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REMOTE PERTURBATION TECHNIQUES

PROJECT DECRIPTION AND EXPERIMENTAL PROTOCOL (U)

SHORT TITLE: RPT(U)

DATE: 7 NOVEMBER 1979

U.S. ARMY MISSILE COMMAND

Redstone Arsenal, Alabama 35809

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(S) GENERAL (U)

(S) This document describes proposed DARCOM research on remote perturbation (RP). The term "remote perturbation" is used herein to signify an intellectual/mental process by which a person perturbs remote sensitive apparatus or equipment. RP does not involve any electronic sensing devices at, or focused on, the RP agent. No drugs, hypnosis, special sensory (visual, auditory or olfactory) or proprioceptive stimuli, liminal, or subliminal, electrical, or electromagnetic, will be used in this investigation.

(U) The Commander, US Army Materiel Development and Readiness Command (DARCOM), approved in principle the US Army involvement in what is now known as Project GRILL FLAME, in April 1978. In May 1978, the Assistant Chief of Staff for Intelligence (ACSI) accepted lead responsibility for GRILL FLAME applications. Overall DOD responsibility resides with the Defense Intelligence Agency (DIA).

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(S) CONTENTS

(S) REMOTE PERTURBATION TECHNIQUES: PROJECT DESCRIPTION AND EXPERIMENTAL PROTOCOL

1. (S) BACKGROUND

(S) There have been many reported accounts of phenomena variously known as telekinesis, psychokinesis, teleportation, etc. Most of these accounts are clearly derived from carefully staged tricks which are revealed whenever they are studied under controlled and well recorded conditions. There are a few, however, which describe serious research by reputable investigators. Included among these are experiments in which the subject attempts to perturb, by mental processes alone, the outcome of an otherwise random event. This kind of remote perturbation experiment is appealing in that it involves no subjective interpretation - the results may be expressed entirely in probabilistic terms. Appendix A contains a summary description of these experiments. As an overall evaluation of this data base, it is unlikely that the apparent RP effect is simply an artifact of selected reporting by the laboratories involved; even if one were to assume that there were ten unreported nonsignificant experiments for each reported significant one, the entire expanded data base would still show significant effects with odds against chance of better than 2000:1.

(S) There are, however, two characteristics of this data base which pose problems. First, the effects are rarely stable with one individual's RP effort, the quoted results being averages over a number of individuals. Secondly, the physical environment of the random event sources and associated electronics was not discussed in any detail for any of the experiments, so it is possible that some of the effects may be the result of normal and possibly subtle electronic interference.

2. (S) SCIENTIFIC MERIT

(S) Scientists have been slow to admit that such phenomena as RP may be consistent with the formalism of established science. The interpretation of quantum physics is flexible enough to encompass a number of seeming

paradoxes and some scientists have suggested quantum mechanisms to explain RP without violating the basic conservation theorems of physics. Mattuck[34] describes one such mechanism and shows that effects on a macroscopic scale are consistent with the theory. While these hypotheses do not prove the existence of RP phenomena, when coupled with the findings discussed in Appendix A they do strongly indicate that further research is appropriate. In view of the obvious military value of being able to disturb sensitive enemy equipment such as computers, locks, switches, codes, etc., it is to the advantage of the Army to assess the validity of RP claims.

3. (S) OBJECTIVE

(S) This experiment is designed to replicate the type of experiments described in Appendix A under more rigorously controlled conditions in order to evaluate the claims of having demonstrated the RP phenomenon. While it is recognized that the risk of failure is extremely great, the potential return on investment is correspondingly great.

4. (S) STATUS

(S) Past research in RP has been discussed elsewhere. The current effort in RP techniques is part of the DOD-wide program called GRILL FLAME. Other GRILL FLAME projects involve "remote viewing" - the ability to access and describe, by means of mental processes, information blocked from ordinary perception by distance or shielding. Prior investigations and applications of remote viewing over the past decade have been very encouraging. The current project is the first GRILL FLAME investigation of RP.

5. (S) PLAN

(S) Expressed in simplest terms, the experiment may be described as follows (Appendix B gives a detailed technical description):

a. (S) A truly random sequence of 0's and 1's (binary sequence) is generated by processing and sampling the behavior of a noise source or random event generator (REG).

b. (S) The RP participant is instructed to bias the composition of the sequence in favor of 1's or 0's by exercising mental processes.

c. (S) Feedback is provided the participant, so that he can instantaneously be aware of the degree to which he is succeeding.

d. (S) The associated computer equipment simultaneously carries out a statistical analysis of the sequence of digits until it can be deemed perturbed (biased as instructed) or not whereupon the trial (or test) is ended.

(S) The testing phase of the experiment consists of a large number of such tests by each participant.

(S) The basic elements of the experiment are:

a. (S) Sources of Randomness: Two sources for genuinely random binary sequences are to be employed as well as one pseudo-random binary sequence generator. The radioactive decay of prometheum 147 (^{147}PR), occurs by the emission of beta particles which are readily detected. The other random event generator is an electronic noise diode which is subject to avalanche discharge which is also easily detected electronically. The theory of both these devices and the distribution of random events (β-emission or avalanche discharge) is well understood and has been well verified experimentally.[30,35] The random events are Poisson distributed in time. Each time a random event occurs, it will trigger a change in a flip-flop device - from one to zero or from zero to one depending upon the state upon detection of the random event. The flip-flop device thus randomly switches back and forth between zero and one with the occurrence of random events. This device is sampled periodically (at intervals much longer than the average event rate) to produce the desired random binary sequence.

(S) In addition, a pseudo-random binary sequence will also be utilized as needed. This differs from a random sequence in that, although the numbers appear to be random, they are actually calculated by the computer from a starting number or "seed" and thus for any given seed are deterministic. If the RP phenomenon should exist, a great deal can be determined about the nature of the phenomenon by the difference to which truly random and deterministic events are affected by it.

b. (S) Analysis Capability: The random (or pseudo-random) binary sequence must be statistically analyzed in order to determine if it is actually random or is biased. Computational capability is also used to

govern the sampling process described above, to drive the displays and to catalog and store certain results of the tests. The analysis is carried out in real time in order to provide effective feedback to the RP participant.

c. (S) Feedback Display: In order that the RP participant can benefit from almost instantaneous feedback, he will be provided with a color video display driven by the output from the statistical analysis of the binary sequence. A variety of preprogrammed displays will be made available including simple clock motion or "race-car" displacement as indicators of perturbation as well as more technical ones such as the progress of the statistical pawn in the sequential analysis diagram (see Appendix B). An auditory feedback channel will also be provided wherein the frequency or intensity of a tone (or complex waveform) varies to indicate perturbation. The participant is expected to choose the particular feedback mode which he feels is most effective.

(S) It has been tacitly assumed that any RP effect would act upon the random event generator. This assumption will be checked by recording the incidence of random events, the resulting binary sequence, and the output of the statistical analysis on magnetic disc storage for subsequent stage-to-stage analysis. The analysis of this for consistency along with the recorded output of the feedback channel (video or audio tape) will isolate the source of any perturbation as being in the random source, the computer equipment or the display equipment.

