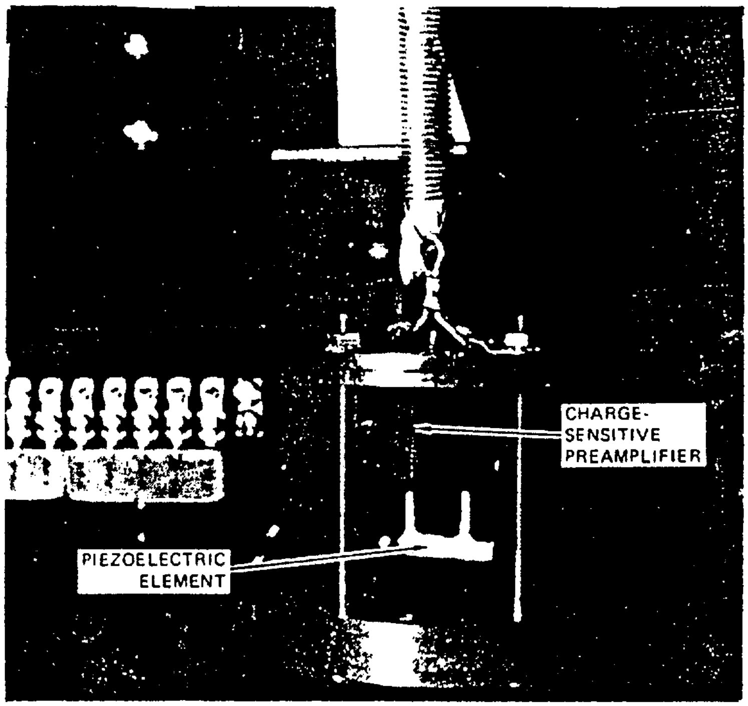

FIGURE B-1 PIEZOELECTRIC ELEMENT, MOUNT, AND SUSPENSION. THE BARE CERAMIC IS COVERED BY A SILICONE LAYER AND CONDUCTIVE SILVER PAINT.

Because the entire sensor system was electronic, it required shielding from electromagnetic interference (EMI). The basic sensor enclosure was a standard industry NEMA 12 steel, EMI-shielded box (Figure B-2) having dimensions of 20 x 16 x 6 inches. According to the manufacturer's specifications, this box provides up to 95 dB of magnetic-field shielding from 14 kHz to 1 megahertz (MHz) and over 100 dB of electric field shielding from 14 kHz to at least 450 MHz. Performance is degraded, however, if any openings are made in the steel case. The only hole through the shell is a 1/4-inch opening for the fiber-optic cables; a straightforward calculation can demonstrate that signals must be greater than about 10 gigahertz (GHz) to propagate through this opening. The enclosure housed two PZTs with preamplifiers and drivers. The PZTs were coated with a silicone insulator to provide electrical insulation and conductive silver paint to shield against EMI. All PZT instrumentation within the shielded enclosure was powered by rechargeable batteries. The primary danger from stray fields (field-to-cable coupling outside the shielded enclosure) was eliminated entirely by using fiber-optic cables to carry the signal to the external hardware. Two more fiber-optic modems were added before data collection to transmit duplicate signals to the tape recorder.

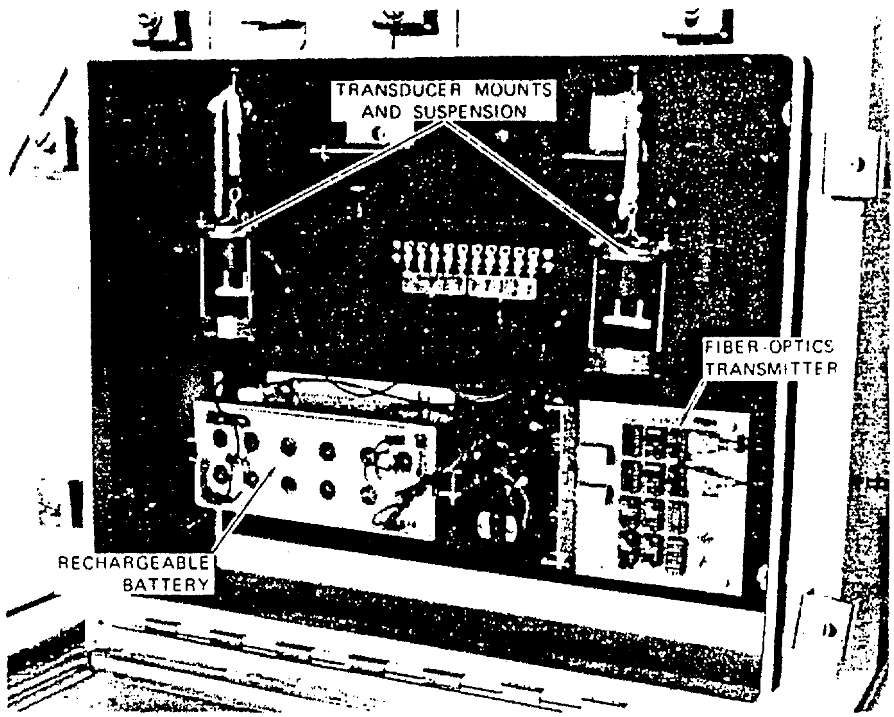

FIGURE B-2 INTERIOR OF THE SHIELDED ENCLOSURE SHOWING BOTH SENSOR MOUNTS, RECHARGEABLE BATTERIES AND FIBER-OPTIC TRANSMITTERS. NOTE THE CLAMPS USED FOR SEALING THE DOOR.

Because all interconnect wires in the enclosure were shielded coaxial or multiconductor cables, they were relatively immune to extraneous fields. A single-point common ground was used to minimize ground loop currents and the associated signal-noise voltages.

As discussed in Section B, "Transducer Susceptibilities," our basic shielded enclosure (with the door tightly clamped) also provided about 40 dB of acoustic attenuation and protected the sensors against visible light and infrared environmental transients.

2. Signal Transmission and Processing

a. Feedback and Control

A microprocessor controller programmed in BASIC provided the operator interface, feedback control, and transmission of data to both the printer and the experimenter's keyboard and display (TRS model 102 computer). The data consisted of time of event, voltage from sensor one (V_1), voltage from sensor two (V_2), and the absolute value of the difference between V_1 and V_2. Only data above a set differential threshold were printed. This threshold was adjustable for each participant's personal characteristics. These data were fed to two serial ports on the back of the controller: one was connected to the printer, and the other to the TRS model 102 computer. The controller also provided chart recorder output for each of the two sensors.

