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Final Report
Covering the Period October 1983 to October 1984

May 1985

PHOTON PRODUCTION (CHINESE REPLICATION) (U)

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WASHINGTON, D.C. 20301

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I OBJECTIVE (U)

(S/NF) The objective of this task was to examine and replicate foreign work in psychokinesis (PK) (SOW 2.4.1, FY 1984).

II EXECUTIVE SUMMARY (U)

(U) Our intention was to conduct a conceptual replication of the work published by the People's Republic of China (PRC) in which they claimed that "effects" upon physical systems can be observed during successful remote viewing* (RV) sessions. Specifically, we experimentally examined their claim that light is emitted in the vicinity of correctly identified RV target material.

(U) To accomplish this task, we used remote viewers from existing RV programs who had previously demonstrated RV ability. Because we had little evidence that our viewers were capable of identifying symbols, we utilized our well-characterized *National Geographic* Magazine target material.

(U) In reproducing the PRC experiments, we took exceptional care to equal or improve the equipment and protocols wherever possible. We used a state-of-the-art, ambient-temperature, photon counting system to monitor the target material (35-mm slides of the *National Geographic* Magazine photographs). In our study, the viewers were not allowed to handle the apparatus (contrary to the parameters identified in PRC reports).

(U) A single RV session involved remote viewing a target slide that had been placed in the photon counting apparatus. (We utilized standard RV protocols developed in other parts of the FY'84 program.) The analysis of the data from the session consisted of a quantitative assessment of the remote viewing (figure of merit), and various measures derived from the data produced by the photon-counting system.

(U) We collected data from a total of 22 sessions using four of our best RVers. The RV analysis demonstrated evidence of target material contact that was consistent with the viewers' earlier work. The statistical measure (derived from the photon-counting apparatus) that best represented the data collection used in the PRC work showed a significant correlation with the RV results ($p \leq 0.035$). That is, when the remote viewing was good,

*(U) RV (remote viewing) is the acquisition and description, by mental means, of information blocked from ordinary perception by distance or shielding.

(U)

there was an increase in the signal detected by the photon–counting system. When the viewing was less accurate, a smaller signal was detected by the counting system. One RVer demonstrated independently significant correlations ($p \leq 0.007$ and $p \leq 0.022$) between his/her viewing and photon–counting signals.

(U) Out of the 22 sessions, we recorded two that contained a photon–counting anomaly resembling those reported by the Chinese. In each case, the anomaly was detected with a signal–to–noise ratio of about 20–40:1. This ratio is far below the 100–1000:1 reported by the Chinese, however, other characteristics that we observed were in agreement with their work.

(U) Overall, our results indicate that we observed a weak effect which supports the PRC claims that correct RV acquisition of information perturbs physical systems. We had no evidence of the consistently large effects that they had reported. Because our protocols (hardware and procedural) were significantly better than those reported, and because our experimental conditions were different (i.e., target material, RVers, etc.), we have confidence that our results are not likely to be the result of artifact.

(U) To confirm the effect and to examine the mechanisms, we recommend that the experiment be repeated. We suggest (1) improved photon–counting hardware to eliminate all thermal noise, (2) a mixture of target material to provide a more exact replication of the claims, and (3) a wider variety of viewers to increase the quality of the remote viewing.

III INTRODUCTION AND BACKGROUND (U)

(S/NF) We have attempted to assess the possibility of constructing an intrusion detector that would be sensitive to remote viewing (RV) of facilities. In order to perform this task, we have surveyed many reports of psychokinesis (PK) in the open and classified literature.[1] * While a few of these papers seemed to document genuine psychoenergetic phenomena, none really served as an exact model for testing physical correlates at the site of RV activity. Since that survey was conducted, new reports of PK experiments by physicists in the People's Republic of China (PRC) have emerged.[2-3] The two papers cited contain brief descriptions of experiments in which individuals with "exceptional vision" affected physical systems (film, photomultiplier tubes, and plants) when correctly identifying Chinese language characters hidden with the test apparatus.

(S/NF) As the Chinese themselves point out, the photomultiplier (PM) tube has the best sensitivity, stability, and response to transients of the three systems examined. For these reasons, we concluded that a replication of the PRC experiments (using SRI International RV participants and a PM tube) afforded the most promising test of intrusion detection. While investigating the intrusion concept, we would be able to replicate foreign work in PK as well.

(U) Specifically, the Chinese reported that PM-tube-count rates of 10^2 to 10^3 greater than background rates have been produced during "exceptional vision." Their signal discriminators were set to produce a background of about 15 counts/s. Although the Chinese claim to have eliminated sources of experimental artifact such as light leaks, electromagnetic interference, and the like, at least one report states that individuals "must touch the surface of the light-proof material" or the effect is not produced.[2] This procedure seems such an obvious potential source of artifact that we excluded touching entirely in our investigations. The PRC experiments also reported that the anomalous signals produced during exceptional vision were primarily large-amplitude pulses which appeared rapidly ($\sim$1 s rise time).

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*(U) References are listed in order of appearance at the end of this report.

(U) We have carefully examined these claims and present our techniques and findings in the following sections.

IV METHOD OF APPROACH (U)

(U) Our goal was to test for the presence of a physical correlate to successful remote viewing. Specifically, we performed a conceptual replication of work published by physicists from the People's Republic of China.[2-3] The PRC papers claimed that correct psychoenergetic identification of Chinese characters, which were being monitored by a photomultiplier (PM) tube, resulted in large changes in the output of that tube. Count rates of 10^2 to 10^3 greater than background were reported. The Chinese speculated that light (photons) was being produced at the target when the characters were identified.

A. (U) Hardware

(U) To test the PRC claims, we devised a photomultiplier-tube, light-detector system plus a remote-viewing procedure that paralleled the Chinese efforts. In order to make use of techniques developed in a concurrent RV training program, we selected 35-mm slides of *National Geographic* Magazine photographs as our target material.

(U) A light-tight slide holder, which could be easily opened and closed, was fabricated and fitted to the end flange of the photomultiplier-tube housing. The slide was positioned within approximately 1 cm of the active surface of the PM tube.

(U) The PM tube was selected to have an active area equal to or greater than the film area of the slide. In addition, we required that the tube be sufficiently broadband and sensitive so as to equal or surpass the device used by the Chinese. We also required that the dark-count (background) rate be as low as possible at or near room temperature. (Very low background-count rates can be achieved by cooling PM tubes to -20^oC, but the additional complexity, expense, and deviation from the PRC experiments prevented us from using cooling in this series of investigations.)

(U) The output of the PM tube was processed and displayed by state-of-the-art instrumentation used in nuclear radiation spectroscopy. We selected the multichannel-scaling (MCS) mode of signal processing as the most appropriate for our experiment. In this type of

(U)

data acquisition, the amplified pulses from the PM tube were counted for a specific length of time (0.9 s), and the resulting total was stored and displayed. A histogram was then constructed showing the count rate of the tube over the duration of the experiment (~ 15 min).