(S) We intend to address the two problems with previous experiments by first focusing our attention upon a limited number (nine or less) of participants who have shown previous expertise as remote viewers. By using experienced remote viewers, it is anticipated that we should observe any effect within this limited number, rather than having to average over large numbers of individuals as in the data base experiments. Also, by using more sensitive analysis techniques than have been used previously, even a small effect can be stabilized.

(S) Secondly, to assure ourselves that the noise sources are sufficiently free of even subtle (but normal) electronic nonrandomness, we

intend to use the most rigorous construction and design techniques possible (battery power, optically coupled signals, etc.) to isolate the sources from normal environmental influences. Furthermore, the noise sources will be chosen for their internal simplicity[30] and thus may be amenable to realistic mathematical modelling. Using the models, we are able to calculate by Monte Carlo techniques a noise source's dependence on various external and internal physical parameters.

(S) The experiment will be conducted in two phases. Phase I consists of the assembly and checkout of the apparatus and exhaustive validation testing. During the validation testing the entire system will be exercised over a wide range of environmental and testing conditions to assume the randomness of the binary sequence and the proper functioning of the computer and displays. Appendix C provides further information on the validation testing procedures.

(S) Phase II consists of the actual RP participant testing. There are three primary independent variables that may be varied during the course of the investigation. Two of them, the random source (beta decay, noise diode, pseudo random) and the mode of feedback have been discussed. The prime independent variable is the presence or absence of an RP participant. The final measure of significance of the experiment is essentially whether a consistent difference can be discerned in the randomness of the binary sequence when the apparatus is operating with and without an RP participant. The dependent variable, provided by the statistical analysis of the binary sequence, is a quantitative measure of the degree to which the composition of the sequence differs from what would be expected by chance. (Details of the statistical analysis are provided in Appendix B.) For individual trials, the criterion for success will be that the odds against chance expectation be greater than 20:1. The first four months of the investigation will be used as a pilot period during which participants will familiarize themselves with the experiment and explore various techniques in a learning mode. This period will also be used to optimize the device parameters.

(S) During the final two months of the investigation, each participant

will be asked to contribute 100 trials. The following is a typical succession of events during an RP trial session:

- The participant and experimenter will discuss the program status to date. If the participant feels that set or circumstance are unfavorable to his participation, the session will be postponed.
- The variables or other changes in the experiment will be described to the participant to whatever extent desired.
- The participant will select whatever mode of feedback he prefers for the trials for the impending session.
- The participant initiates successive trials at his own pace at the instant of his choosing until the (nominally) 30-minute session is concluded or sooner if the participant wishes.
- The participant is then debriefed. He is told of the outcomes of the trial, the statistical significance or lack thereof and given the answers to any other questions concerning the session or his cumulative performance.

(U) At no time will any participant be exposed to radiation or be instrumented for monitoring any physiological function - even by remote sensors. No drugs, hypnosis, special sensory or proprioceptive stimuli, liminal, or subliminal, electrical, or electromagnetic, will be used.

(U) After a participant has contributed one hundred trials, we will determine the number of trials that had odds against chance expectation of greater than 20:1. If this total number of runs is greater than ten (the number required by exact binomial calculation to meet odds against chance of greater than 20:1) then we will declare that participant to have a significant result. To assess whether the entire investigation is significant, we shall combine the results of the six participants using standard statistical procedures.[33]

(S) One primary consideration in the planning of the experiment is assuring the credibility of the findings. If positive results are reported, critics will challenge virtually every aspect of the test and data analysis. The following measures are being taken to reduce the vulnerability of the experiment to attack.

a. (S) Safeguards Against Deception: The entire experiment is being carried out twice; once at the facilities of SRI, International, in Menlo Park, California, and duplicated in substance at Redstone Arsenal, Alabama.* The two experiments are to use almost identical apparatus and RP participants. The experiment at Redstone Arsenal, however, will utilize independently acquired and assembled equipment and will be conducted by US Army MICOM scientists. In addition to allaying any question of manipulation of equipment or concealed means of affecting the course of individual tests built into the system (barring large scale collusion, of course), the duplicate test provides a means of checking repeatability of results. The equipment in the testing room with the participant cannot be used to program the computer and can only be used for feedback display and to allow the participant/experimenter to initiate the test, select among various displays or similar preprogrammed options. All equipment subject to tampering which could bias or invalidate the test will be located in a separate, locked room. The susceptibility of the equipment to remotely applied agents such as radiation, ultrasonics, etc., will be ascertained, as far as practical, in Phase I. The recorded data from each trial session will be secured in a manner comparable to classified material immediately upon completion of the session.

b. (S) Validity of Data Sample: All data taken in Phase II will be saved and made available for further analysis if the data analysis techniques should be questioned. No data will be discarded. If any part of the data taken subsequent to the four-month pilot period is not included in the combined statistical assessment, it will be so identified. Any circumstances during experimentation which are out of the ordinary will be recorded.

c. (S) Validity of Analysis Methodology: After Phase I validation of the functioning of the apparatus, the entire system will be exercised using artificially biased binary sequences (Monte Carlo testing) to the extent that the probability of errors of the first and second kind are accurately

*This document refers to the US Army MICOM experiment. A similar one has been prepared for the contractor's experiment.

known. These probabilities can also be calculated probabilistically to provide an independent check. Basically we are testing the hypothesis that the binary sequence is composed of 50% zero's and 50% one's. An error of the first kind consists of rejecting this hypothesis when it is true; an error of the second kind consists of accepting the hypothesis when it is false. The previously cited criteria for each trial of judging the sequence to be perturbed if the odds against its occurrence by chance are greater than 20:1 correspond to a probability of error of the first kind of .05.

d. (S) Influence of Uncontrolled Parameters: It can be endlessly hypothesized that such uncontrolled factors as solar storms, cosmic radiation, the phases of the moon, etc., may affect the experiment. In some cases, the threshold values at which the level of the parameter might be significant can be determined. In general, however, we rely on two safeguards to minimize any effect due to uncontrolled parameters. During validation testing and before and after trial sessions, the experimental apparatus will be exercised and any anomalous behavior recorded. Second, the chief independent variable - presence or absence of RP participant - should be uncorrelated with the uncontrolled parameters, hence a clear dependence of any measured RP effect upon presence of a participant can be attributed to the participant. In other words, it would be highly improbable that any uncontrolled parameters would be effective only when the RP participant is present.

e. (S) Interpretation of Results: This experiment is an attempt to determine if remote perturbation as defined exists. The nature of the experiment was suggested by earlier research which has claimed some degree of success. The scope of this project does not permit much extension in the list of independent variables. As a result, such potentially important variables as shielding, device/participant separation or the simultaneous use of multiple participants cannot be investigated.

(S) It has been assumed that if any RP effect is detected it is due to the designated participant. Obviously, there is a large number of individuals who might be in a position to exert an RP influence on the device, in

particular, the experimenter. No attempt has been made in the design of the experiment to isolate the agent of any RP influence. Neither has any attempt been made to distinguish between RP and precognition which (if it exists) could permit the participant to initiate the trials in anticipation of a favorable sequence and achieve the same result.

(S) At the end of the current program, the result can be characterized in one of three ways as follows:

- Positive: Both the contractor and the government experiments meet or surpass the overall criteria stated on page 5.
- Negative: Neither the contractor nor the government experiments meet the stated criteria for the entire experiment or the overall performance of a single subject.
- Indeterminate: Anything other than positive or negative as defined above.