The signals from the piezoelectric sensor preamplifier were transmitted to the microprocessor controller via voltage-to-frequency converters, optic transmitters, and two 20-meter fiber-optic cables. This effectively isolated the battery-powered sensor and its circuitry from the line-powered controller circuitry. The fiber-optic link was a one-way transmission line; no components could reverse the process and send spurious signals back to the sensor enclosure. The controller converted these signals back into voltages using a fiber-optic receiver followed by a frequency-to-voltage converter. All signals were then filtered and full wave rectified. The high-pass filter time constant was selected using software to be either 100 or 30, while the low-pass filter bandwidth was fixed at 1 kHz.

The RA system was designed to detect signals having a duration on the order of milliseconds. Such a signal is obviously too fast for any meaningful feedback to a participant. To accommodate a typical human perception threshold, therefore, the signals were fed to fast-attack slow-decay circuits that had a decay time constant of 1.5 seconds. This decay was slow enough to allow the participant to observe the sensor output via the feedback that was derived directly from the stretched signals. The chart recorder outputs were derived from the pulse stretchers as well.

Peak voltages detected by the two channels were digitized and the remainder of the processing was done using software. A high speed, analog-to-digital converter (ADC) sampled a channel every 50 microseconds. In addition, two monitor circuits continuously examined the fiber-optic links and sensor battery voltages. These circuits were polled each time a data sample was obtained. If either circuit detected a deviation from preset limits, data collection was interrupted by an error message that invalidated all values. This check of the link and voltages could also be initiated manually from the operator's keyboard.

Figure B-3 shows the typical output of the two PZTs, as recorded after transmission through the 20-meter fiber-optic lines. As can be determined from the strip-chart record, the peak to peak signal was < 1 millivolt (mV) for both channels. This value represents a factor-of-four decrease from the typical system noise in the 1986 experiment.

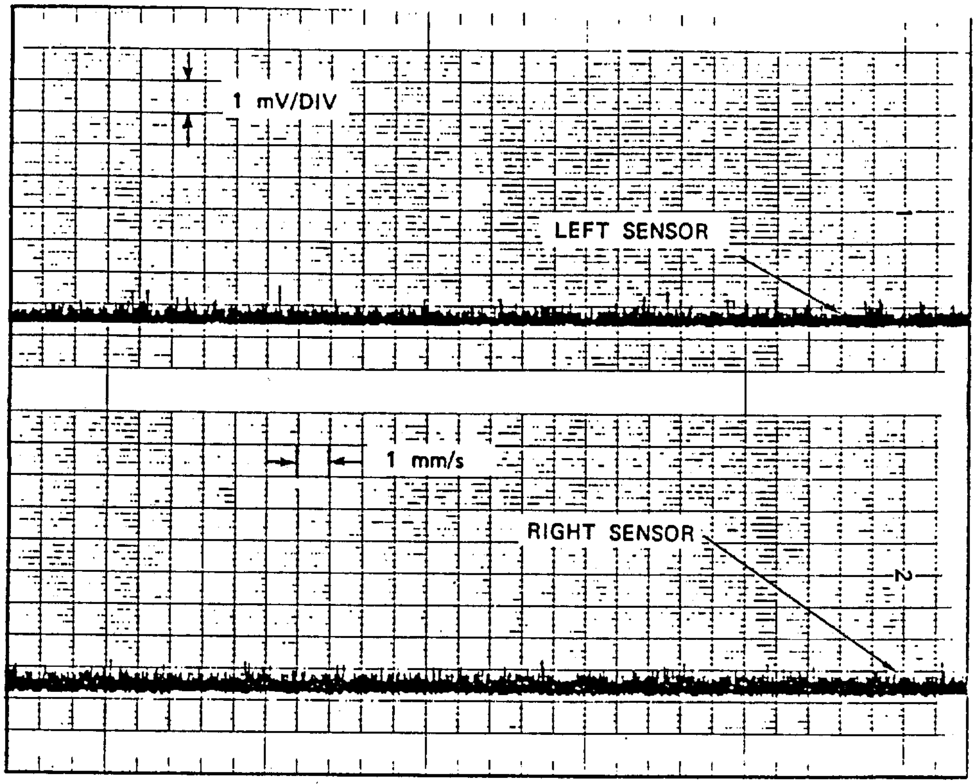

FIGURE B-3 TYPICAL OUTPUT OF THE PZT SENSORS AS MEASURED FROM THE FIBER-OPTIC TRANSMISSION LINE

b. Data Storage

In the main body of the report, we point out the necessity for an authoritative data record, collected inside the artifact boundary. This goal was met by installing a second pair of fiber-optic modems in the shielded enclosure. These modems transmitted the raw PZT signals approximately 2 meters to a custom-built interface containing the fiber-optic receivers and a band-pass amplifier having gains of approximately 50 and 3 dB, respectively, and corner frequencies of about 10 Hz and 1 kHz. The amplified PZT signals were then transmitted to a seven-track instrumentation tape recorder by a short (0.5-meter) section of coaxial cable. The power supply for the interface was heavily filtered and connected to AC supply via a noise and power-surge suppression unit.

Six of the seven tracks of the Ampex FR1300 analog tape recorder were used for data storage. In addition to the two PZT channels, four environmental monitoring device outputs were also simultaneously recorded. Included were two audio channels, one magnetic field antenna, and one accelerometer (for vibration detection).

During the entire experiment we used Consolidated Electrodynamics Corporation recording tape (0.5 inch x 4,600 feet). Each tape was new, still sealed in the original manufacturer's packaging. Before each data recording session, the recorder heads were cleaned in accordance with the maintenance manual. The Ampex recorder was thoroughly serviced, and all record and playback amplifiers were calibrated. We selected a tape speed of 7.5 inches per second, providing approximately 90 minutes of recording time, the length of a typical RA session. At that speed, our dynamic range was 43 dB in the critical range of dc to 5 kHz. The gain of 50 in our PZT signal interface was selected to guarantee that the PZT noise signal would be clearly detectable above the recorder noise. Data playback was performed using the same recorder in exactly the same configuration as that used during recording. All data tapes were stored in the locked and guarded sensor room, inside the artifact boundary.

Power for the tape recorder was supplied from a TOPAZ power conditioner, which is designed to filter common-mode and differential-mode noise and to regulate surges in line voltage.

3. Participant Feedback

Although the physics and engineering of the piezoelectric sensor systems were the primary responsibility of SRI, an area of considerable overlap with the JFK staff was structuring the audible and visual feedback to satisfy both psychological and technical criteria. Previous experience had shown that the participant needed to receive real-time feedback of the activity of the sensor noise output in order to establish contact.* This requirement follows directly from the JFK staff claim that operant conditioning and bio-feedback are key elements to training RA ability.

In addition to the active feedback equipment shown in Figure B-4, full color photographs of both sensors and the enclosure were made. Enlargements of these pictures were posted in the participant's area as additional aids in making contact.