(U) Because the voltage output of a photomultiplier tube is directly proportional to the intensity of the incident light source, we decided to set two "windows" on the PM tube signal. One window displayed the entire voltage-range output, which is dominated by numerous, small-amplitude background pulses. We designated this window Region I. The window for Region II was adjusted to show only large-voltage pulses. In this fashion, we were able to monitor the system for either of two possible outcomes:

- A significant increase in the number of small amplitude pulses.
- An increase in the frequency of relatively rare, large-amplitude events.

The Chinese claim that an individual with "exceptional vision" produces an anomalous signal from the PM tube that primarily consists of large-amplitude pulses.[2]

(U) Because the PM tube was in total darkness and no light-emitting materials were included in the sample chamber, all background counts were caused by thermionic emission at the photocathode or dynodes. A photon striking the photocathode will produce a signal that is indistinguishable from those resulting from thermionic emission. Therefore, we could not say conclusively in our experiment whether a statistically significant increase in count rate (above background) is caused by enhanced thermionic emission or by photon production. For simplicity in this report, we have referred to the putative effect as "photon production," and have calculated our results assuming that photons are striking the photocathode in the PM tube.

(U) A multichannel analyzer (MCA) with four inputs received, sorted and stored the signals coming from the two windows. A third input was connected to a signal generator, which could be triggered by a microswitch in the adjoining RV room. (The fourth input was a spare.) The microswitch was used to mark the beginning and end of data taking in the RV session. (Details of the sessions are contained in the methodology section.) A schematic of the equipment used is shown in Figure 1.

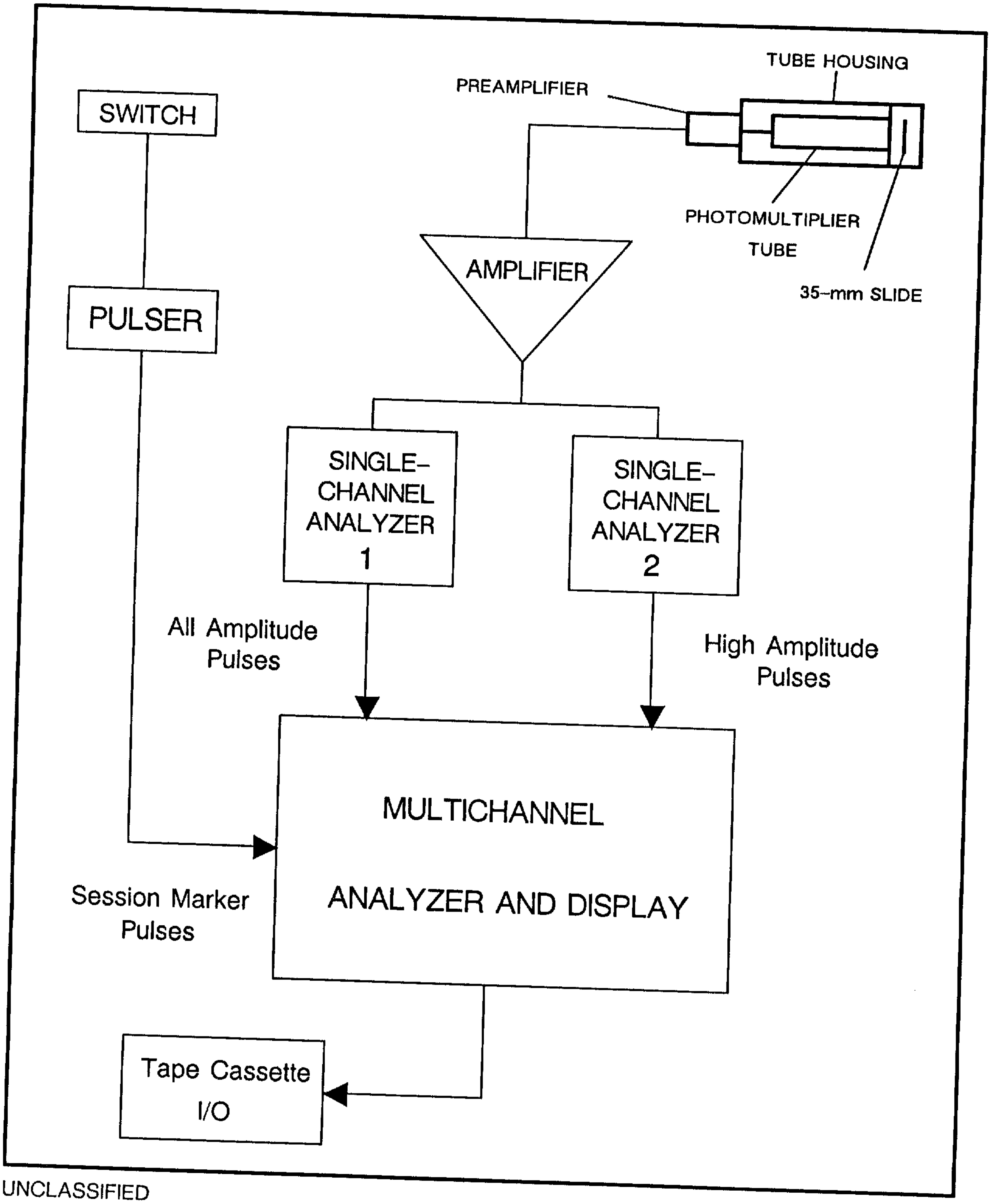

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FIGURE 1 (U) SCHEMATIC DIAGRAM FOR THE PHOTON-PRODUCTION EQUIPMENT

(U) Following an experimental session, the data collected by the MCA was transferred to cassette tape. The cassette was subsequently read into a computer for analysis (see Photomultiplier-Tube Analysis, Section D below). The count rates during control periods in our two regions of interest were approximately 300 s^{-1} and 10 s^{-1} respectively. Because a single photon can produce a count, we were sensitive to an increase of approximately $\sqrt{N}$ photons, where N is the count rate. This figure would correspond to about 50 to 60 excess counts in Region I, and as few as 3 to 4 excess counts in Region II.

(U) We exercised considerable care in reducing the sources of experimental artifact. The PM-tube housing and slide holder were light-tight and constructed of metal, which was grounded and shielded against rf, magnetic, and electrostatic fields. In at least one Chinese report, the light proofing of the PM tube was accomplished by using only layers of black cloth. Our entire PM-tube housing was further enclosed in a standard, photographer's film-changing bag so that slide selection and insertion could be accomplished in the dark.

(U) We found it necessary to isolate and filter the 110-V ac power to the experimental setup. Line transients produced by nearby heavy machinery caused spurious peaks to appear in the PM-tube output until suitable filters and surge suppressors were installed.