(S) If the result is positive, further experiments will be undertaken to determine the limitations of the phenomenon for military exploitation. Such experiments would include an assessment of the effects of distance and shielding, possible interference from other physical phenomena and the potential for refinement for greater consistency or sharper definition. It is also likely that some experimentation would be undertaken to attempt to determine the mechanism for RP and the physiological source.

(S) If the result is negative as defined above, but with certain well-characterized portions showing an effort which is quite unlikely to have occurred by chance alone, an additional experimental phase will be added to attempt to discover conditions (sampling rates, feedback, etc.), which might salvage the program. Otherwise, this line of investigation will be terminated.

(S) An indeterminate result may take many forms. Contingencies have been considered for some of these.

- If only one of the experiments is positive, an additional phase of testing will be undertaken with an exchange of certain critical hardware as well as other modifications which might be indicated by an analysis of the results. In addition, the stored stage-to-stage data from both experiments will be reanalyzed on the MICOM CDC 6600 computer.

- If one or two participants show a significant RP capability as defined on page 5 , further experiments will be considered to determine if the capability can be transferred, or detected to be present in enough individuals for military consideration.

- If any observed effect seems to be inconstant - on again, off again - the data will be analyzed to seek correlations which might explain the fluctuation. A limited number of additional tests might be necessary to validate possible causes.

(U) It is understood that any experimentation not covered by this document will be subject to the same course of review before implementation.

6. (S) PARTICIPANTS

(S) Some relation between remote perturbation and remote viewing might be expected since in ordinary physical interactions information about the state of a system (as in RV) can be obtained only by way of some interaction with the system, which in some cases is supplied by the observer. We might therefore expect an observable dependence between RV and RP under certain conditions. For this reason, we plan to seek only experienced remote viewers to participate in this investigation, and we will work with no more than nine individuals. All participants are to be in general good health, as determined by a standard employment physical examination.

(S) The US Army Missile Command (MICOM), Army Materiel Systems Analysis Agency (AMSAA), and SRI International have individuals who are presently, or have past experience in, participating in remote viewing experiments. The MICOM and AMSAA participants are government employees. The SRI participants are consultants or members of the SRI staff and will work if selected in a contractual arrangement. Only those individuals who indicate a positive desire to participate, after familiarization with the remote perturbation experiments and procedures, will be accepted into the RP program. The information and consent form to be used is included as Appendix D. Some of these participants will have had some familiarity with RP experiments of a similar nature. The difference in levels of naivete among the RP participants

will be offset by the oral and written briefing material (see Appendix D) and by the four-month pilot period.

(S) The total duration of Phase II of the investigation is six months. Experiment sessions will take place during the normal work week and will not exceed 1/2 hour length each. There will be no more than two sessions per day, one in the morning and one in the afternoon. The total number of trials by any individual during the pilot period and the ultimate contribution of 100 trials will not exceed 300. This should require approximately 30 half-hour sessions from each participant.

(U) A medical doctor will be briefed on the program and will be available during all periods of experimentation on a standby basis. Appendix E describes the available medical facilities, the procedures employed, and insurance coverage applicable to the various participants.

(S) Participants will be debriefed as follows:

- Session Debriefing: At the end of each experimental session, the subject will be given all the data available pertaining to that group of trials. Any statistical significance or lack thereof will also be clearly explained to him.

- Experiment Debriefing: At the conclusion of experimental testing, a final unclassified report will be prepared, summarizing all results from the experiment, together with any conclusions or scientific findings that may have come out of the study. The report will be given to each participating subject. Finally, any remaining questions that the subjects may have about the experiment will be answered.

- Specific Debriefing Protocols: We do not anticipate that participation in these experiments will have any effect on the day-to-day life of the subjects. This study is a purely intellectual activity, and we believe that the debriefing provided by the final technical report will be a suitable termination of the experiment for the subject.

7. (S) FACILITIES

(U) The MICOM experiment is to take place in Building 7770, Redstone

Arsenal, Alabama. A three-room suite is being adapted to suit the purposes of the test.

(S) The room to be used by the RP participants for this work is a comfortable, carpeted, air-conditioned environment. It is lit by a combination of fluorescent fixtures in the ceiling and incandescent table lamps. There is a couch, an easy chair, and four tables. The computer graphics terminal stands on one of these tables. The participant will be seated on a conventional reclining swivel chair.

(S) In an adjacent room, the random event generators, computational equipment, programmable terminals and associated peripheral equipment will be installed. This room may be secured independently from the rest of the facility.

(U) The third room is a foyer with costumer, receptionists's desk and filing cabinets.

(U) Standby medical facilities are described in Appendix E.

APPENDIX A

DATA BASE FOR RNG EXPERIMENTS

(S) APPENDIX A: DATA BASE FOR RNG EXPERIMENTS (U)

1. (S) EARLY EXPERIMENTS

(S) In 1970, H. Schmidt[2] reported that he had observed significant perturbations by psychoenergetic means, of an otherwise binary (0,1) random sequence that was derived from the beta decay of strontium 90 ^{90}SR. The binary sequence was produced by the random interruption of a high speed binary electronic clock when an electron from the ^{90}SR decay was detected. The sequence generation rate was approximately 1/S.

(S) In this experiment, individuals were asked to focus their attention on the electronic system by remote viewing the noise source, and monitoring any effects that occurred by watching the random walk of a display light feedback system. (A circular array of lights was used to indicate the state of the interrupted clock by advancing the position of the activated light clockwise for each logical "1" and counterclockwise for each "0".)

(S) When individuals focused their attention on the apparatus, the resulting binary (0,1) sequence was found to contain only 49.1% one's. Since the total sequence had a length of over 32,000 bits, the deficit of one's was highly significant. The probability of such a result occurring by chance is less than one in a thousand. Furthermore, during extensive control runs when no individual was focusing his attention on the electronic hardware, the system performed according to the usual binomial statistic, and showed no statistical effect. The original paper describing this experiment is inclosed at the end of this appendix.

2. (S) TOTAL RNG DATA BASE

(S) As of 1978, a total of 54 experiments of this type had been reported in the literature (see Table 1). Of these, 35 reported significant departure from chance expectation, and none reported similar effects during control runs. We can summarize the data base generated in these experiments as follows:

a. (S) The generation rate extended from a few per second to 300 per second.

b. (S) The sequence lengths varied from 10^3 to 10^5 bits.

c. (S) Beta decay and thermal noise were used as sources of randomness.

d. (S) The effects (deviation from 50% chance expectation) were on the order of 1% to 5%.

e. (S) Control runs did not yield results which differ significantly from chance expectation.