There are three modes of operation for the feedback: channel A, channel B, or differential. Channel A used only the signal from sensor A to drive the feedback. Channel B selected the signal from sensor B for feedback. Differential mode drove the feedback using the absolute value of the difference between the two sensor signals ($|A - B|$). During all experimental

* Isaacs, J., "Directly Detectable Psychokinetic Effects: A New Category of Psychokineses," *Parapsychology and Human Nature,* Proceedings of an International Conference of the Parapsychology Foundation, Washington, D.C. (October 1986), in press.

trials, only the differential mode was used. Regardless of the feedback mode selected, the data output to the printer and TRS model 102 computer was as described earlier.

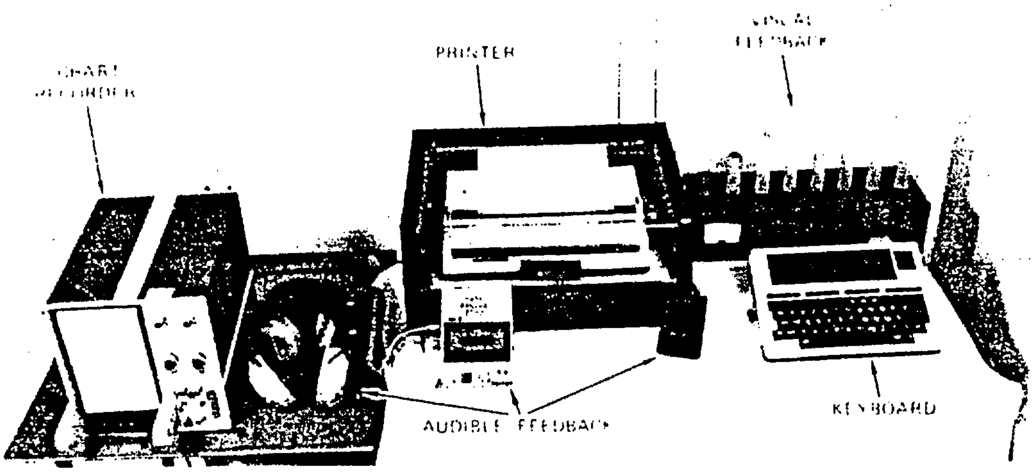

FIGURE B-4 IN ADDITION TO THE FEEDBACK AND CONTROL EQUIPMENT, THE COMPUTER PRINTOUT AND CHART RECORDER ARE SHOWN.

For feedback, two thresholds were chosen: T_0 and T_1, where T_1 was greater than T_0. These threshold values were selected and served to divide the signal amplitude (s) into three categories: $s < T_0$, $T_0 < s < T_1$, and $s > T_1$. For signal values below T_0, an audible "click" was generated, the frequency of which was determined by variations in the system output amplitude. The visual display was not active below T_0. For signals between T_0 and T_1, both the audible and visual feedback became active. The audible feedback was selected from the eight tones of the major chromatic scale (beginning with middle C and going up an octave). The eight colored lucite bars of the visual display were illuminated in step with their respective tones. The update rate for the feedback was such that the decaying signal could be clearly seen and heard as a series of tones decreasing in pitch. Signals having an amplitude above T_1 caused a cassette tape recorder to turn on and to play a tape selected by the participant. The cassette remained on for a period set by the experimenter, during which time all signals from the sensors were ignored.

B. Transducer Susceptibilities

During 1987, a substantial effort at SRI was directed toward characterizing the transducer susceptibilities, environmental monitoring, physical security, and shielding of the sensor environment. We tested the RA system response in accordance with the expected RA signals. In discussion with the JFK staff, we adopted as the goal for the FY 1987 study a signal amplitude of 50-mV output from the feedback apparatus. This value was used in all subsequent susceptibility testing as a reference point only. The only authoritative test of the RA hypothesis was a comparison of the maximum control trial voltage (Vc) with the effort period maximum (Ve). A brief summary of the scope of this effort follows.

1. Electric and Magnetic Fields

In this and all following susceptibility measurements, both the test stimulus voltage and the RA sensor response voltage were digitized by a low-frequency signal analyzer (Scientific-Atlanta model SD-380Z) and the complex (amplitude and phase) transfer function was calculated. A transfer function is a ratio of the input voltage to output voltage as a function of frequency. It demonstrates the sensitivity of a system to external influences. The amplitude-time waveforms, the corresponding spectra, and the calculated transfer function were all printed on hard copy for storage in the archives.

Electric field susceptibility was measured by inserting the piezoelectric element between the plates of a parallel-plate field antenna driven by a low-impedance arbitrary waveform generator. Test voltages (pulse and sine wave) of up to 20 V peak-to-peak amplitude were applied with a resultant interior field strength of 3,150 V/cm. No RA system signals could be seen using the electric field generator with sine or pulse signals having frequencies up to 10 kHz. We attribute this insensitivity primarily to the conductive silver paint covering the sensors.

Magnetic field susceptibility was measured using a specially fabricated Helmholtz coil driven by a voltage pulse generator. The resulting coil current was used as the reference signal. The Helmholtz coil was calibrated against a commercial Gaussmeter (Bell model 610). Both the Helmholtz current and the RA response voltage were applied to the signal analyzer for measurement and comparison.

Current to the coil was switched on, held at about 1.5 amperes (A) (7.5 gauss [G]) for about 18 milliseconds, and then switched off. The RA sensor response to this stepped magnetic field was essentially an impulse with little time or frequency structure. A nearly uniform response of the sensor and the lack of a low-frequency component implies that the effect was essentially proportional to the time rate-of-change in a magnetic field.

As shown in Figure B-5, the calculated transfer function indicates an initial increase in output with frequency, peaking around 1 kHz, and then a decay. We believe the rise with frequency was caused by the charge induced in the RA charge amplifier by the magnetic field "cutting" the loop formed by the charge amplifier, the PZT sensor plate capacitance, and the interconnect wiring. This loop lies in the X-plane of the enclosure and perpendicular to the piezoelectric element. When the Helmholtz coil was rotated 90°, the system response dropped markedly. It is not clear whether the piezoelectric element contributed to this effect.

