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Interim Report, Objective H, Task 1, Deliverable a

INITIAL PROTOCOL FOR REMOTE ACTION INTERACTIONS WITH α-PARTICLES

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Prepared for:

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SRI International

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Covering the Period 1 October 1986 to 31 March 1987

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SRI Project 1291

Approved by:

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I INTRODUCTION

SRI International has designed and constructed hardware that it will use to test for the existence of remote action (RA) by examining the geometrical distribution of a beam of α–particles as a function of mental effort by selected participants. The hypothesis is that RA will deflect an α–particle to a position where it would never appear under control conditions. In the proposed experiment, a low–intensity collimated beam of α–particles will be allowed to drift approximately 1 cm, in a vacuum, from the radioactive source to a position sensitive radiation detector. The detector will be capable of registering the arrival of single particles. During the experiment, individuals will be asked to deflect particles from the beam by "mental" means alone. The conceptual outline of the experiment was reported in FY 1986. Figure 1, below, reproduces that orginal concept for reference.

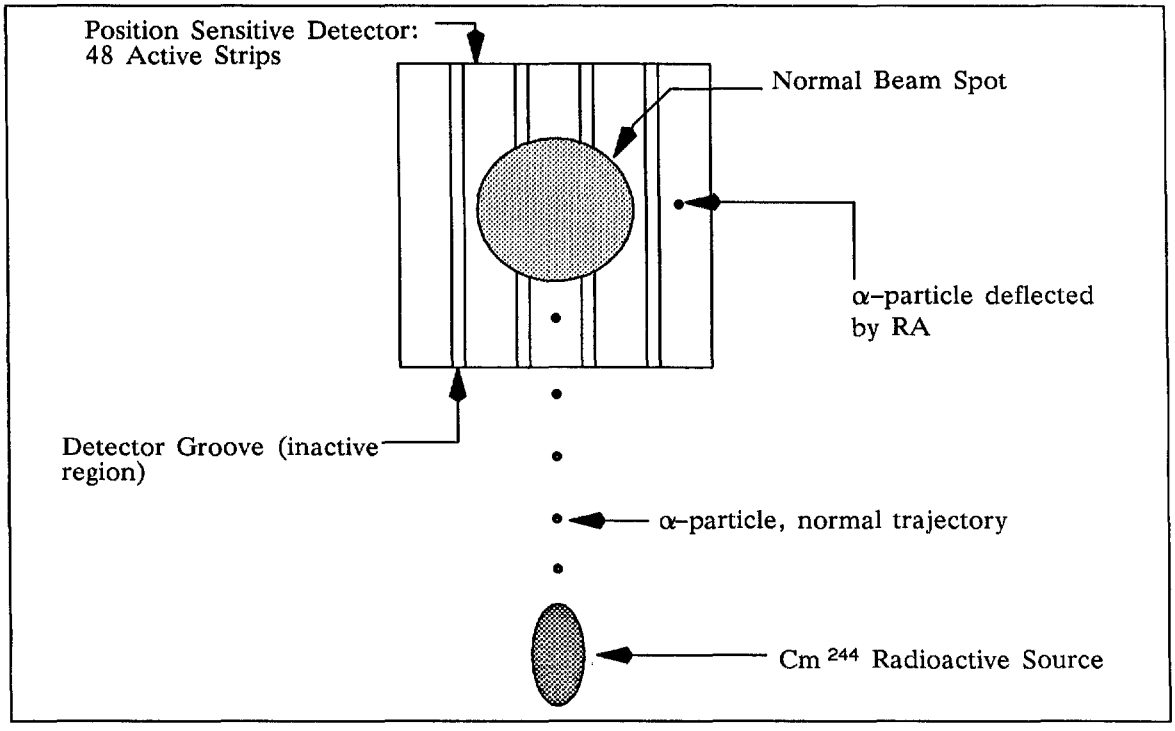

FIGURE 1 CONCEPTUAL CONFIGURATION OF AN α–PARTICLE EXPERIMENT

An initial protocol for an RA experiment using α–particles as the target element has now been devised. Development and testing of the α–particle detector instrumentation, computer controlled display of data, examination of potential artifactual influences, and determination of potential participants have proceeded during FY 1987. The status of each area is outlined in the section on method of approach.