TABLE 1

RANDOM NUMBER GENERATOR EXPERIMENTS - DATA BASE

Author (Reference)	Comments	Level of Significance
Schmidt (3)	Preliminary Experiment	n.s.
	Main Experiment	0.00087
Schmidt (4)	1st Cat Series	0.016
	2nd Cat Series	n.s.
	1st Roach Series	0.0069
	2nd Roach Series	1.2×10^{-4}
Schmidt & Pantas (5)	Preliminary Experiment	0.012
	Series I	6.3×10^{-5}
	Series II	0.0093
Matas & Pantas (6)		0.0014
Andre (7)	Experiment I	0.11
	Experiment II	0.009
Honorton & Barksdale (8)	Group Series	0.034
	Individual Ss	n.s.
	Selected Subject	3.4×10^{-6}
Schmidt (9)	Exploratory Experiment	5.6×10^{-6}
	Confirmatory Experiment	2.1×10^{-8}
Bierman & Houtkeeper (10)		0.026
Schmidt (11)	Experiment I	
	Series 1	0.001
	Series 2	0.001
	Series 3	0.001
	Experiment II	
	Real-time	0.05
	Prerecorded	0.0005
	Experiment III	n.s.

TABLE 1 (Concluded)

Author (Reference)	Comments	Level of Significance
Stanford & Fox (12)		0.05
Stanford, et al (13)		0.0069
Braud, et al (14)	Experiment I	0.002
	Experiment II	0.05
	Experiment III	n.s.
Honorton & May (15)		0.035
May & Honorton (16)		0.011
Millar & Broughton (17)		n.s.
Millar & Mackenzie (18)		n.s.
Millar (19)		n.s.
Honorton & Winnett (20)	Meditator	0.018
Winnett & Honorton (21)	Meditators	0.0024
Braud & Hartgrove (22)	Meditators	0.034
Broughton, et al (23)		n.s.
Braud (24)	Experiment 1	0.028
	Experiment 2	0.022
	Experiment 3	n.s.
	Experiment 4	0.044
Schmidt (25)	Expt. I (prerecorded)	0.00037
	Expt. II (prerecorded)	n.s.
Terry & Schmidt (26)	Condition A	0.04
	Condition B	n.s.
Jungerman & Jungerman (27)	Experiment 1	n.s.
	Experiment 2	n.s.
David & Morrison (28)	Experiment 1	n.s.
	Experiment 2	n.s.
	New Procedure	n.s.
Braud & Braud (29)	Experiment 1	n.s.
	Fbk	0.05
	No Fbk	0.05
	Experiment 2 (no Fbk)	0.05

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A PK TEST WITH ELECTRONIC EQUIPMENT

By HELMUT SCHMIDT

ABSTRACT: The subjects in this research were tested for their psychokinetic ability by means of an electronic apparatus made up of a random number generator (RNG) connected with a display panel. The RNG produced random sequences of two numbers which were determined by a simple quantum process (the decay of radioactive strontium-90 nuclei). The essential aspect of the display panel was a circle of nine lamps which lighted one at a time in the clockwise (+1) direction or the counterclockwise (−1) direction depending on which of the two numbers the RNG produced. The subject's task was to choose either the clockwise or counterclockwise motion and try by PK to make the light proceed in that direction.

One run was made up of 128 "jumps" of the light, and there were four runs per session. In a preliminary series of 216 runs, the 18 subjects had a negative deviation of 129 hits. Accordingly, the main series was expected to give negative scores, and a negative attitude was encouraged among the subjects. Fifteen subjects carried out 256 runs, with a significant negative deviation of 302 hits ($P = .001$).

The RNG was checked for randomness throughout the experiment and was found to be adequate.—Ed.

In previous work (4, 5) the author was able to get significant evidence of precognition in which the testing apparatus was an electronic device based on a simple quantum process. The present experiment was an attempt to get significant evidence of psychokinesis by the use of a similar apparatus.

The basic part of the apparatus was a binary random number generator which produced the numbers "+1" and "−1" in random sequence, and the general objective was to have the subjects try to mentally influence the generator to produce one of the two numbers more frequently than the other.

The most easily available random generators, which have been used in many PK experiments, are a rolled die and a flipped coin. In comparison with these, an electronic random generator, the operation of which most of the subjects cannot understand, may at first thought seem psychologically unfavorable. Results of experiments with complex targets (3, p. 142), however, suggest that PK is goal oriented in the sense that results can be obtained by concentrating on the goal only, no matter how complicated the intermediate steps may seem to the rationalizing mind. A definite advantage of an electronic apparatus is that it permits a psychologically challenging formulation of the goal. In the present experiment the random number generator (RNG) was connected with a display panel showing a circle of nine lamps. One lamp was lit at a time, and each generated "+1" or "−1" caused the light to jump one step in the clockwise or counterclockwise direction, respectively. The subjects were not asked to try to force the generator to produce more +1's than −1's but, rather, to force the light on the panel to make more jumps in one direction or the other. Both tasks are certainly equivalent, but the latter seems psychologically much more appealing to most subjects.

A further obvious advantage of electronic test equipment is that the detailed results can be automatically recorded and evaluated and that one can work, if desired, at high speeds.

The particular type of random generator used here was chosen partly for practical and partly for theoretical reasons. The sequence in which the random numbers are produced is determined by simple quantum processes, the decays of radioactive strontium-90 nuclei. The electrons emitted in this decay trigger a Geiger counter, and the random times at which electrons are registered at the Geiger counter decide the generated numbers. Practically, the generator is easy to build, and the randomness of the generated numbers has been found to be very good. Furthermore, the simplicity of the generator allows a complete theoretical discussion (6) of its randomness properties; and in addition, one can say fairly well at which point the random element in the number generation comes in. The generator is essentially deterministic except for the random decay times of the nuclei.

The use of simple quantum jumps to provide randomness is, for

the theorist, a rather natural choice, since these processes are assumed by physicists to be nature's most elementary source of randomness, and some psi tests utilizing quantum processes have already been reported (1, 2). Certainly, the outcome of a die throw is also largely determined by microscopic quantum processes. The thermal vibrations of the surface and the air fluctuations at an atomic level co-determine the generated die face. The process in this case is much more complicated, however, since many more factors contribute to the end result.

Apparatus

The test equipment consisted of a binary random number generator and a display panel.

Random Number Generator

The RNG, which was similar to the one described in connection with earlier precognition experiments (4, 5, 6), can produce sequences of binary random numbers of any specified length. Electrons emitted by the strontium-90 decay trigger a Geiger counter and the momentary position of a binary high frequency counter at the time of the electron registration determines whether a "+1" or a "−1" is generated.

The numbers of electrical pulses produced on the +1 output and the −1 output are recorded by two electromechanical reset counters, and the complete sequence of generated numbers is recorded on paper punch tape.

Randomness Tests

Because of the simplicity of the circuitry, the degree of randomness to be expected of the RNG can be discussed in detail (6) and it can be shown to be much greater than required by the experiment.

The electronic circuitry is designed so that variations in the characteristics of the components cannot impair the randomness. In order to guard against any gross malfunctions, the proper electronic operation was tested frequently. Furthermore, the randomness of the generated number sequence was tested experimentally. For this purpose, a sequence of four million numbers, generated on many

different days, was recorded on paper tape. Then for the whole sequence the numbers N^+, N^- of generated +1's and −1's were counted and were found to be consistent with randomness, as was the total number of flips (F); i.e., events where a +1 was followed by a −1 or vice versa. The same procedure was applied to the 400 number sequences obtained by cutting the whole sequence into blocks of 10,000 numbers each. A goodness-of-fit test verified that the 400 values for +1 and −1, and the 400 values for F were consistent with their expected normal distribution.