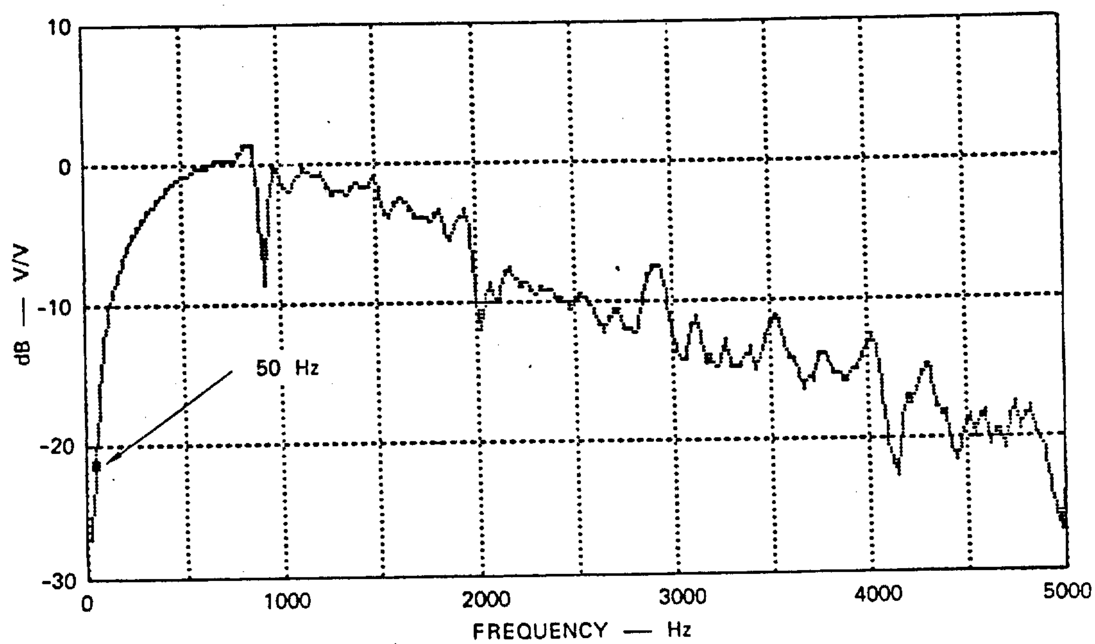

FIGURE B-5 MAGNETIC FIELD TRANSFER FUNCTION

The sensor response increased when a static magnetic field (from a permanent magnet) was near the sensor during the pulse testing. In this case, a large static field appeared to change the piezoelectric polarization or some other electrical characteristic. This auxiliary field was quite strong--hundreds of gauss--and stronger than would be encountered under RA testing conditions. We performed subsequent tests without the pulsed field but with the shielded box closed. In those experiments, a 1.4-kilogauss (kG) permanent magnet did not produce any measurable output when held stationary or waved (~ 5 Hz) within a few centimeters of the enclosure.

Using the peak value of the excitation step function 7.5 G, and the peak response of the RA system, about 0.1 V, we arrived at a susceptibility coefficient of about 13 mV/G. To produce an RA system signal of 50 mV, the sensors would require a transient of about 3.8 G--a value approximately seven times that of the earth's ambient magnetic field. For this to occur, that magnetic field would have to change fast: in less than a fraction of a millisecond.

The RA sensor enclosure was fabricated from mild steel, primarily to provide insulation from high-frequency electromagnetic fields. Published theory is weak regarding shielding of low-frequency magnetic fields, so a simple test was performed to determine whether the box provided any isolation. A single coil of twenty turns of wire was formed onto a cardboard box that was about 2 x 3 feet. A current of 1.5 A was applied, and the interior field measured to be about 0.5 G. The entire sensor package was placed inside and the coil activated with various current waveforms.

To offset the lower field strength, the measurement sensitivity was enhanced by choosing a waveform that was a sine sweep over the 50- to 10,000-Hz range. This resulted in about the same spectral density as that produced in the small Helmholtz coil under step-function excitation. The RA system response was quite small (about 7 mV at peak), and the associated spectrum showed one predominant peak at about 1.95 kHz. Special tests were run with a pulsed, continuous-wave (CW) magnetic field current at that particular frequency, and, indeed, a relatively large response could be induced. Even in this case, however, with the excitation pulse length in excess of 20 milliseconds, the peak response was barely 20 mV.

The conclusion is that the steel box appeared to provide some isolation since the response for similar excitation field strength spectral density (in G/Hz) at the sensor was smaller with the steel box than without it. The observed resonance response in the latter case appeared to result from circuitry in the box other than the piezoelectric sensor. Because shielding against low-frequency magnetic fields is difficult, we incorporated a magnetic field antenna into our environmental monitoring. If unusually large magnetic field transients occurred, then we could discriminate them from candidate RA events.

2. Shock and Vibration Susceptibility

To determine the sensors' susceptibility to vibration, a shock was applied to induce a peak acceleration of slightly less than 1-g to the RA enclosure. The enclosure was struck at a point aligned with the unit's center of gravity in each of the three orthogonal axes to induce lateral translational motion. The actual applied acceleration was measured with three calibrated accelerometers affixed to the enclosure along the three primary physical axes. These axes corresponded to the front, side, and top surfaces of the enclosure box.

The transfer function, shown in figure B-6, confirmed that a predominant resonance occurred at about 8 Hz. Other peaks were substantially lower, except for one at about 68 Hz and another at about 138 Hz.