(U) In summary, our overall method of approach was to construct the most rigorous replication of the Chinese reports possible using off-the-shelf, state-of-the-art hardware. Should an extraordinary effect be observed, we could upgrade various elements of the system to include more specialized or specially selected hardware.

B. (U) Methodology

(U) A detailed outline of a typical RV session monitored by the PM-tube hardware is contained in the appendix. Our goal was to conceptually reproduce the procedure carried out by the Chinese while using techniques with which we were familiar, and which were consistent with rigorous work. For example, we did not allow the subject in the RV session to touch the photomultiplier-tube housing. In at least one of the Chinese papers, the authors specifically state that the subject "must touch the cloth" covering the PM tube.[2]

(U) The slides serving as targets during the session were prepared from a pool of 112 *National Geographic* Magazine photographs. Each slide was placed in a separate opaque envelope marked with an identification number. Prior to each session, four slides were

(U)
selected from the target pool by a random number generator. All four slide envelopes were placed in the changing bag with the PM-tube housing, then shuffled. One envelope was selected; the slide was removed and placed into the special holder that covers the PM tube. This procedure ensured that the slide selected was unknown to the viewer and the experimenter.

(U) The photomultiplier tube and its preamplifier were both positioned in the same room used for the RV session. Connecting cables for signals, high voltage, and the like, were run through a utility access space into an adjoining room where the instrumentation for amplifying and counting the PM-tube signals was located. The viewer and the experimenter always accompanied each other when it was necessary to enter the instrumentation room during the course of a session. At all other times that room was locked.

(U) Prior to the arrival of a viewer, the experimenter selected the four slides, checked the equipment for proper functioning, shuffled the envelopes, then loaded the target slide. To achieve a relatively constant background-pulse rate, we always cooled the exterior of the PM housing and changing bag with a plastic bag of ice.

(U) This moderate form of cooling was necessary because the RV session room would get quite warm during afternoon sessions. A rise in temperature to about 26^0 C was sufficient to increase the background-count rate a factor of two or three over that observed in the morning session. Cooling with ice allowed us to maintain the temperature of the PM tube near 20^0 C for all sessions. With a more elaborate housing, it is possible to exactly stabilize the temperature of the tube and, hence, its dark noise. The additional expense and inconvenience did not seem justified, however, for three reasons:

(1) The Chinese experimenters' report changes from background rates on the order of 10^2 to 10^3. We would surely observe these effects even with a background drift of a factor of two.

(2) Our data analysis was always based on two minutes of control run recorded immediately prior to the first RV response.

(3) The variable temperature housing contains a double-quartz window and additional flanges to facilitate rapid sample changing. These additions would have increased the sample-to-PM-tube distance from 1 cm to 6.7 cm, and would have caused a significant deviation from the PRC methodology.

(U) After the arrival of the viewer, three minutes of data were collected with no one in the RV room. (The first minute was always discarded in subsequent analysis because of transients occurring when voltage was again applied to the PM tube after installing a slide.) The viewer and experimenter then entered the RV room and performed an RV session following procedures developed in other sections of the SRI program.[4] Each time the viewer was ready to give a response in the RV session, the experimenter marked that time with a press of a microswitch. Closing the switch briefly sent a series of TTL logic pulses, which were registered in the MCA memory. After the response, the experimenter again closed the switch for 1 to 2 s. These two bursts of pulses clearly defined the period of psychic effort for future analysis of the PM-tube output. Following the session, the viewer and experimenter once again returned to the instrumentation room where the accumulated data were read out onto a cassette tape. Once this process began, the pair returned to the RV room, where the target slide was removed from its holder and displayed to the viewer.

(U) Following the departure of the viewer, the experimenter rechecked the apparatus and left it ready for the next session. Following the manufacturer's recommendations, all primary hardware (PM tube, amplifier, MCA, etc.) remained turned on. The data tape remained in place until filled (~15 sessions), and was then removed for further analysis.

C. (U) Hardware (Details of Construction)

(U) In nearly all cases, we purchased state-of-the-art, off-the-shelf instrumentation. Where required, special-purpose items were fabricated at SRI. Specific details follow:

- **Photomultiplier Tube**--Thorn/EMI low-background, high-performance PM tube, Model 9829 QB; peak spectral response at 400 nm with 28 percent quantum efficiency. The tube is sensitive from 200 nm (ultraviolet) to 600 nm (red light). A sample spectrum is shown in Figure 2.
- **Photomultiplier-Tube Housing**--Pacific Instruments Model 3262 RF; nickel-plated steel with electrostatic magnetic and rf shielding. This housing was designed for ambient temperature use.
- **Photomultiplier-Tube Preamplifier**--Canberra Model 2005, charge-sensitive preamplifier; conversion gain of 22.7 mV/pC, noise $< 1 \times 10^{-15}$ C, 15 ns rise time. The drift is less than $\pm$ 0.01%/^{0}C, and the linearity is better than $\pm$ 0.02% of $\pm$ 10-V output.

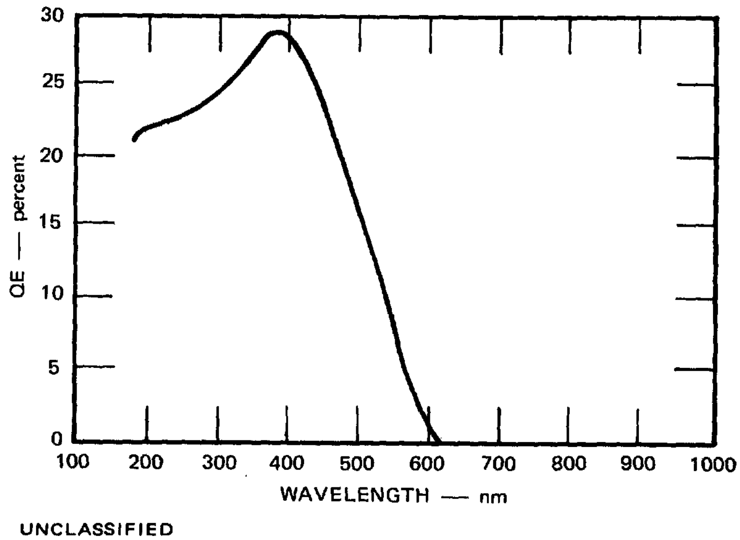

FIGURE 2 (U) SPECTRAL RESPONSE OF 9829 QB PM TUBE

(U)

- **Slide Holder**--Fabricated at SRI International; black anodized aluminum construction, O-ring seal to the PM housing flange, and O-ring, bayonet-type cover for light-tight operation. A half-twist open and close feature allows a quick change of slides.

- **Single-Channel Analyzer (SCA I)**--Canberra Model 2030. As described below, SCA I gives a logic pulse whenever the output of the amplifier falls in the range set by E and ΔE. Both SCAs have stability of better than $\pm$ 0.005%/$^{\circ}$C, and linearity of < $\pm$ 0.25% of full scale. The final settings for SCA I were ΔE = 10 and E = 0.2.