Display Panel

In testing with this apparatus, the two above-mentioned counters for the numbers of generated +1's and −1's could serve as the only display, i.e., the (visual) focusing point toward which the subject could have directed his PK efforts. In this case, the subject might try to enforce mentally on the +1 counter a higher number of counts than on the −1 counter. It seemed desirable, however, to use a psychologically more stimulating display in the form of a panel with nine lamps arranged in a circle and connected to the RNG by a 30-foot long cable. One of the nine lamps was lighted at a time; and each time the RNG produced a signal, the light advanced one step in the clockwise or the counterclockwise direction according to whether the signal came to the +1 or the −1 output. Thus the light performed a "random walk" among the nine lamps. Rather than direct his PK toward the counters, then, the subject generally tried to "will" the light on the display panel to advance in an overall clockwise motion.

Some of the subjects, however, preferred to force the light in the counterclockwise direction. For them the two signal wires from the RNG to the display panel were interchanged by flipping a switch on the display panel so that a count on the +1 counter was displayed as a jump of the light in the counterclockwise direction. Thus, for all subjects, a jump of the lamp in the preferred direction, whether clockwise or counterclockwise, was registered on the +1 counter.

Test Procedure

The subjects in this experiment were members of the Institute for Parapsychology plus a few visitors. During a test session, the

subject sat in a dark closet with the display panel in front of him. The RNG and the experimenter were stationed in the room outside the closet.

Each testing session comprised 4 runs of 128 counts (steps in the random walk). A run took approximately two minutes. The machine stopped automatically after the one hundred and twenty-eighth count. There were short breaks, mostly between one-half and two minutes, between the runs.

At the beginning of each run, the subject, having decided in which direction (clockwise or counterclockwise) he wanted to influence the light to go, set a switch on the panel accordingly. Then the experimenter turned on the start switch, causing the RNG to generate 128 random numbers. At the end of each run, the experimenter recorded the readings of the +1 counter and −1 counter. The correctness of the counter readings was later checked with the sequence of generated numbers recorded on the paper punch tape.

From the experimenter's point of view, the subject's goal was always to produce a high number of +1 counts. From the subject's viewpoint the equivalent goal was to influence the light in the direction desired and indicated by the position of the switch on the display panel.

The subject was permitted to flip the switch during the course of a run so as to change the direction in which he wanted the hits displayed, but only a few subjects actually took advantage of the opportunity. With this arrangement, the subject could have had the impression that he was doing a test in precognition (by setting the switch in the direction in which he thought the light would move on the next jump) while he was actually doing a PK test.

Preliminary Series

There were 18 subjects in the preliminary series and they carried out a total of 54 sessions, each subject contributing from one to seven sessions.

The total score was a negative deviation of 129 hits below chance expectation out of 216 runs; $CR = 1.55$. These results include one subject who obtained a high positive score of 52 hits above chance in 16 runs ($CR = 2.3$).

MAIN SERIES

It was expected on the basis of the preliminary results that by leaving out the one high-scoring subject, an overall significantly negative score would be obtained in the main series. In order to emphasize the negative scoring, some subjects were asked to associate feelings of pessimism and failure with the experiment. The more negative-scoring subjects were used more frequently, and a few new subjects were allowed to contribute only after preliminary tests had suggested a negative scoring tendency.

The total length of the experiment was set in advance at 64 sessions of four runs each. It was not determined in advance, however, how many sessions each individual subject should contribute. Altogether there were 15 subjects and they contributed between one and 10 sessions each.

Although the proper randomness of the generator had been tested extensively, as mentioned before, a further safeguard against a possible bias of the generator was introduced. After the first half of the confirmatory test was completed the two outputs of the generator were internally interchanged. Thus, even a constant bias in the generator could not have caused the total significant score to be reported.

A total of 256 runs in this part of the experiment yielded a negative deviation of 302 hits ($CR = 3.33$; $P < .001$, two-tailed). Of the 64 sessions, 46 gave below-chance scores, 15 above-chance scores, and three were just at chance level ($CR = 4.0$). Of the 256 runs, 147 were below chance, 92 above chance, and 17 at chance level ($CR = 3.55$). These three CR values are certainly not independent, but they do emphasize the consistency of the results.

A post hoc analysis of the data showed two types of decline effect: more negative scoring in the second half of each run than in the first; and more negative scoring in the second half (the third and fourth runs) of each session than in the first half (first two runs). The decline results, however, are suggestive rather than statistically significant:

Deviation for pooled first half of the run: —91
Deviation for pooled second half of the run: —211
Deviation for the pooled first half of the session: —83
Deviation for the pooled second half of the session: —219

Discussion

The result of the experiment shows that the binary random number generator had no bias for generation of +1's or −1's as long as it was left unattended (in the randomness tests) but that it displayed a significant bias when the test subjects concentrated on the display panel, wishing for an increased generation rate of one number.

The experiment has been discussed in terms of PK, but in principle the result could certainly also be ascribed to precognition on the part of the experimenter or the subject. Since the sequence of generated numbers depended critically on the time when the test run began, and since the experimenter, in consensus with the subject, decided when to flip the start switch, precognition might have prompted experimenter and subject to start the run at a time which favored scoring in a certain direction.

If the PK interpretation is appropriate, the results imply the action of PK at some distance, since the generator was separated from the subject by a wall and only the display panel was close to the subject.

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APPENDIX B

DESCRIPTION OF EXPERIMENTS

(S) APPENDIX B: DESCRIPTION OF EXPERIMENTS (U)

1. (S) GENERAL

(S) We intend to replicate the type of experiments that are represented by the data base discussed in Appendix A. These experiments are to be carried out, however, under conditions more rigorously controlled. As with the earlier experiments, our proposed experiments contain three basic elements:

a. (S) Noise sources - beta decay, noise diode.

b. (S) Analysis and recording techniques - LSI-11, floppy-disk-based microcomputer.

c. (S) Feedback display - video system.

(S) In this section, we describe the assumptions and the independent and dependent variables that are implied in such an experiment. This section also contains an outline of the hardware and software components of the complete random number generator system.

2. (S) ASSUMPTIONS

(S) The characteristics of this hypothesized remote perturbation process are completely unknown. The data base suggests that the putative effect is quite small, so it is reasonable to make a few assumptions about our experiments:

a. (S) The analysis hardware (LSI-11 microcomputer), the recording device (floppy disk system), and the display devices (computer-driven video monitors) are to first order assumed to be stable against remote perturbation processes, the effect being assumed to be isolated within the random noise sources exclusively (an assumption that can be checked during the course of experimentation);

b. (S) The source of the remote perturbation is assumed to be the human participant. Evidence to date tends to support these assumptions.

3. (S) INDEPENDENT VARIABLES

(S) There are three primary independent variables that may be varied

during the course of the investigation: participant/no participant; source variation (beta decay, noise diode, pseudo random; and feedback display variation.

4. (S) DEPENDENT VARIABLES

(S) There is only one dependent variable, namely the output of the statistical analysis of the binary bit stream derived from the noise source.