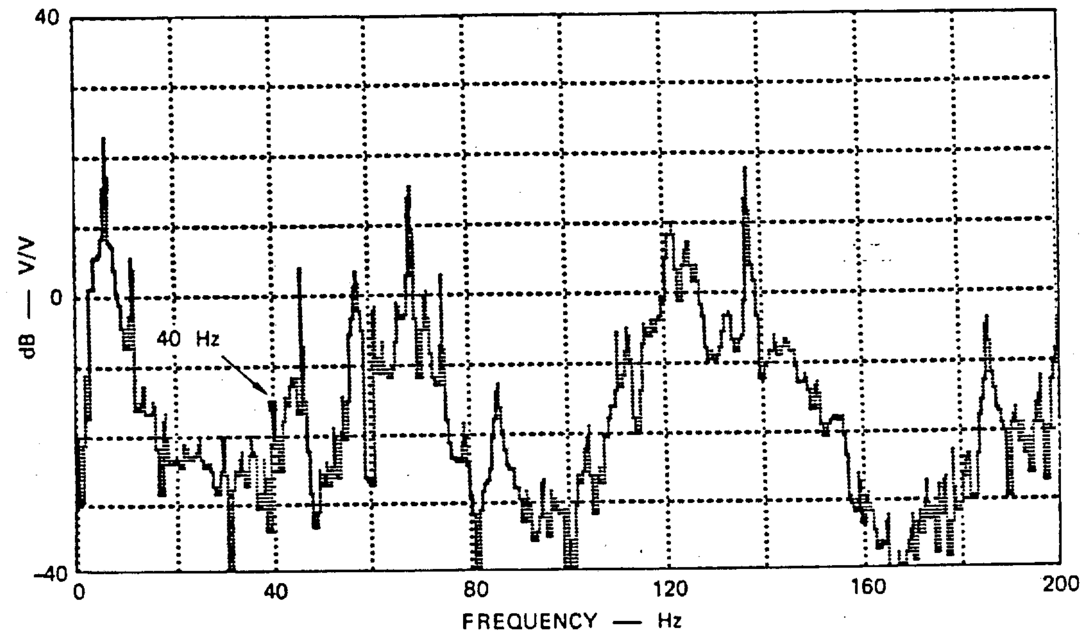

FIGURE B-6 SHOCK AND MECHANICAL VIBRATION TRANSFER FUNCTION

As described earlier, we assumed an RA system output of 50 mV. Applying the measured shock transfer coefficient of 0.65 V/g yielded an equivalent shock threshold of 76 mg. Because this value for vibration and shock was small, the amount of environmental isolation had to be large. We obtained this isolation for the RA sensor enclosure by using the air-suspension, large-mass vibration isolation table and the elastomeric support pads described in Section A of this Appendix. The float table had a resonance of about 1 Hz for light loads and was heavily damped, providing an isolation of 12 dB per octave. This figure implies an attenuation of 36 dB at the lowest system resonance of 8 Hz; therefore, a floor acceleration of 4.8-g would be required to produce 50-mV events. We field tested this isolation by dropping a mass of more than 100 kilograms from a height of 75 centimeters within less than a meter of the table. Since the sensor room was on the top floor of the building, this experiment was repeated on the roof directly above the sensor enclosure. No significant RA system output was observed in either case.

Although this testing and characterization indicated the sensor output was not susceptible to outside vibrations, we attached an accelerometer to the sensor enclosure to record any extraordinary vibration (e.g., earthquakes) that might occur during an RA session and create signals.

3. Acoustic Excitation

We measured the acoustic susceptibility of the piezoelectric transducers in the audible range of 20 to 20,000 Hz. All power levels were expressed in decibels. As a practical reference, 40 to 50 dB is the level of the average quiet residence; average traffic at a distance of 100 feet is 60 to 70 dB; and heavy traffic may be 70 to 80 dB. The threshold of sound discomfort is about 118 dB, and hearing impairment occurs at about 140 dB.

The source of the acoustic excitation was a commercial audio speaker unit that consisted of a combination low/mid-range woofer and a high-range tweeter, both in a bass-reflex enclosure to extend low-frequency response down to less than 30 Hz. Maximum acoustic power was less than 10 watts (W) input. The speaker system was driven by a standard audio-power amplifier that was fed arbitrary signal waveforms from an audio-function generator. Pulse, pulse-CW, and FM CW (chirp) waveforms were used to excite the test unit.

Sound level at the PZT sensors was measured using a Bruel and Kjaer (B-K) sound-level meter (type 2203) calibrated in decibels (pascals). The meter was used to provide the complete audio-pressure versus time waveform as defined in the 20- to 20,000-Hz frequency range. No filters or weighting were employed.

Our test geometry placed the RA sensor and the sound-level meter at the same distance from the speaker unit. The distance normally employed was about 2 meters. Both the sensor unit and the speaker were placed about 1 meter above a hard-surface floor inside a large, high-ceiling room (about 30 x 30 x 15 meters high). No anechoic capability was provided, but the distance ratio between the direct and any reflected energy was large enough to make reverberation contamination insignificant.

Based upon the B-K meter measurements, the sound level at the RA sensor was about 0.8 pascals. Spectral intensity varied somewhat, but in general was flat from 50 Hz to 5 kHz.

Regardless of the source format, the response from the piezoelectric system was quite complex and can best be described as a multitude of resonance peaks (Figure B-7). The overall spectral response shows most sensitivity was in the 1- to 3-kHz band with predominant resonance modes near 1.5, 2.0, and 2.5 kHz. These measurements were made with the piezoelectric element installed inside the steel enclosure but with the enclosure door open.

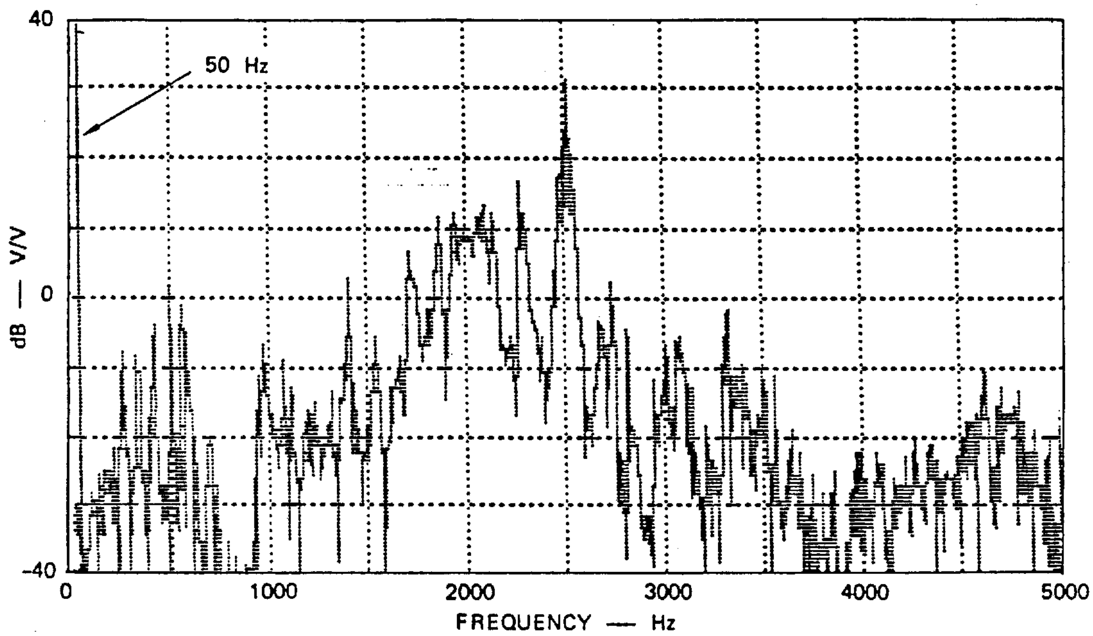

FIGURE B-7 ACOUSTIC TRANSFER FUNCTION

When the door was closed and tightly clamped, the amplitude of the acoustic response was markedly reduced (by more than 20 dB), but the spectral character remained the same. Thus, we concluded that most of the acoustic response was produced by the sensor element itself.

An important observation was that the piezoelectric sensor was quite sensitive to acoustic energy on a time scale that was pertinent to the RA application. The response to a short acoustic pulse (a few milliseconds duration) was a relatively long-lived "ringing" time waveform composed of the primary resonances described in preceding paragraphs. Hence, a simple acoustic transient (produced by a variety of common actions) could induce a sizable and long-lasting RA artifact.

Even more important was the sensor's extreme sensitivity to discrete CW frequencies that corresponded to the sensor resonances: a low level "whistle," if of sufficient duration, sufficiently nearby, and at the correct frequency, could induce a large RA artifact signature.