- **Signal Amplifier and Single-Channel Analyzer (SCA II)**--Canberra Model 2015A single-width, NIM module spectroscopy amplifier with gated baseline restoration and timing single-channel pulse height analyzer. The amplifier accepts linear pulses from the preamplifier, then shapes and amplifies them for further analysis. The unit is extremely stable over a wide range of temperature and count rates. The final amplifier settings were for positive input, coarse gain = 8, fine gain = 0.0. Setting the two signal windows was accomplished by a SCA, which produces a logic signal whenever the amplifier unipolar signal falls between the voltage levels determined by the front panel controls (E and Δ E). The final settings for SCA II were Δ E = 10.0 and E = 1.10.

- **Multichannel Analyzer (MCA)**--Canberra Series 40 MCA. This analyzer performed basic functions of data collection, display, memory, and output for later analysis. It uses an LSI microprocessor and ROM firmware. Our work used the multichannel-scaling (MCS) mode and a signal mixer/router

(U)

capable of accepting four inputs. In the MCS mode, a collection time of 0.9 s was used for each of 1024 channels for four inputs. Input One accepted the logic signals from SCA I; Input Two, SCA II; Input Three accepted the session "target" marker, and Input Four was a spare. The MCA counted the number of logic pulses entered in one channel of memory for 0.9 s, then advanced to the next channel. The resulting histogram was stored in memory along with date, time of day, ID code, and other information. All 4096 channels of memory were read out onto a cassette tape via the MCA EIA I/O port.

- **High-Voltage Power Supply**--Canberra Model 3002 power supply providing dc voltage to the PM tube. Output was continuously adjustable from 0 to $\pm$ 3000 V at 0 to 10 mA. Ripple was < 10 mV peak to peak, drift < 0.01% hr calibrated to $\pm$ 0.25% of sum of control settings. Temperature coefficient was $\leq \pm$ 50 ppm/^{o}C.
- **Logic Pulser and Relay**--Rutherford square pulser adjusted for TTL logic pulses of + 5 V. The pulser was used with a battery operated relay; a hand-held microswitch marked periods in the RV session. Specifications on these items were not critical because only time marking and not data collection was involved. The output of the pulser was connected to Input Three of the MCA mixer/router.
- **System Power Supply**--Canberra Model 2100 NIM bin nodular power supply. This was used to provide $\pm$ 24 V dc and $\pm$ 12 V dc to the other instrumentation. A standard voltage regulator and surge suppressor were installed on the main 110 V ac line to filter out noise and transients resulting from nearby machinery.

D. (U) Photomultiplier Tube Analysis

(U) Figure 3 shows typical data recorded from the photomultiplier (PM) tube during a 15-min RV session. Three spectra are displayed concurrently. The top spectrum displays all pulses from the PM tube (regardless of their amplitude) that were detected during each 0.9-s counting period; the middle spectrum displays only those pulses (detected in the same 0.9-s interval) whose amplitude exceeded a preset threshold, which was adjusted to eliminate all but the largest of pulses. The remaining histogram represents RV-session-dependent timing markers. Each spectrum has a common x-axis of 1024 channels (0.9 s/channel). For the the all-amplitude-pulse case, the average counting rate was about 180 counts per channel (0.9 s). The deviation about the mean ($\pm$ 15 counts) is ordinarily caused by random variations in thermionic emission within the PM tube, and it is a well understood phenomenon.