The design for this experiment stems from the following argument: If RA manifests itself as a causative effect upon matter, then it may well be mediated by one of the known fundamental forces of nature [strong or weak nuclear forces, gravity or electromagnetism (EM)]. Many of the macro–RA studies cited in the literature on parapsychology appear to be electromagnetic in their effects (bending metal, affecting electronic apparatus, moving small objects). Soviet and Eastern Bloc researchers have coined the term bioelectromagnetism to characterize many of their observations. Because EM is very well understood and quantifiable, particularly in comparison to the other forces, we proposed that an RA target be selected that is fundamentally sensitive to EM. Ideally, the electron, a basic unit of electric charge can be used; however, practical engineering difficulties eliminated electrons as an RA target. Similarly, hydrogen ions (a single positive charge) are difficult to use and potentially dangerous as molecular hydrogen (H_2). The best alternative is the α–particle, which has two positive charges and is relatively easy and safe to manipulate.

II METHOD OF APPROACH

A. Hardware Considerations

1. Detector Instrumentation

During FY 1986, the necessary detector apparatus was specified and purchased or fabricated. This equipment has now been tested for use in the proposed RA experiment and has been modified or improved where necessary. Figure 2 shows the schematic arrangement of the apparatus. The activity level of the radioactive source has been verified with a

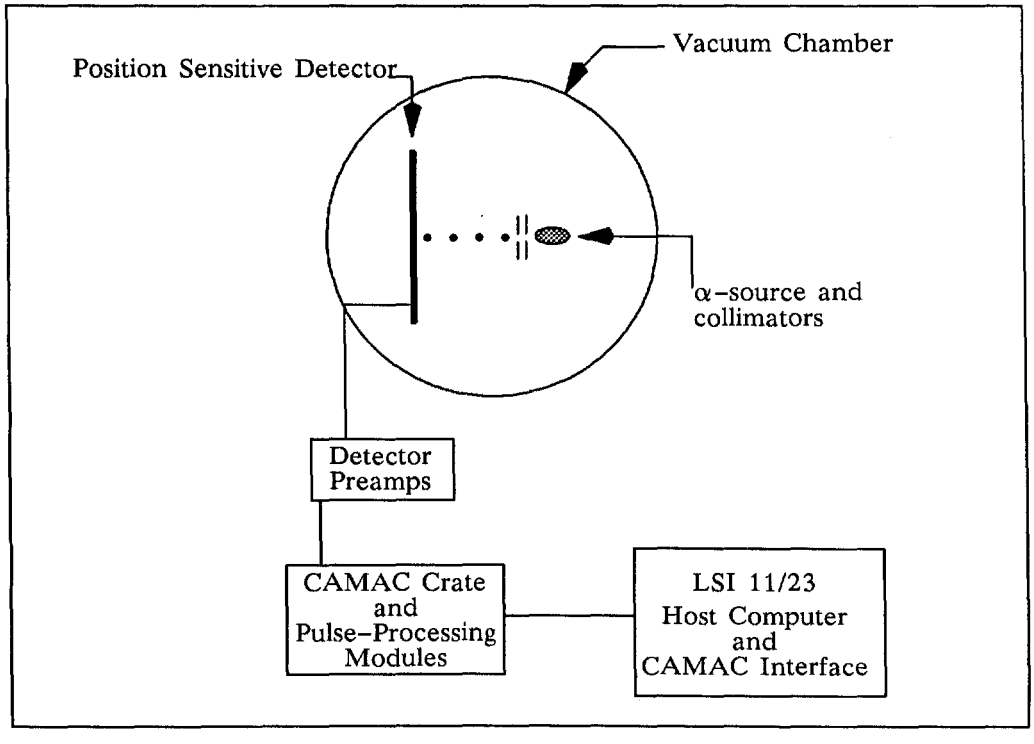

FIGURE 2 SINGLE α–PARTICLE RA APPARATUS

Geiger–Mueller Tube detector system with an appropriate thin entry window. It is in the range of ~100 cts/s, which will be adequate for the the experiment. The operation of the multiple strip detector system has also been tested with a single channel preamplifier unit and

was functioning properly after the system noise had been properly filtered by use of an appropriate amplifier time constant. Principal difficulties encountered in the pilot work with the detector centered on proper alignment of 48 parallel channels and suppression of electronic noise pickup from the environment. The first problem was solved by carefully rerouting and checking all wires, vacuum feedthrough connectors, and computer register inputs. Noise interference has been suppressed by several techniques, including identifying and removing ground loops, establishing a substantial ground plane next to the detector, supplying a shielded connector inside the vacuum chamber, and replacing twisted pair wires with coaxial cable.