5. (S) HARDWARE

(S) An electronic instrument that is designed to be sensitive to remote perturbation processes contains three basic elements: sources of randomness, an analysis capability, and a feedback mechanism. We propose to integrate these components with our existing Digital Equipment Corporation LSI-11/2 microcomputer system. Figure 1 shows a block diagram for such a system.

a. (S) Random Sources:

(S) We will consider three types of random sources: an electronic noise disk, a radioactive (beta) decay source, and a pseudo-random feedback shift register.

(1) Electronic Noise Diode: In a preliminary design effort carried out in another program, we have determined a suitable electronic noise diode. The diode, first constructed by Haitz,[30] is well understood from the quantum mechanical point of view.

(2) Radioactive Beta Decay Source: We propose to design a binary noise source derived from the beta decay of carbon 14 (^{14}C) and promethium 147 (^{147}PR). We have chosen these isotopes since they are 100% beta emitters with no competing decay modes, and thus provide a simple radioactive decay spectrum. To insure isolation from spurious power line transients we plan to use battery-operated surface barrier detector with charge-sensitive preamplifier and associated shaping circuitry to produce the random binary noise signal. This and the electronic noise source will be optically coupled to the LSI-11.

(3) Pseudo-Random Shift Register: To act as a control noise

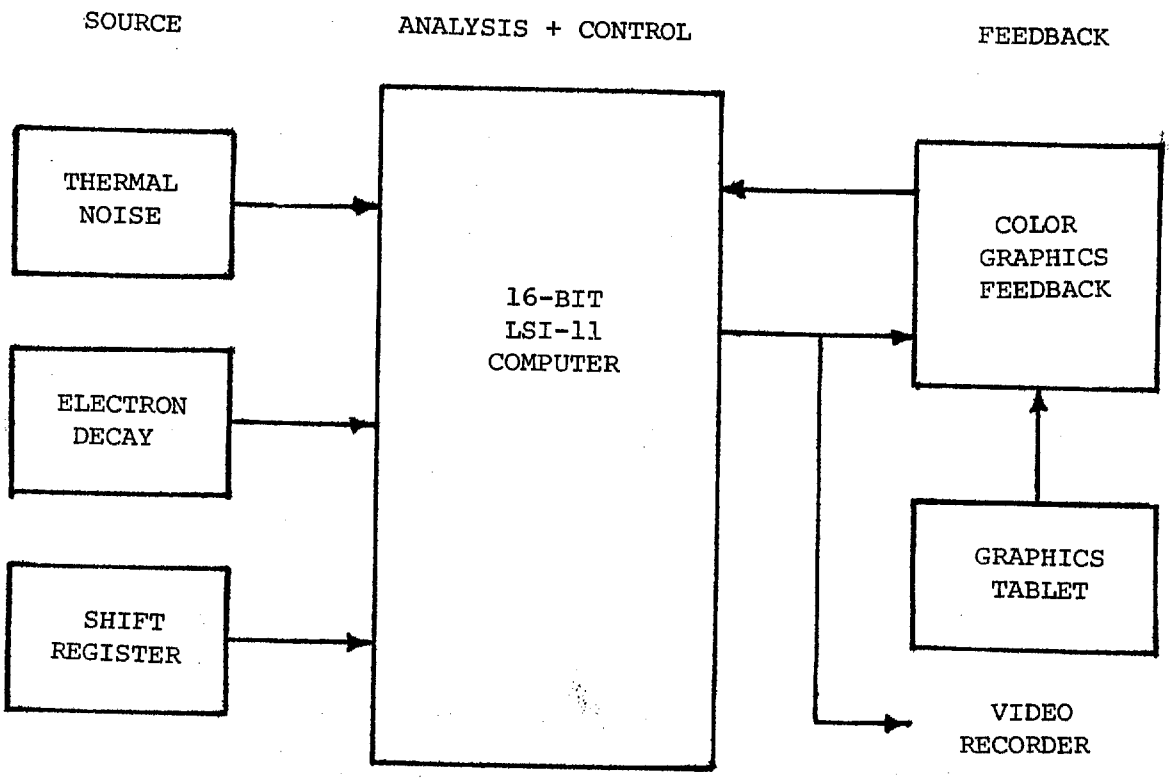

FIGURE 1: BLOCK DIAGRAM OF A COMPUTER-BASED INSTRUMENT DESIGNED TO BE SENSITIVE TO REMOTE PERTURBATION PROCESSES

source we will optically couple a standard pseudo-random shift register to the LSI-11. The binary output of such a device has the property that although the sequence meets a number of criteria for randomness, the sequence is deterministic, once the starting seed for the register is given.

b. (S) Analysis:

(S) The analysis and control portion of the system consists of an existing project LSI-11 microcomputer. To obtain an input, the LSI-11 is programmed to sample one of the noise sources at a specified rate to obtain its random bits. A sequence of such samples is tested by the LSI-11 for an excess or deficiency of one's on a continuous basis, using a sequential analysis statistical technique.[31,32] The sequential analysis technique is an extremely efficient technique for determining whether the output of the binary random generator contains a distribution of zero's and one's as expected for an unperturbed source, or is distorted due to, say, RP influence. The principal advantage of the sequential sampling technique as compared with other methods is that, on average, fewer bits per final decision are required (roughly 50%) for an equivalent degree of reliability.

(S) Before we are able to detect that the random output of the binary generator has been distorted, we must a priori define how much distortion we require to conclude that there is an effect, and what statistical risks we are willing to accept for making an incorrect decision as to whether the disturbation under consideration is indeed distorted. To meet these criteria sequential analysis requires the specification of four parameters to determine from which of two binomial distributions under consideration (distorted or undistorted) a data sample belongs. The four parameters are: p_0, the fraction of one's expected in an undistorted distribution (e.g., 50%); p_1, the fraction of one's assigned a priori to define a distorted distribution (e.g., 60%); α, the a priori assigned acceptable probability for concluding that the random source is perturbed (p_1 distribution) when in fact it is not perturbed, i.e., the correct distribution is the p_o one (Type I error); β, the a priori assigned acceptable probability for concluding that the random source is unperturbed (p_0 distribution) when in fact it is perturbed (p_1 distribution), i.e., the

correct distribution is the p_1 one (Type II error). With the parameters thus specified, the sequential sampling procedure provides for construction of a decision graph as shown in Figure 2. The decision graph gives a rule of procedure for making one of three possible decisions following the sampling of each bit: continue sampling before making a decision (Region I in Figure 2); label the sequence as undistorted; label the sequence as distorted (Region III).

(S) Sampling rules can be defined for the nth sample:

- Sample the binary sequence
- Sum the numbers of one's to date
- If the sum of one's lies in Region I, then do Step 1.
- If the sum lies in Region II, stop the run, concluding that the binary sequence is derived from the undistorted p_0 distribution.
- If the sum lies in Region III, stop the run, concluding that the binary sequence is derived from the distorted p_1 distribution.