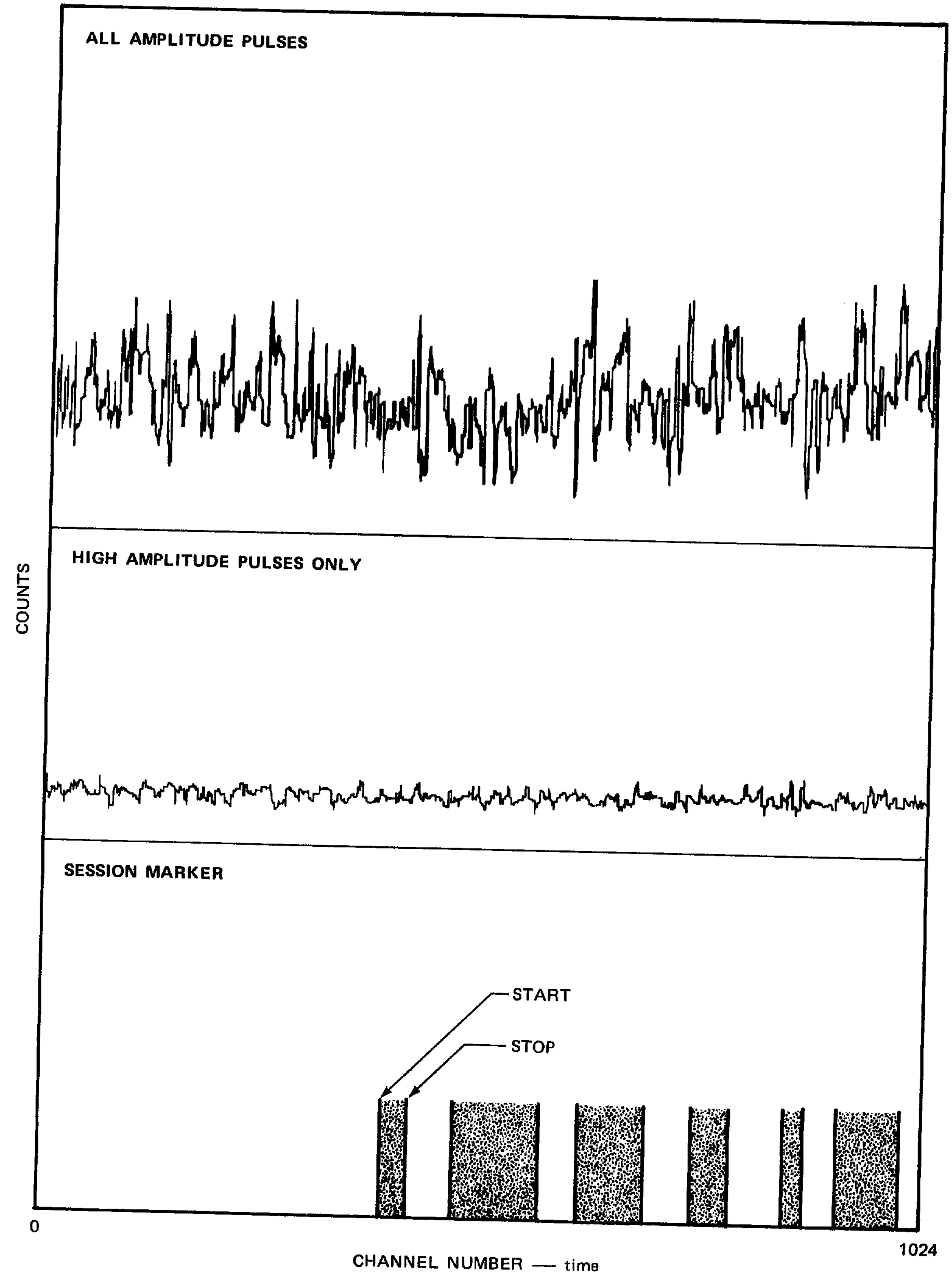

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FIGURE 3 (U) TYPICAL PM-TUBE OUTPUT DURING AN RV SESSION

(U) The analysis of these data proceeded as follows. For each spectrum, a control (baseline) period was designated to be the two minutes of data collected one minute prior to the first RV time marker. This period occurred when the PM tube was unattended. The data in this region were fit with a straight line by the least-squares technique. For each possible number of counts greater than or less than that represented by the fitted straight line, a histogram of the number of channels was constructed. For example, assume the straight-line fit has zero slope (i.e., the same value regardless of the channel number). Further assume this value is 100 counts. First, we count the number of channels in the region of interest that contain 100 counts. Next, we count the number of channels that contain 101 counts. We continue this until all observed channels have been accounted for. The resulting histogram approximates a normal distribution. In the analysis of the baseline region, a normal distribution, with mean μ_0 and standard distribution σ_0, is fit to the baseline histogram.

(U) The RV timing markers displayed in the bottom histogram of Figure 3 represent the beginning and end of an assumed "target access" period. The complete description of these access periods can be found in other reports.[4] For this report, it is sufficient to say that we have evidence contact was made with the target material during these periods.

(U) The analysis for each RV marker pair is the same. If there was no psychoenergetic effect, we assume that a normal distribution, calculated as above, will be the same in the baseline period as in the RV period. While there are a number of statistical measures for comparing two distributions, we chose to count the number of channels (time periods of 0.9 s) in the RV period that contained a significantly greater number of PM pulses. We chose this particular technique to be consistent with the PRC claims that the interaction causes an increase in the count rate. We also counted the number of channels that contained a significant decrease of PM pulses. The number of pulses required for significance in a channel in either direction is given by

$$\text{counts required} = y \pm 1.65 \times \sigma_0$$

$$y = a + b \times t \quad ,$$

where t is the channel number in the region, and a and b are the intercept and slope of the best-fit line for the region, respectively; σ_0 is the empirical standard deviation found in the control region.

V RESULTS AND DISCUSSION (U)

A. (U) Remote Viewing Results

(U) Four remote viewers contributed six sessions each in the photon-production experiment. The viewers were selected on the basis of good performance in concurrent RV training programs. Each RV session was judged using techniques developed in the RV Evaluation Task.[5] Because the same target pool was used in the photon-production experiment, a figure of merit (FM) could be calculated that gave a direct measure of the degree of RV contact with the target. Tables 1 through 4 show the RV results for each session.

Table 1

(U) REMOTE VIEWING RESULTS FOR VIEWER 177

Session	Figure of Merit
2001.hs	0.457 *
2002.hs	0.250
2003.hs	0.356
2004.hs	0.300
2005.hs	0.125
2006.hs	0.167
Overall Z = 1.67, $p \leq 0.05$	

* Significant $p \leq 0.05$

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Table 2

(U) REMOTE VIEWING RESULTS FOR VIEWER 309

Session	Figure of Merit
2001.wm	0.125
2002.wm	0.167
2003.wm	0.257
2004.wm	0.300
2005.wm	0.036
2006.wm	0.048
Overall Z = −0.636, n.s.	

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Table 3

(U) REMOTE VIEWING RESULTS FOR VIEWER 558

Session	Figure of Merit
2001.br	0.286
2002.br	0.100
2003.br	0.214
2004.br	0.225
2005.br	0.680 *
2006.br	0.161
Overall Z = 1.63, n.s.	

* Significant $p \leq 0.05$

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Table 4

(U) REMOTE VIEWING RESULTS FOR VIEWER 807

Session	Figure-of-Merit
2001.cr	0.286
2002.cr	0.300
2003.cr	0.356
2004.cr	0.444 *
2005.cr	0.056
2006.cr	0.257
Overall Z = 1.72, p $\leq$ 0.05	

* Significant p $\leq$ 0.05

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(U) From the analysis performed in the RV training program, we found that a figure of merit greater than 0.42 for any single session is statistically significant at the 0.05 level (May, et al., 1985). When developing this analysis, we also derived a transformation to convert FM to standard Z-score. In combining the 24 Z-scores based upon the FMs for each viewer, we found an overall Z = 2.187, corresponding to a p-value $\leq$ 0.014. From Tables 1 through 4 we see that Viewers 177 and 807 each produced independently significant results. Because we had initially decided to base our conclusions on the correlation between the data from the photomultiplier tube and the RV figures-of-merit, we required some evidence of "contact" with the target material. Since the overall Z-score was significant, and a majority of the sessions produced FMs greater than the expected mean (0.17), we concluded that there was good evidence for contact with the target material.

B. (U) Photomultiplier-Tube Results

(U) As described in Section IV-D, we devised a technique for statistically comparing the control period to the RV-target-access periods. For a single RV session, the number of channels having significantly increased or decreased count rates are summed over all of the

(U)

RV target-access periods. These summations were made for the all-amplitude spectrum (A), and for the high-amplitude spectrum (H). The final output from the photomultiplier-tube data analysis consists of the four summations described above, normalized by the total number of RV channels (i.e., the length of time during the whole session that the viewer was in "contact" with the target material).

(U) Table 5 shows the results of the RV-figure-of-merit and photomultiplier-tube analyses for the all-amplitude and high-amplitude cases for each RVer. The figures of merit have been described earlier. The PM results are shown in units of percent: the number of significant channels divided by N, the total number of channels. The symbols A and H represent the all-amplitude and high-amplitude data, respectively, and the symbols + and – represent the increase or decrease from the expected number of pulses, respectively.

(U) In order to analyze the combined RV and PM results, we chose to calculate the linear-correlation coefficient between the figure of merit and the normalized-PM-tube data. This method was chosen because the Chinese claim that "exceptional vision" results in an increased count rate of primarily large-amplitude pulses. Therefore, we could expect a positive correlation between the FM and H+ and a negative correlation between the FM and H–. (As the quality of the RV contact increases, there should be fewer number of channels containing small count rates.) Although the PRC data do not specifically mention results for the all-amplitude PM data, we would expect that the far greater count rate of small-amplitude pulses in A+ and A– would tend to mask any increase in only high-amplitude pulses. Because the direction of the correlation could be specified, we calculated single-tailed p values for the correlation coefficients. Table 6 shows these results.