2. Data Display

With the help of a Geoscience and Engineering Center specialist in real-time computer systems, the LSI 11/23 computer, Computer Automated Measurement and Control (CAMAC) interface and data inputs have been made operational. We now are able to identify which of 48 possible detector strips have been activated, to save the position data, and to reinitialize the system rapidly for another cycle. The position information is transmitted via the CAMAC interface to the LSI 11 computer where it is stored in a memory buffer. The data are then shown on a video display screen and printed out for later inspection. At present, this process is repeated each time any detector strip has been activated. Early in the third quarter of FY 1987, we anticipate improving of this process to include a continuous updating of the video display, which will serve as the feedback to the participant while he is attempting to influence the flight of α-particles. Schematically, the new display may appear as in Figure 3.

3. Artifactual Influences

We have initiated measurements of potential sources of artifact that may influence the flight of the particles or add extra noise to the electronics.

The room in which the apparatus is located contains a transmission electron microscope (TEM) with its attendant high voltage power supply, typical industrial fluorescent lighting, as well as the video display terminal and other computer equipment. Measurements of magnetic field transients indicated that shielding was needed near the detector apparatus. A metal shield for the source-detector assembly is being made, and we anticipate installing and testing it early in the third quarter. This shield will also serve to suppress ambient electric fields. A TOPAZ power conditioner was purchased and installed to suppress or eliminate power line surges resulting from switching of other nearby apparatus such as the TEM. The

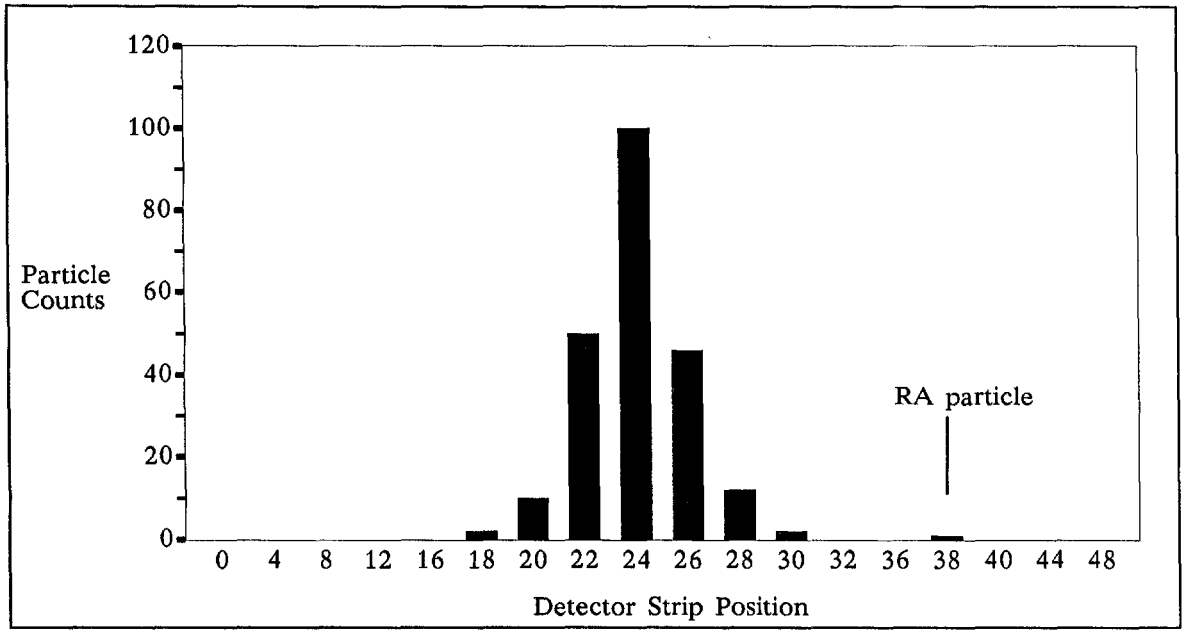

FIGURE 3 SCHEMATIC REPRESENTATION OF VIDEO DISPLAY, SHOWING NORMAL PARTICLE DISTRIBUTION AND ONE RA DEFLECTED PARTICLE

power conditioner meets severe IEEE and Mil-Std specifications for noise and transient suppression and appears to have successfully eliminated such problems.