Utilization of the above statistical procedure permits analysis of the binary noise sequence for excess one's or zero's by the most efficient techniques currently possible.

c. (S) Display:

(S) The feedback display to the participant consists of two independent color video channels. The output from the computer analysis of the binary bit stream will "drive" some interesting aspect to the video image. The second channel may be connected to a video recorder for later off-line analysis.

d. (S) Hardware Redundancy:

(S) Using a computer system such as the one described above as a possible detector of remote perturbation, it is important to have as much hardware redundancy as possible. Particularly in the areas of data recording and feedback display. As was stated above, the most likely assumptions for

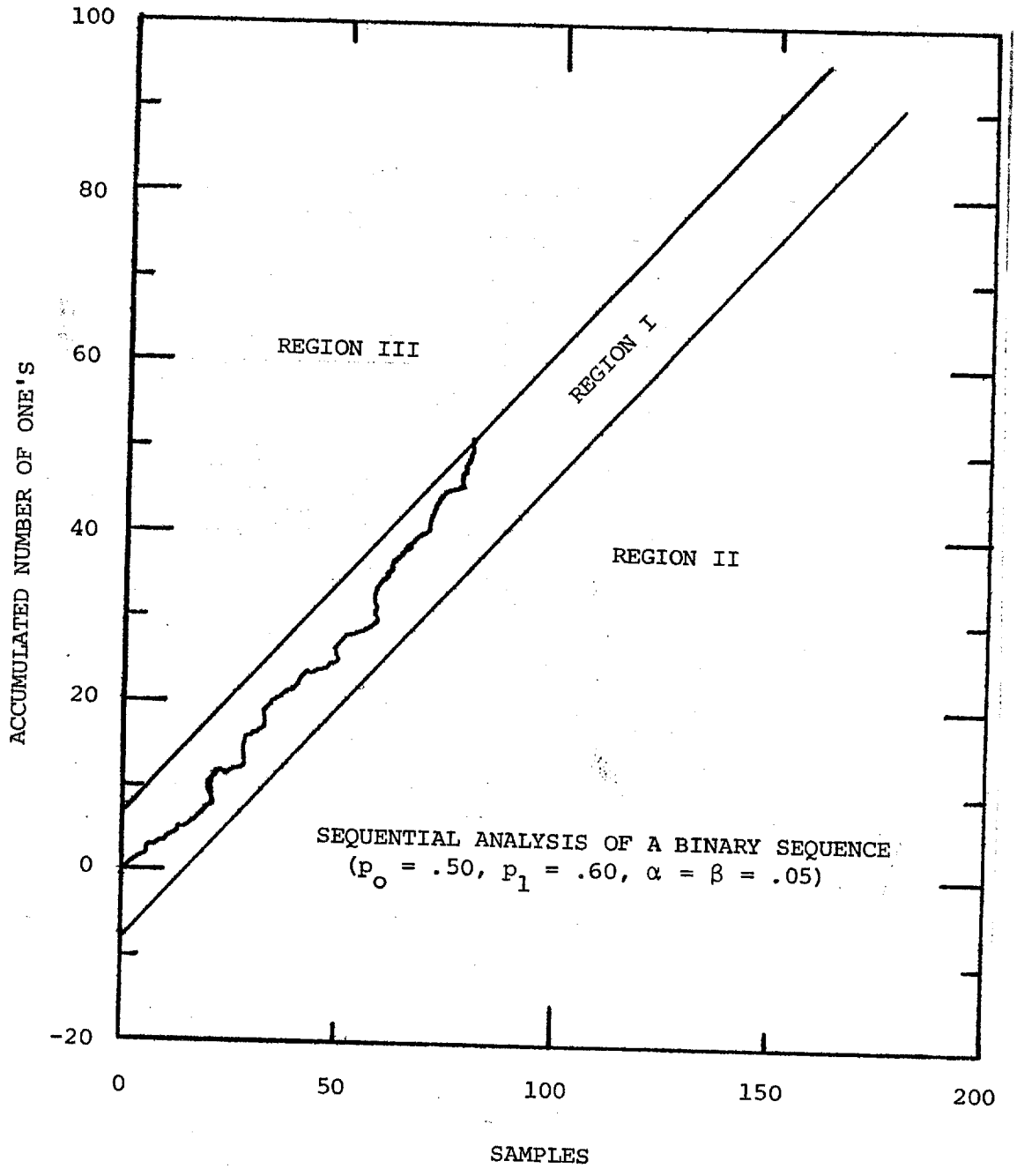

FIGURE 2: IF THE ACCUMULATED NUMBER OF 1's ENTERS REGION III, THE SEQUENCE IS ACCEPTED AS PERTURBED. If it enters Region II, the sequence is accepted as unperturbed, and no decision is made while the accumulated number of 1's remains in Region I.

experiments of this type are that the recording and display hardware are stable with respect to remote perturbation processes. It is possible to examine partially the validity of these assumptions with suitable hardware redundancy. We plan to record the raw noise data prior to analysis, and to record the feedback display on video tape during the experiment, using the second channel of the display facility. After the participant has left the area, a comparison can be made between the actual display during the experiment and the display which is now generated from the recorded raw data of the experiment. If there is a disagreement, we are able to isolate the perturbation to the analysis display (as opposed to source) hardware. An agreement between the two displays is an indication that the initial assumptions are valid.

APPENDIX C

AN OUTLINE OF TESTING PROCEDURES TO BE USED IN PHASE I

(U) APPENDIX C: AN OUTLINE OF TESTING PROCEDURES TO BE USED IN PHASE I

1. INTRODUCTION

During Phase I, an LSI-11 computer based random number generator will be constructed and certified as "random." The following is an outline of the testing procedures that will be implemented.

2. SUB-SYSTEM TESTING

a. Haitz Noise Diode

(1) Measure filtered and raw power spectra, and filtered pulse height distribution as a function of the following:physical parameters:

(a)	Diode reverse current for	60-200 μ amps
(b)	Reverse current of 100 μ amp (manufacturers recommendation)	
-	Temperature	-40° to $+40^{\circ}C$
-	Magnetic field	6000 gauss (parallel and perpendicular to the diode junction
-	Low intensity gamma ray irradiation	1.33 MeV

(2) Measure filtered and raw power spectra, and filtered pulse height distribution at 100 μ amps reverse current at $20^{\circ}C$ with the diode and temperature sensor mounted in its final package.

b. Electron Detector

(1) With detector and source mounted in the final assembly, confirm manufacturer's noise specifications, and measure the ^{147}Pm beta decay pulse height spectrum and compare with the known spectrum.

(2) Confirm that amplifier and pulse shaping system IC's are functioning per manufacturer's specification.

c. Pseudo Random Generator

Generate the entire number set (2^8-1) and compare with expected number set.

d. Sequential Analysis

Using tested computer algorithms for random number generation, Monte-Carlo test the sequential analysis formalism.

e. Computer and Display Sub-System

(1) As there appears to be no evidence to the contrary, we will assume that the manufacturer's specifications of mean-time-between-failure to be an approximate measure of these sub-systems' susceptibility to possible environmental factors such as geophysical phenomena and cosmic rays.

(2) We shall consider what thresholds must be exceeded before extreme environmental factors such as gamma irradiation become important.

(3) These sub-systems must, of course, meet the usual acceptance criteria applied to such apparatus before they are declared operational.

3. COMPLETED SYSTEM TESTING

Once the total system meets design specifications and is decloared operational, a complete series of tests will be initiated.

a. Each of the "true" random sources will be subjected to at least the following statistical tests.