(U) In Table 6, we observe a weak, statistically significant correlation of RV with an increased number of PM pulses of high amplitude. Furthermore, the direction of the correlation is as expected, although the difference in the correlations is not significant. This is in direct agreement with the PRC claims--with the exception that the magnitude of our observations is considerably less than theirs.

Table 5

(U) PHOTOMULTIPLIER-TUBE NORMALIZED RAW DATA

Viewer	Session	FM	A^+ %	A^- %	H^+ %	H^- %	N
177	2001.hs	0.457	7.14	5.95	11.11	2.78	252
	2002.hs	0.250	4.67	0.67	9.33	4.33	300
	2003.hs	0.356	6.02	1.88	7.89	1.50	266
	2004.hs	0.300	4.03	1.15	13.26	4.32	347
	2005.hs	0.125	0.00	0.00	0.65	0.00	306
309	2001.wm	0.125	3.71	2.47	6.01	2.82	556
	2002.wm	0.167	2.52	3.35	9.64	5.24	477
	2003.wm	0.257	5.52	6.75	9.00	4.50	489
	2004.wm	0.300	2.30	1.67	8.35	1.46	479
	2005.wm	0.036	6.10	4.67	2.33	1.26	557
	2006.wm	0.048	7.68	5.91	7.87	2.76	508
558	2001.br	0.288	7.02	5.58	13.02	4.96	484
	2002.br	0.100	8.91	7.09	10.73	5.87	494
	2003.br	0.214	6.22	6.00	7.56	3.33	450
	2004.br	0.225	13.11	12.70	11.68	2.66	488
	2005.br	0.681	2.24	1.55	6.88	1.72	581
	2006.br	0.160	6.78	4.03	5.27	0.00	472
807	2001.cr	0.286	7.00	5.32	10.36	3.92	357
	2002.cr	0.300	1.36	0.68	13.22	4.41	295
	2004.cr	0.444	0.00	0.00	10.79	0.00	241
	2005.cr	0.056	0.00	0.00	0.00	0.00	199
	2006.cr	0.257	0.50	5.00	1.00	5.50	200

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(U) Possible explanations for this weak correlation are

- We have simply observed a statistical fluctuation in a noisy environment.
- Because our target materials were photographic slides of natural (and existing) locations, our assumption that the slides were the target materials (rather than the actual sites) was false.

Table 6

(U) CORRELATION RESULTS

Analysis	Mean	Correlation Coefficient (r)	p value (single-tailed)
FM	0.247	–	–
A^+	4.674	−0.158	0.242
A^-	3.746	−0.174	0.220
H^+	7.998	0.393	0.035 *
H^-	1.981	−0.017	0.469

* Significant

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(U)

- The PRC subjects having exceptional vision might be much more skilled than our RVers.
- Closer proximity between the viewer and the PM tube might be required to enhance the effect.
- The thermionic emission of the PM tube has been enhanced rather than the photons being produced.

By calculating the autocorrelation functions for lags of 0 to 20, we found that each of the all–amplitude spectra was significant for most lags. Moreover, there were significant correlations between all– and high–amplitude spectra––an expected result because the high–amplitude information is completely contained in the all–amplitude spectra. Only a few of the high–amplitude spectra, however, showed significant autocorrelations. Thus, we are able to say that we observed some small amplitude periodic signals in the output of the PM tube.

(U) The most likely source of periodic signals in the PM–tube pulses is from the ac power line. During construction of the apparatus, we noticed occasional periods of highly-regular signals in the analyzer. We found that our laboratory was across the hall from a

(U)

machine shop. All of the observable artifacts vanished when we utilized appropriate power-conditioning hardware. Nonetheless, the significant autocorrelations demonstrated that we were unsuccessful at eliminating all of the regular structure from the signal. Therefore, our first explanation above must remain as a likely possibility.

(U) As of this report, there is not enough data to determine the origin of the RV information (i.e., from the slide in present time; precognitively from the slide at a future feedback time; or the site itself in present and/or feedback time). Thus, our second explanation above can not be eliminated as a critical distinction between our work and that of the Chinese.

(U) Because we chose the RVers who were available to us for the experiment, we chose those who had a demonstrated ability at remote viewing natural scenes. We did not have individuals with a history of viewing abstract or alphabetic symbols. Therefore, we attempted a conceptual replication of the PRC experiments rather than an exact one.

(U) Finally, we note that one of the best viewers, 177, demonstrated significant positive correlations between figures of merit and both all-amplitude measures ($p \leq 0.007$ and $p \leq 0.022$ for A+ and A− respectively). Because this result is not confirmed by the summed result (only the positive high-amplitude pulses showed significance), it is difficult to interpret. If the PRC claim proves ultimately to be correct, it is tempting to say that Viewer 177 "interacted" with the target system by increasing the variance of the signal during the RV periods.

(U) The above analysis, while statistically suggestive of the PRC results, does not demonstrate that we observed an overall effect of the same magnitude. The Chinese report signal-to-noise ratios of at least 25:1, and usually 100:1 to 1000:1.

(U) We did, however, observe two "anomalies" during the course of the experiment that are suggestive of the PRC claims. Those anomalies are shown in Figures 4 and 5. In order to designate any spectral feature as an anomaly, several strict criteria had to be met:

- The anomaly must appear simultaneously in both the all-amplitude A, and the high-amplitude, H, spectra. Because we observed occasional, small-amplitude noise bursts in our pilot trials, we decided to ignore high-count-rate signals appearing only in the A spectrum. Likewise, the H spectrum must overlap the A spectrum by virtue of the discriminator settings.