On an absolute level, a single sensor would produce an artifact of 50 mV if the applied audio level (in sine-sweep mode) was more than 1 pascal (with the enclosure door open). Given this acoustic sensitivity, it was necessary that we locate and characterize a sound-attenuating facility in which to locate the RA system.

Approval was obtained to use an existing soundproof room in Building G of SRI's Geoscience and Engineering Center. The room had been constructed to meet a sound transmission class (STC) of 45. STC 45 implies a weighted average attenuation of 45 dB for a band of frequencies principally in the speech range. To verify this assertion quantitatively, we employed SRI's acoustic testing expert to examine the room. Using a calibrated noise source, precision microphone, and standard measurement techniques, we determined that our facility provided the acoustic attenuation shown in Figure B-8. As indicated, transmissions at the critical resonant frequencies were reduced more than 40 dB. We then positioned the noise source directly outside the door of the sensor room to simulate an acoustic intrusion. In his summary, the acoustic consultant stated:

> "...a 100 Watt source of pink noise, set for maximum output, was placed in the hallway, facing both the silencer [ventilation] opening and the door. Measured sound levels midway between the loudspeaker and the wall were 117 dB, [yet] there was no detectable interference with the instrumentation in the room."
>
> "To determine the sound level at which interference would occur, the sound source was placed in the southeast corner of the room. The output was gradually increased until interference was detected. This was found to occur at a sound level, measured at the equipment in question, of 91 dB. Therefore...a sound level of approximately 127 dB would be needed in the hallway before interference would occur to the interior instrumentation. This level is at or above the pain threshold for most people, and its generation would require at least an audio kilowatt. It is my opinion that room G-316 is quite satisfactory for its present use."

Despite these extraordinary measures, some artifact-inducing noise could occur inside the room, thereby defeating the insulation. To detect such noise, we positioned sensitive microphones to record the acoustic background continuously during all sessions.

4. Pulsed Infrared Radiation

During the original construction of the RA system, we noticed that the PZTs appeared to be photosensitive. As a result, we decided to measure the photo-susceptibility of the PZTs principally in the infrared but also over the visible spectrum.

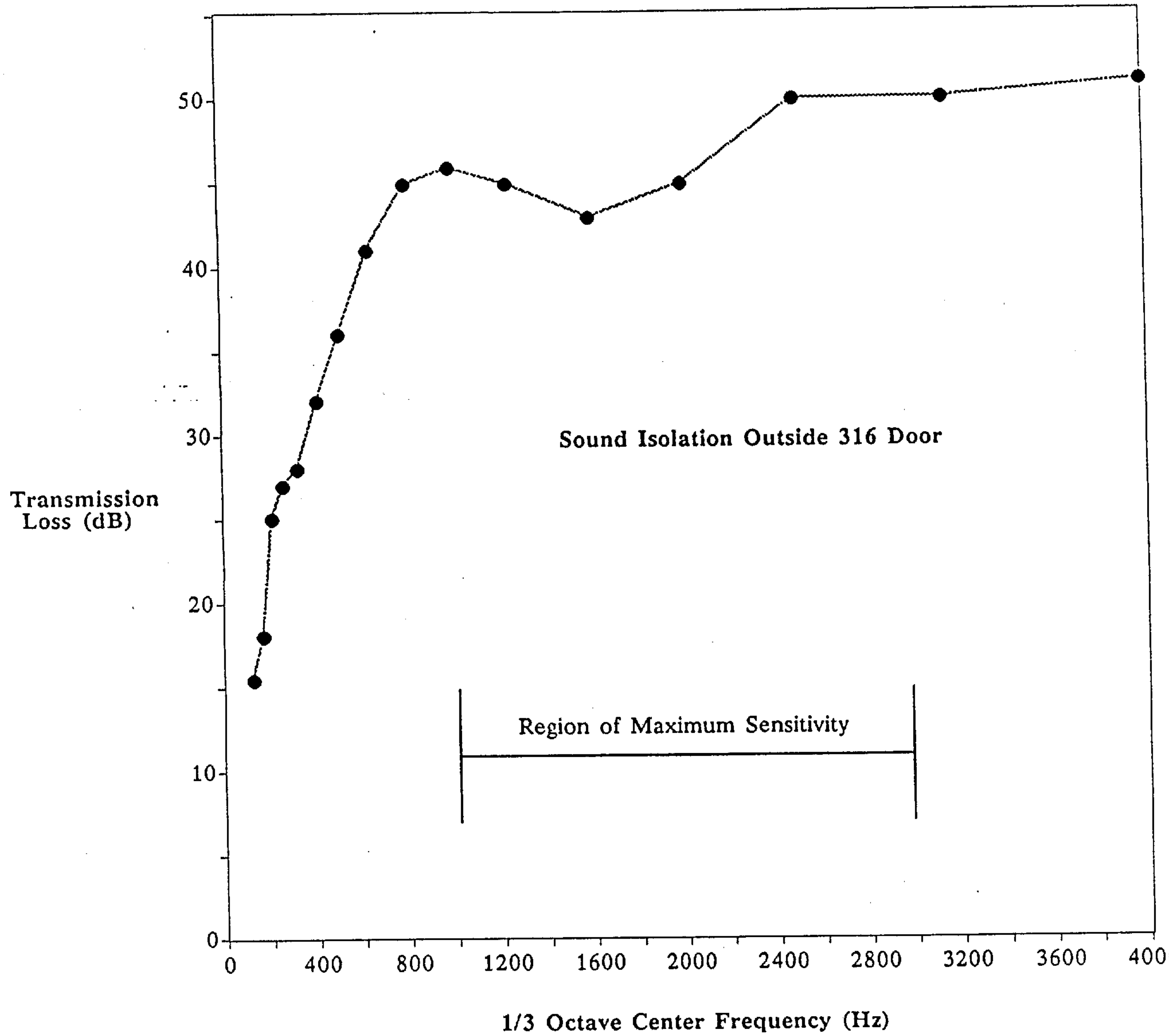

FIGURE B-8 ACOUSTIC ATTENUATION OF THE PZT SENSOR ROOM

The source of the thermal illumination was a standard microscope-stage lamp bulb. Peak temperature was at least 2,700° Kelvin so that the spectral intensity was maximum at the 1,000-nanometer wavelength. Bulb power was at least 15 W and source-to-element distance less than 18 inches.

To provide a quasi-impulse, the bulb filament was excited by a short-duration current pulse configured to produce a fast temperature increase with a coincident photo energy rise in less than 50 milliseconds. Thermal pulse decay resulted when the bulb cooled down. The photo-illumination time waveform was measured using a PIN photodiode operated in the short-circuit current mode to obtain linear output. Spectral response was that for standard silicon devices and covered the visible and near-infrared region.

Based upon the current waveform measurements and the filament cold resistance, the input energy was about 1.2 joules. From the measured optic pulse waveform and the geometry, the peak power density at the sensor element was about 60 milliwatts per square centimeter.