- Frequency test
- FFT tests
- Serial test
- Gap tests
- Yule test (5-digit sums)
- Autocorrelations test
- Conditional bit tests
- D^2 test
- Runs-of-length-n test
- Sum-of-n test
- Maximum/minimum-of-n test

b. The pseudo-random generator must produce the expected sequence.

c. All generators will be used individually in Monte-Carlo confirmations of the sequential analysis.

d. Finally, the various procedures to be used in Phase II will be simulated with extensive Monte Carlo runs.

APPENDIX D

VOLUNTEER CONSENT FORM

(S) APPENDIX D: VOLUNTEER CONSENT FORM (U)

(S) INTRODUCTION

(S) Each participant will be provided a written description of the experiment which contains essentially all the information in this document. If desired, any aspect of the experiment will be elaborated upon to the satisfaction of the participant. He will then be asked to sign the form shown on the following pages.

VOLUNTEER CONSENT FORM

I, _____, *SSN* _____, *having attained my eighteenth (18th) birthday, and otherwise having full capacity to consent, do hereby volunteer to participate in this program to determine the nature, and possible applications of inherent psychic abilities. I have been provided documentation and oral clarification as desired by* _____ *detailing all aspects of this program. I am thus aware of the following items and have initialed the summary statements on the reverse side of this agreement.*

a. The nature, duration, purposes, and expected benefits of the program in which I will be participating.

b b. The methods and means by which the program is to be conducted; any methods and means that are expeimental will be identified as such.

c. The inconveniences, hazards, discomforts, risks or other effects on my health or person which may possibly come from my participation in the program.

d. The alternative procedures, if any, that might be employed to protect or further my health and well-being. I have been given an opportunity to ask questions concerning this project and any such questions have been answered to my full and complete satisfaction. I understand that I may at any time during the course of this project revoke my consent and withdraw from the study without prejudice; however, I may be requested to undergo certain further examinations, if, in the opinion of a qualified physician, such examinations are necessary for my health or well-being.

_____ _____

(Name) *(Date)*

I was present during the explanation referred to above, as well as the volunteer's opportunity for questions, and hereby witness his signature. I am not involved in the program in any way.

_____ _____

(Name) *(Date)*

1. (S) Explanation of the Experiments: The purpose of these experiments is to determine the extent to which a person is able to mentally perturb or affect sensitive electronic equipment. In this case a random number generator will control a variety of different video displays generated by a small computer. Your interaction with the computer is to be by mental means alone. You will be asked to try to make changes in the video display; or, in biofeedback terminology, to use passive volition to produce the desired change. We are naming this interaction between a person and a remote system "remote perturbation", or "RP", for short. We are endeavoring to both foster and understand these abilities.

(S) In the course of these experiments, no drugs, hypnosis, psychopharmacological agents of any kind, or subliminal stimulation will be used.

2. (S) Explanation of the Procedures: You will be asked to sit in a comfortably appointed environment on Redstone Arsenal (see photograph). A video display will be present which you may attend to if you wish. In the course of a half-hour session, a number of electronically controlled runs will be carried out, in which you will be asked to try to cause a change on the video monitor, by an act of will. You will receive immediate feedback, if you wish, to assist you in gaining conscious control over the remote perturbation abilities we are examining. You will be asked to participate in no more than one half-hour session in the morning, and one half-hour session in the afternoon. At any time, you may decline to take part in either session, without prejudice to your continued participation in the program.

3. (S) Description of Reasonably-Expected Inconveniences, Hazards, Discomfort, Risks, or Other Effects: There is no known evidence for any adverse effects or risks associated with participation in research of this type. Investigations such as these have been carried out in laboratories for almost a hundred years in the United States and in England, and there is no record of any type of hazard or discomfort to a participating subject.

4. (S) Description of Any Alternative Procedure that Might be Employed to Protect the Subject's Health: There is no known risk to protect against.

5. (S) Description of Alternative Advantages to the Volunteer: He has opportunity to gain conscious control over otherwise latent or unconscious processes within himself.

6. ( ) Questions Posed by Volunteer--and Answers: (To be filled in.)

Volunteer will initial end of each of the above paragraphs.

APPENDIX E

MEDICAL FACILITIES AND PROCEDURES

(S) APPENDIX E: MEDICAL FACILITIES AND PROCEDURES (U)

1. (U) PERSONAL INJURIES OR ILLNESSES

a. General

When accidents occur involving personal injuries to project members or subjects, or when a project member or subject experiences a sudden onset of illness, the supervisor shall:

(1) Ensure that the project member or subject receives first aid and medical care immediately;

(2) If the accident or illness is serious enough to warrant additional assistance, dial 6-5854 for the emergency room, Fox Army Hospital, Redstone Arsenal, AL, and, if necessary, 6-6110 for ambulance service to the hospital;

(3) Investigate the accident or illness, and prepare in duplicate an Accident/Illness Investigation Report. This report must be submitted to the Project Manager or his designee the same day. The Project Manager will sign the report and forward the original to Occupational Health, Bldg. 7110, Redstone Arsenal, AL 35809.

b. Medical Assistance in Case of Injury

The Fox Army Hospital, Redstone Arsenal, has been designated to handle accident and illness cases occurring on-post at Redstone Arsenal. The emergency room service is available 24 hours a day, seven days a week.

2. (U) EMERGENCY RESPONSE PROGRAM

The Project Manager, or his designated alternate, is responsible for the preparation of the Emergency Program and the coordination of all emergency activities. He has complete authority to take whatever action is necessary to protect human life or property in time of an emergency.

3. (U) PROCEDURE

In the event of, and depending on the type of emergency, the person involved will as soon as practical:

a. Dial 117 for Fire Department

b. Dial 6-6110 for ambulance service

c. Dial 6-5854 for Medical Officer of the Day (Fox Army Hospital)

d. While waiting for assistance and ...

(1) if the injured person is bleeding profusely, the first aider should try to stop the flow of blood (e.g., direct pressure should be applied over the wound, and if necessary a tourniquet should be applied);

(2) if the injured or ill person is not breathing, the first aider should apply mouth-to-mouth resuscitation or whatever method he is most familiar with, in order to revive the injured person as soon as possible;

(3) if the injured or ill person is suffering from shock, he or she should be wrapped or covered with a blanket.

Emergency on-post ambulance service may be obtained on a 24-hour basis. A driver and attendant will be present with each ambulance. These personnel will be familiar with and capable of operating the emergency life saving apparatus installed in the ambulance.

4. (S) INSURANCE COVERAGE

a. (S) Medical and Disability Benefits

Participants in the Remote Viewing activities will fall into three classes, with resulting differences in their insurance coverage.

a. (S) SRI Employees (California): Their participation in the project will be as part of their employment at SRI. Therefore, if they sustain any injury or illness as a result of their participation in the project, they would be entitled to the benefits of Worker's Compensation Insurance, as prescribed by the State of California. These benefits include full medical treatment, reimbursement for lost wages (subject to statutory limitations), and awards for permanent disability, if any.

b. (S) U.S. Government Employees: Their participation would be in the course of their employment with the U.S. Government, and so they would be entitled to the federal equivalent of Worker's Compensation Insurance benefits.

c. (S) Individual Consultants: As independent contractors, consultants would not be covered by Worker's Compensation Insurance, nor would they be covered by any of the insurance benefits available to SRI employees or government employees. They would have to look to their own personal insurance for protection.

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