6600 Sub 5 - - ELF/RV Correlation Study

SRI International

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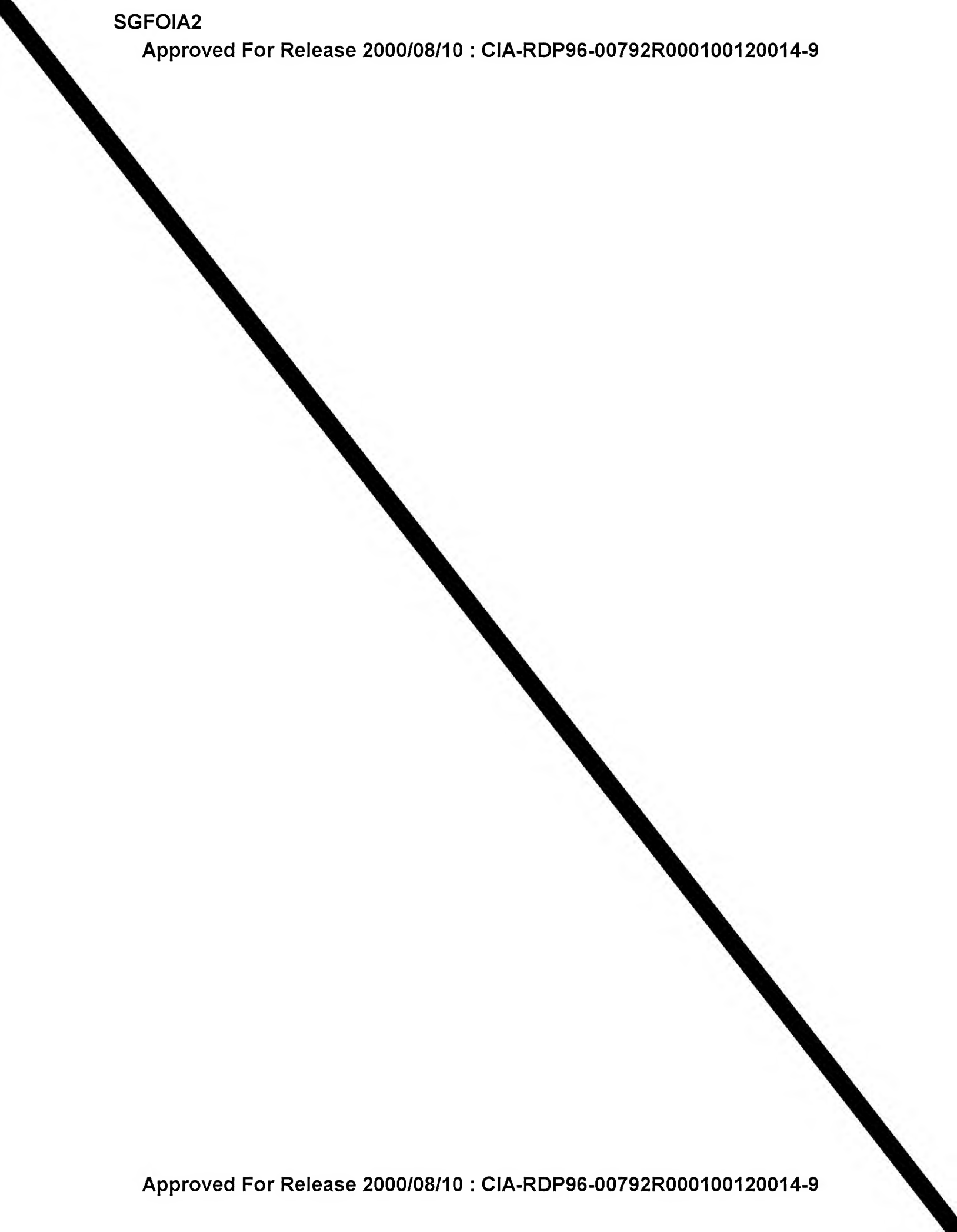

15. End-of-Year Sponsor Evaluation

16. Recommendation for Follow-On Project

(1) Sponsor:

(2) Contractor:

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Attachment #1

With regard to RV Jamming/Ambient ELF, SRI International will provide the appropriate equipment, facilities and personnel to accomplish the following tasks:

(1) Search and summarize the literature that indicates that geomagnetic storm activity and other factors that produce fluctuations in the ambient ELF bands (<300 Hz) can degrade psychoenergetic performance.

(2) Construct an ELF detector that can monitor ambient ELF fluctuations in the local RV chamber.

(3) Examine the statistical correlation between RV performance (on an appropriate series of trials carried out in the RV chamber) and the ambient ELF fluctuations to determine whether measurement of ambient ELF can be used as an indicator of expected performance, and whether optimum performance windows can be identified.

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Statement of Problem

The ELF/RV Correlation Study task is directed toward determining whether correlations exist between high-quality RV and the occurrence of certain geophysical conditions, such as EM storm activity, solar flare activity, lightning stroke activity, etc.