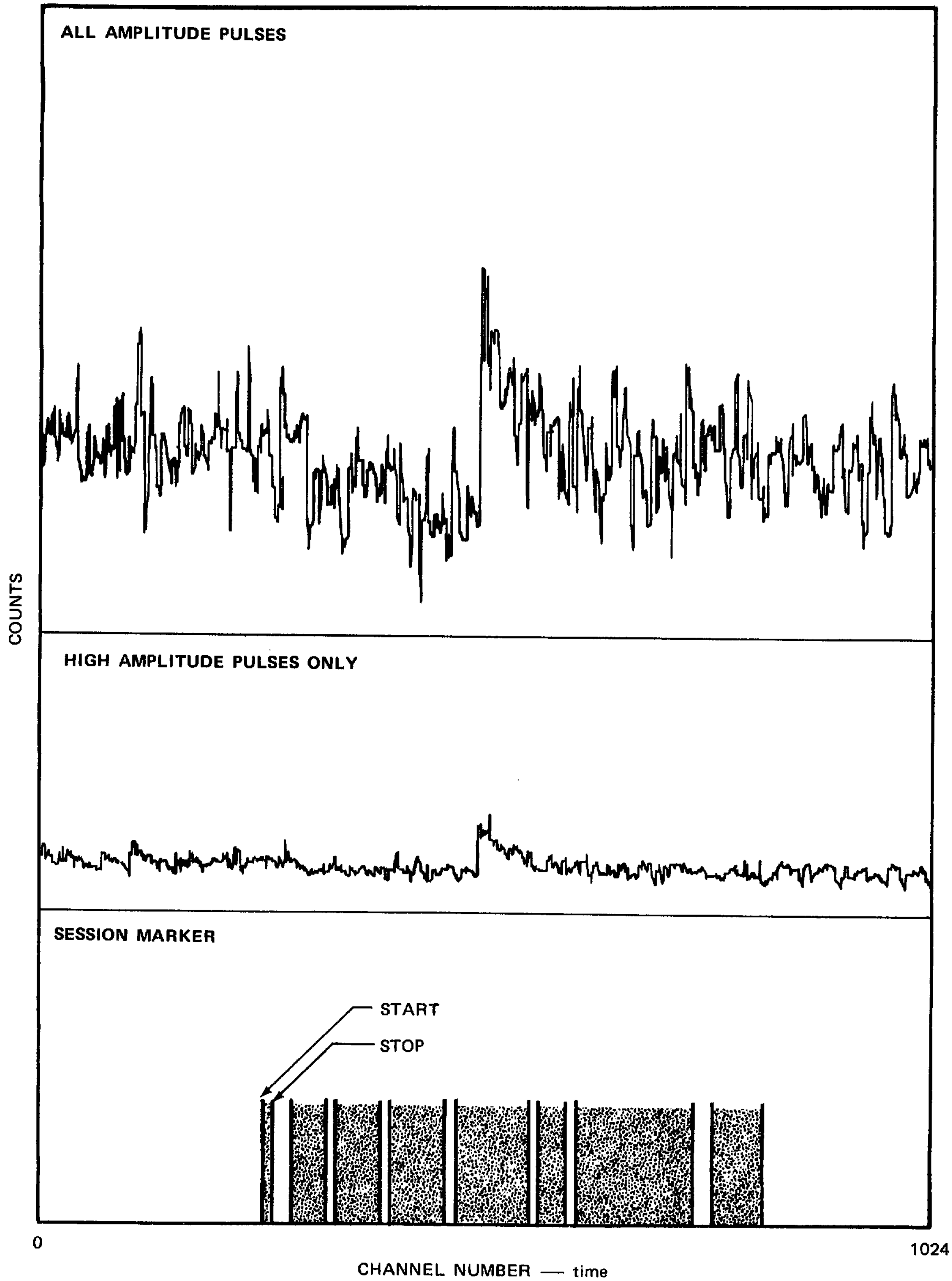

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FIGURE 4 (U) ANOMALY PRODUCED BY VIEWER 558

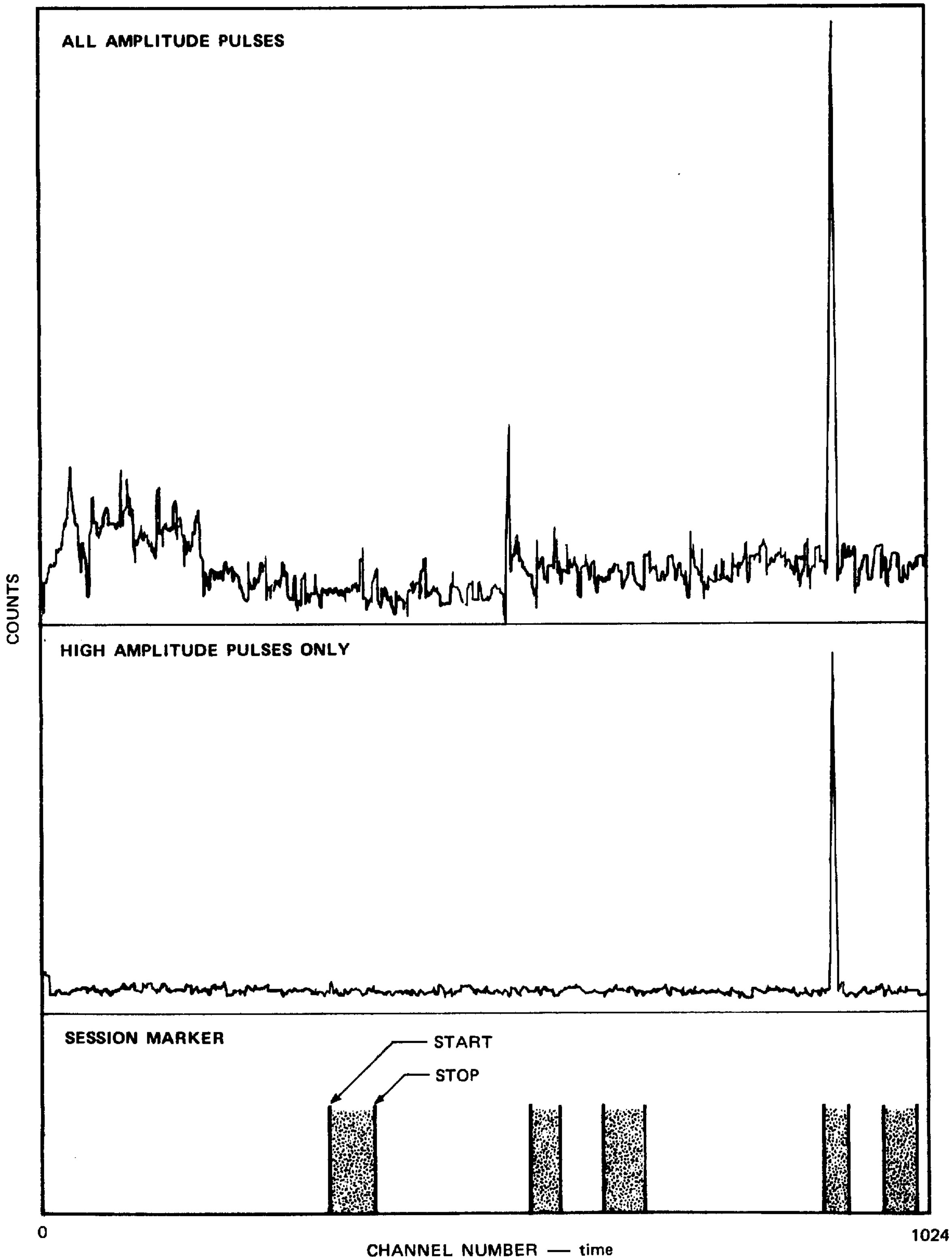

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FIGURE 5 (U) ANOMALY PRODUCED BY VIEWER 807

(U)

Therefore, any unusual feature appearing only in the H spectrum must be caused by an equipment malfunction, not a psychoenergetic event.