B. Participant Selection

A request for clarification about potential RA participants was made to the COTR through SRI's program director. Although outside RA participants recruited through the John F. Kennedy University subcontract will be used in the SRI study of RA effects on piezoelectric transducers, it was decided that these individuals will not be appropriate for the α-particle experiment. The COTR has specified that only certain individuals should participate in the α-particle experiment. Accordingly, we have are considering several possibilities, including using experienced remote viewers who have expressed some interest in or demonstrated some previous ability at RA, screening SRI staff with pilot trials, and contacting individuals who participated in the FY 1980 random number generator RA study.[1]* We anticipate beginning the process of selecting participants in the third quarter of FY 1987.

* References are listed at the end of this report.

C. Data Collection

By late third quarter of FY 1987, we anticipate beginning exploratory and pilot RA trials using the α-particle experiment. Typical experimental protocols will include three types of data collection:

- Global Control Trials: Data collection for many hours with no attention placed on the target element. This technique establishes the long-term performance of the system and determines the unperturbed artifact production rate. To establish RA effects [as distinguished from intuitive data sorting (IDS)], the artifact rate must be zero above a predetermined noise threshold.[2]

- Local Control Trials: Data collection just before or just after an experimental session, with no attention placed on the target element. These trials are intended to confirm the proper operation of the system immediately before or after an RA session. Because both ordinary scientific experiments and RA literature contain evidence for "relaxation" or "linger" effects that persist after an interaction,[3] local control trials are sometimes defined as only those immediately before an experimental session.[1]

- Experimental Trials: Data collection during an RA session when mental intent is focused on the the target element. Usually, periods of effort are interspersed with periods of rest. Periods of effort in RA sessions may be from 5 to 20 minutes long, with, ordinarily, no more than three effort periods in a day and sometimes only a single trial. The timing and spacing of RA sessions depends on the participant and must be determined empirically.

In the present experimental configuration the participant will be about one meter from the radioactive source and detector electronics. In order to determine whether the presence of an individual influences the system, we will record control trials both with and without people present in the experimental area.

A typical experiment might proceed as follows: Prior to the arrival of the participant, an individual serving as the session experimenter enters the experimental area and checks all equipment for proper operation. A local control trial is then conducted in order to record the baseline performance of the system. The experimental session is then carried out, potentially consisting of three periods of effort interspersed with with two periods of rest. During the periods of effort, the subject's task will be to affect the particle's flight by mental means alone, thereby producing an event well removed from the ordinary beam spot. In

practice, the participant's attention will be focused on a video display screen that will show the cumulative counting of particles as they arrive.

During the period of rest, the participant will be asked to direct his attention away from the apparatus and engage in some other activity such as reading. However, at this point in the development of an RA protocol we cannot predict with any confidence the degree of control a participant may be able to exercise over an RA ability. For example, in the parapsychological literature there are reports of "release of effort" or "unintentional" effects that occur immediately after a period of effort.[4] Provided the normal artifact rate is zero, we will report all data produced during the entire experimental session, regardless of whether it is termed "rest" or "effort."

As indicated above, we will define the pre-session local control period as that immediately prior to the experimental session. Control trials will also be conducted immediately after the experimental session. These post-session control trials will be examined for the possible existence of linger or relaxation effects as described earlier.

We will collect data about the position of all α-particles as they arrive at the detector. As a consequence, we shall be able to conduct an IDS experiment in parallel with the RA effort. A statistical comparison of the distribution of particles during the periods of effort and control will show whether the participant has selected an effort time when the normal fluctuation of particle positions is significantly different. This additional analysis will complement the search for causative RA effects.

III DISCUSSION

We stress the exploratory nature of this experiment as a test of the existence of RA. There is no precedent in the parapsychology literature for using the position of α–particles as an RA target. Consequently, certain psychological factors such as visual contact with the target and type of feedback will have to be developed as the experiment proceeds. For example, α–particles are not visible to the naked eye as is the piezoelectric transducer[2] nor does the particle emit background noise that can be amplified as feedback for the subject as with the piezoelectric element. We believe that suitable participant feedback and psychological setting can be created for this study, but the pilot nature of the entire experiment dictates that, at this time, we not commit the extensive resources being dedicated to the piezoelectric experiment. That is, we will depend primarily on control trials to establish the stability of the system and will not employ elaborate security measures or exhaustive environmental monitoring. Should we detect candidate RA effects with the precautions normally observed in a standard radiation measurement experiment, we will proceed with more extraordinary precautions.

IV REFERENCES

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2. Hubbard, G. S., and Isaacs, J. I., "An Experiment to Examine the Possible Existence of Remote Action Effects in Piezoelectric Strain Gauges," *Final Technical Report,* Project 1291, SRI International, Menlo Park, California (December 1986).

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