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III BIBLIOGRAPHY

Bibliography

A. Dubrov, "The Geomagnetic Field and Life," Plenum Press, New York (1978)

W. R. Adey, "Tissue Interactions with Nonionizing EM Fields, Physiological Reviews, v. 61, No. 2 (April 1981)

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IV PLANNED EXPERIMENTS

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Planned Experiments

1. GENERAL

The objective of this effort is to investigate the possible effects of ambient geophysical/low-frequency electromagntic (ELF) factors on RV performance.

1.2 MAJOR GOALS

a. Phase I: Search and summarize the literature on geophysical/ELF effects on biological organisms, especially as they relate to the degradation of Human performance skills at a behavioral level.

b. Phase II: Examine the statistical correlation between RV performance in the historical SRI RV data base and the ambient geophysical/ELF factors.

c. Phase III: Explore the statistical correlation between RV performance and ambient ELF fluctuations--specifically on the basis of real-time ELF monitoring.

d. Phase IV: Provide an evaluation report as to whether measurement of ambient geophysical/ELF factors can be used as an indicator of expected RV performance, and whether optimum performance windows can be identified.

2. SPECIFIC TASKS

2.1 SRI International will conduct a literature search to collect and summarize up-to-date knowledge in the field of bioelectronics. The literature search will be carried out in the following categories:

- Bioactive frequencies for ELF/VLF at the gross anatomical and behavioral levels.
- Effects of ELF/VLF frequencies at the biochemical (hormonal, ionic, molecular) level.
- Effects of ELF/VLF at the neuronal membrane level.
- Natural sources of ELF/VLF.
- Man-made sources of ELF/VLF.
- Artificial generation of ELF/VLF.

- Propagation characteristics of ELF/VLF.

- Detection and measurement of ELF/VLF.

This will be accomplished by means of both references to literature on hand, and by computerized keyword searches. Additionally, the SRI-International consultant will contact Dr. William D. Schul, Olive W. Garvey Center for the Improvement of Human Functioning, Wichita, Kansas.

2.2 SRI International will perform an analysis to determine whether correlations exist between RV performance in historical data (data from previous experiments) and factors in the ambient geophysical environment. Data from previous studies conducted under controlled conditions will be analyzed by means of epoch, bivariate, and multivariate analysis (when possible) against the following geophysical variables:

- Weather (temperature, relative humidity, barometric pressure, and so forth).

- Geomagnetic indices (A_p, A_{fr}, A_a).

- Solar electromagnetic emissions.

- Sunspot number .

- Ionospheric conditions.

- Solar magnetic field.

- Lunar cycles.

Further, because it is hypothesized that the mechanism by which geophysical factors could play a role in RV performance is that of changing the ambient ELF environment, SRI-International will examine this hypothesis as well. An ELF data base spanning a year and a half (from May 1982 to present) was monitored by a field station in Los Altos, California. Data were taken twice daily. The same analysis techniques used for the geophysical analysis will be applied to the ELF data. Positive results from these tasks could yield a rough index of expected RV performance, given prevailing geophysical factors.

2.3 SRI-International will implement a program of real-time ELF monitoring. Little information is available on the variation of the ELF environment from location to location, although it is known that ELF frequencies generated by geophysical means tend to very simultaneously over the globe. Therefore, local variations

may exist that are caused by both man-made sources, and by the geological structure of the area. For this a reason, two ELF stations will be set up: one at the SRI premises in the RV laboratory, the other at a field station 17-km distant. Data from the SRI station will be compared with the field station data to determine the variability attributable to location and distance. This comparison may also help determine whether RV performance is influenced by global, local, or both sources of ELF disturbances. Particular attention will be paid to bioactive frequencies found as a result of the literature search in Task I. Statistical correlations will be sought between the RV performance (on an appropriate series of trials carried out in the RV chamber) and the ambient ELF fluctuations, in order to determine whether measurement of ambient ELF can be used as an indicator of expected performance, and whether optimum performance windows can be identified.

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Funding was received for this task on 15 November.

Discussions were held with R. Leonard with regard to individuals within the Radio Physics Laboratory and among SRI consultants who will cooperate in carrying out this task. The first efforts on this task are to begin 6 December with a meeting with the primary consultant, Marsha Adams.

Project Director Puthoff and Subcontractor M. Adams of Time Research Institute worked out the details of an overall plan and a work statement to carry out the ELF task (see attached subcontract). COTR representative Atwater was briefed on 19 January during a site visit to the Menlo Park facility as to the progress on this task.

Several task subelements have been activated, such as arranging for SRI Burroughs computer programs to be reformatted for the IBM XT to be used on project, ordering of equipment, literature search, initial ELF measurements at the Los Altos subcontractor facility, etc. Meanwhile, all RV data gathered on the various tasks are keyed as to date and time of day for later correlation against geophysical variable measurement.

Next 5 Page(s) In Document Exempt