- Any anomaly appearing in both A and H spectra must appear at exactly the same channel number. For the reasons discussed above, any signals that are not correlated in time would be considered noise or equipment problems.
- To be considered, an anomaly must have been observed during an RV contact period. While some evidence exists for "linger" or "relaxation" effects in PK, we were specifically testing for increased pulse rates during remote viewing. Any unusual signals observed at other times were ignored.
- Finally, anomalies were considered to be only those signals that showed a rapid transition in count rate. Either the increase or decrease in rate must occur within a few channels (i.e., a few seconds). Slowly varying count rates were known to be caused by temperature drift and were discarded.

VI CONCLUSIONS AND RECOMMENDATIONS (U)

(U) We have conducted a conceptual replication of work published by physicists in the People's Republic of China. The overall results (summed across all RVers) indicate a weak statistical effect, which supports the Chinese claims that correct RV acquisition of information perturbs physical systems.

(U) In addition to the statistical result, we observed two anomalies that resemble the shape and magnitude of the signals reported in the PRC papers. The evidence that these transients were psychoenergetically induced is inconclusive (i.e., the transients occurred in RV sessions of modest quality). We observed very similar signals during the initial equipment setup, which were clearly caused by environmental noise and ac-line transients. We are unable to completely dismiss the anomalies, however, for two reasons:

- The anomalies occurred in RV contact periods.
- The characteristics of the anomalies agreed with the type of signals reported by the Chinese.

Because we observed both statistical correlations and two suggestive anomalies, the Chinese claims were partially verified.

(U) We believe the current experiment should be considered a pilot study and, therefore, we recommend that another set of experiments be conducted with the following improvements:

- Add more-experienced RVers to the initial group.
- Examine the possibility of using English language alphabet letters as target material.
- Cool and temperature-stabilize the PM tube to further reduce background noise levels.
- Perform the experiment in a more nearly electrically-isolated environment to eliminate ac-power-line transients.

(U)

By following the above suggestions, we believe a more definitive investigation can be conducted.

(S/NF) Despite our reservations about the large anomalies, the statistical correlations we observed represent the first evidence that intrusion detection may be possible--even in principle. Therefore, this work must be continued to confirm such a possibility.

REFERENCES (U)

1. G. Scott Hubbard and E. C. May, "Countermeasures: A Survey and Evaluation (U)," Final Report, SRI Project 3279, SRI International, Menlo Park, California (January 1982) SECRET.

2. "Exceptional Human Body Radiation," Chinese Academy of Sciences, High-Energy Institute, Special Physics Research Team, *PSI Research*, p. 16 (June 1982).

3. Zhao Yonjie and Xu Hongyhang, "EHBF Radiation: Special Features of the Time Response," Institute of High-Energy Physics, Beijing, People's Republic of China, *PSI Research*, p. 20 (December 1982).

4. E. C. May and B. S. Humphrey, "Alternative Training Task," Final Report, SRI Project 7048, SRI International, Menlo Park, California (October 1984) SECRET.

5. E. C. May, B. S. Humphrey, and H. E. Puthoff, "An Automated RV Evaluation Procedure," Final Report, SRI Project 7048, SRI International, Menlo Park, California (December 1984) SECRET.

Appendix

RV SESSION PROTOCOL (U)

PHOTON PRODUCTION
EXPERIMENTAL PROCEDURE

> Check each item and enter data where required.
> If **any** answer is no, **STOP !**

Session I.D. ________

Date ________

Start Time ________

Presession

Yes	No	Done	Instruction
☐	☐		High voltage on.
☐	☐		NIM bin on.
☐	☐		MCA on.
☐	☐		Target-marker generator on.
☐	☐		Relay switch off.
☐	☐		Oscilloscope on.
		☐	Turn on relay switch (battery).
		☐	Turn up oscilloscope intensity.
☐	☐		Pulses visible on scope.
		☐	Turn up MCA scope intensity.
			Turn off high voltage
		☐	Decrease by 500-V steps--1 every 2 seconds.
		☐	Turn off high-voltage-power switch.
			Return to RV room.
		☐	Turn on audio tape recorder and microphone.
		☐	Insert appropriate tape into recorder.
		☐	Place 4 previously selected slide envelopes into black bag and shuffle.
		☐	Open photomultiplier cap.
		☐	Select (on a blind basis) one of the 4 slide envelopes and place slide into cap.
		☐	Close cap and rotate until positive "click."
☐	☐		Is cap free of snagged cloth?
		☐	If time is > 1200 hours, put ice bag on the tube housing (outside bag).
			Return to equipment room and turn on high voltage.
		☐	Switch on.
		☐	Increase voltage by 3,500 V increments--2 seconds each.
☐	☐		Are pulses on the oscilloscope?
		☐	Wait 1/2 hour before session begins.

PHOTON PRODUCTION
EXPERIMENTAL PROCEDURE

> Check each item and enter data where required.
> If any answer is no, **STOP !**

Session

Session I.D. ________
Viewer I.D. ________
Tag I.D. ________
Slide I.D. ________
Date ________
Start Time ________

Yes	No	Done	Instruction
			Viewer (V) and experimenter (E) go to equipment room.
☐	☐		Pulses visible on oscilloscope.
		☐	Push "CLEAR DATA" on MCA.
		☐	Push "COLLECT" on MCA.
		☐	Wait 3 minutes.
			V and E go to RV room for session.
		☐	Start audio tape recorder.
			As each TARGET/COORDINATE is given, PRESS microswitch for 1 to 2 seconds.
			After each response is complete, PRESS microswitch for 1 to 2 seconds.
			Repeat above two steps until session is complete (MUST be < 10 minutes).
		☐	Turn off audio tape recorder and microphone.
			V and E return to equipment room until end of scan (approximately 2 minutes).
☐	☐		When scan is completed "COLLECT" light is off.
		☐	Turn off high voltage as in PRESESSION.
☐	☐		Is high voltage OFF?
		☐	Turn off relay switch.
		☐	Push "READOUT" on MCA.
		☐	Record TAG I.D. in space provided above.
		☐	Push "YES" on MCA.
			V and E return to RV room.
		☐	Remove slide from photomultiplier cap.
		☐	Replace cap on tube as in presession (positive click).
		☐	Display slide to V using projector.
		☐	Discuss feedback.
		☐	Record slide number in space provided above.
		☐	V departs.

PHOTON PRODUCTION
EXPERIMENTAL PROCEDURE

Check each item and enter data where required. If **any** answer is no, **STOP !**	**Session I.D.** ________ **Date** ________

Postsession

Yes	No	Done	Instruction
		☐ ☐	Check that cap is securely on tube. Replace slide in envelope.
☐	☐	 ☐ ☐ ☐ ☐	Return to equipment room. Turn on high voltage as in presession. Switch on. Increase voltage by 3,500-V increments--2 seconds each. Are pulses visible on oscilloscope? Turn down intensity on oscilloscope. Turn down intensity on MCA scope.
			Comments:

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