The thermal pulse applied to the piezoelectric element occurred in about 35 milliseconds and then decayed back to the 10% level in about 150 milliseconds. The piezoelectric element responded almost immediately (about a 10-millisecond delay) and had a very similar impulse-type of response (Figure B-9). Apparently, the thermal energy was absorbed by the front surface of the sensor, and the ceramic material expanded, forcing the element rod to bend away from the light source. This bending then induced a charge in the sensor amplifier, which was observed as the response. The piezoelectric sensor electronic circuitry was AC-coupled; hence, the response would overshoot on initial recovery and ring at what appeared to be a thermal resonance.

Although both the optic power density used for the susceptibility test and the time rate-of-change were large, they were generated by switching on a simple incandescent lamp and so can be found in most industrial work areas. The shielding of such thermal pulses is quite easy, however, because most materials readily absorb and/or reflect the energy. In the case of the PZT sensors, they were completely enclosed in a steel box having a wall thickness of 1/16 inch. Steel has a very high thermal mass coefficient and, hence, a long time constant and large energy absorbing capability. In addition, the lights in the sensor room were always turned off during experimental sessions and control trials.

5. Ionizing Radiation (α,β,γ)

We obtained a variety of radioactive sources in order to examine the possible susceptibility of the sensors to ionizing radiation. It was suggested that because the transducers operate as capacitive devices, they might detect a charge deposited by radiation. However, their electronic structure was not like that of a diode and, therefore, did not resemble a typical semiconductor radiation detector. Our prediction was that no artifacts would be observed.

The sources used and their principal decay products are as follows:

- ^{60}Co — 1.33, 1.17 MeV γ, 318 keV β
- ^{109}Cd — 88, 23 keV γ
- ^{133}Ba — 80, 223, 356 keV γ
- ^{137}Cs — 662 keV γ, 31 keV γ
- ^{241}Am — 60 keV γ, 5.5 MeV α

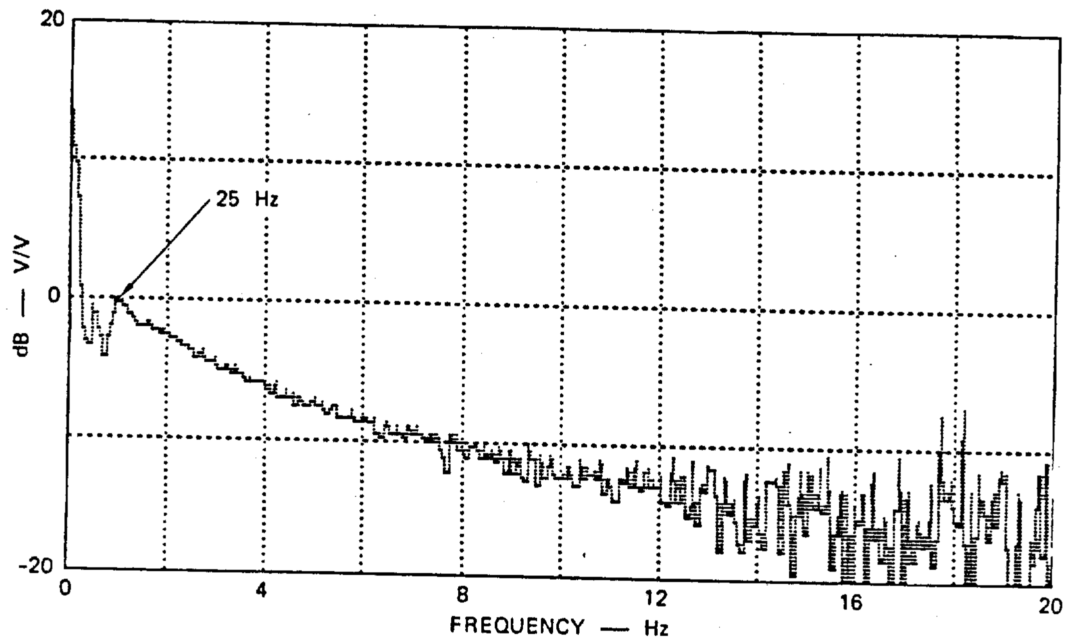

FIGURE B-9 TRANSFER FUNCTION FOR THERMAL PULSE

In our test geometry, we positioned the source as close as possible to the surface of the PZT and observed the system output. As expected, no discernible change in output was detected. We note that discrete semiconductor components resided both in the sensor enclosure and the controller housing. It is well known from testing the effects of radiation on components for space and reactor applications that both so-called "hard" (nonrecoverable) and "soft" (recoverable) errors can occur when ionizing radiation affects semiconductor devices. For this reason, we elected to incorporate a broad-spectrum radiation detector into our environmental monitoring (the detector is described in the following section).

C. Environmental Monitoring

From the susceptibility testing mentioned above, we determined several types of instrumentation that were used to monitor environmental conditions during control runs (to determine the background conditions) as well as during RA data collection. Figures B-10 and B-11 show the fully instrumented RA system.

1. Accelerometer (shock and vibration monitoring)

The motion accelerometers were type 508HS/LF piezo elements manufactured by the Vibrometer Company. These devices have a sensitivity factor of 10 mV/G, a noise level of less than 2 milligauss, and a 3-dB amplitude-frequency response from 0.25 Hz to 10 kHz. They are approximately 0.5 inch in diameter and 0.8 inch long. A battery-powered excitation/scaler unit (model P-16) connected the piezoelectric element with the recording instrument. We also added a 40-dB wide-band signal amplifier to boost the accelerometer signal at the chart recorder and tape recorder.

2. Magnetic Field Antenna

We used a ferrite-core magnetic field antenna fabricated at SRI. These antennas have been used successfully in a wide variety of measurement applications over the last 8 years. Extensive testing has demonstrated that the battery-powered antennas are very stable with time, possessing a response characteristic that is extremely flat from about 250 Hz to more than 25 kHz. From dc to 250 Hz, the response of the antenna is very similar to that of the piezoelectric element, making the antenna extremely well suited to artifact detection.

3. Calibrated Microphones (acoustic monitoring)

Two Nakamichi CM 100, recording quality microphones were used to detect potential acoustic artifacts. Their frequency response is essentially flat from 30 Hz to 18 kHz, thereby entirely covering the sensitive region of the piezoelectric sensors. We independently verified the frequency response using the B-K sound-level meter described earlier. Since each microphone has a cardioid spatial pattern, two units were employed--facing away from each other--to ensure a spherical pickup geometry.

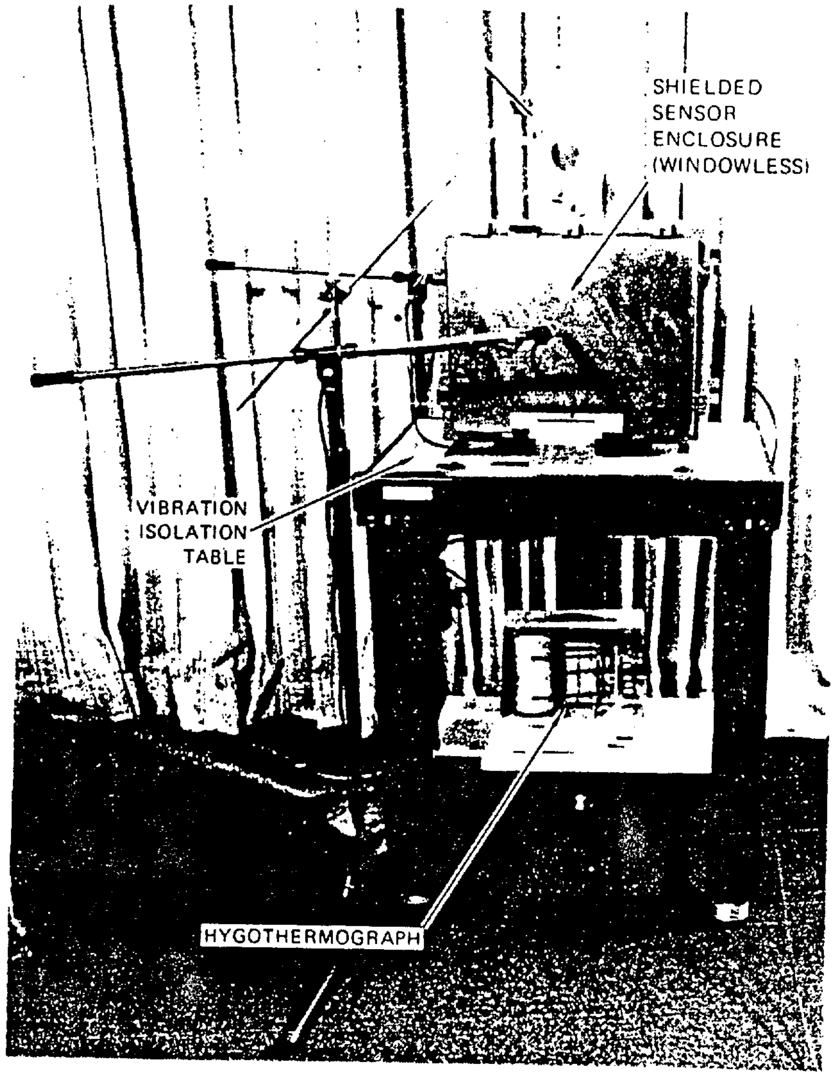

FIGURE B-10 THE SHIELDED ENCLOSURE (DOOR CLOSED) IS SHOWN IN PLACE ON THE VIBRATION ISOLATION TABLE. SOME OF THE MONITORING DEVICES ARE VISIBLE.

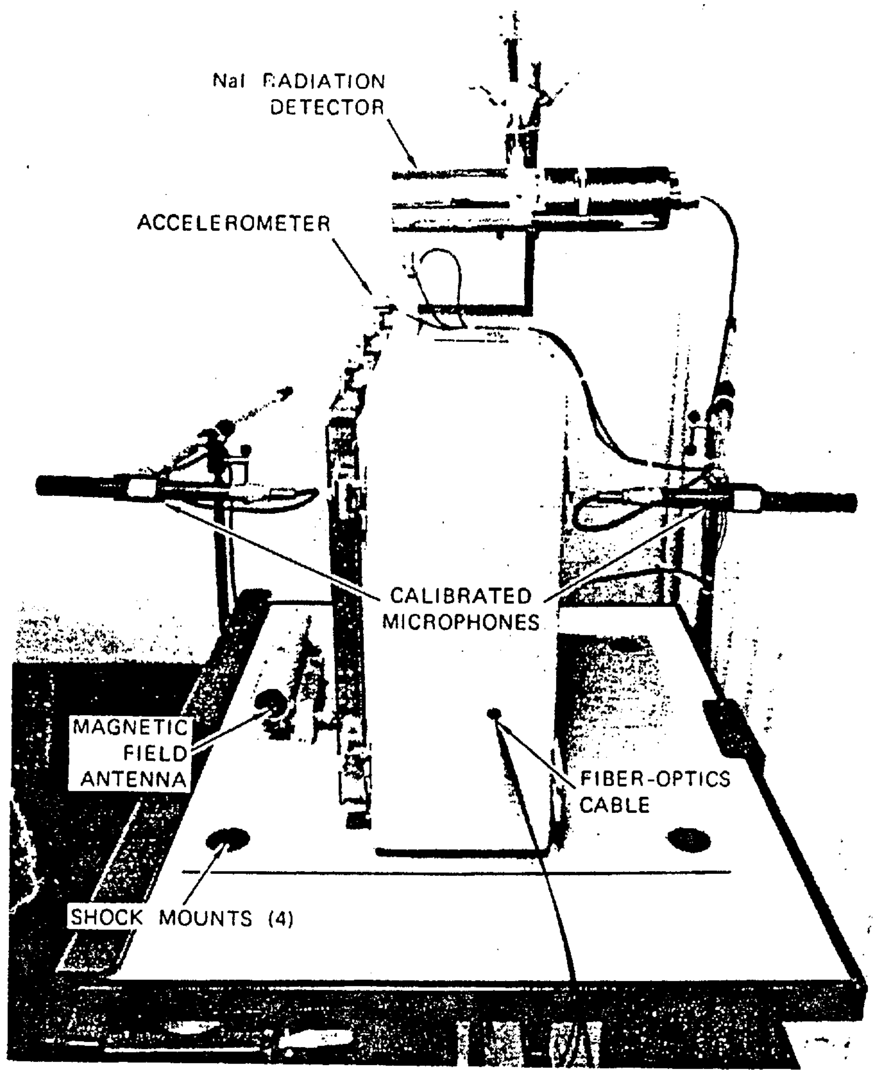

FIGURE B-11 PRINCIPAL MONITORING EQUIPMENT IS DISPLAYED. TWO MICROPHONES WITH CARDIOID PICKUP PATTERNS WERE EMPLOYED TO ENSURE ACOUSTIC COVERAGE FOR THE ENTIRE AREA.

4. Sodium Iodide Detector (ionizing radiation detection)

Our ionizing radiation detector (Canberra Industries Model 802-3) was an industry standard, 2-inch-diameter sodium iodide scintillation crystal affixed to a photomultiplier tube. The combined unit had a charge output directly proportional to the incident energy of the radiation. A charge-sensitive preamplifier (Canberra Model 2007-P) and Gaussian-shaping-pulse amplifier produced a 0- to 10-V signal for subsequent digitization.