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C^3 GENERIC WORKSTATION: PERFORMANCE METRICS AND APPLICATIONS

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ABSTRACT

When a researcher studies complex decision-making tasks in the laboratory, he records a few performance measures and a few physiological measures at most. This presentation describes the large number of integrated dependent measures available on the C^3 generic workstation under development in the Aerospace Research Branch at Brooks AFB. In this system, embedded communications tasks will manipulate workload to assess the effects of performance enhancing drugs (sleep aids and decongestants), work/rest cycles, biocybernetics, and decision support systems on performance. Task performance accuracy and latency will be event coded for correlation with other measures of voice stress and physiological functioning. Sessions will be videotaped to score non-verbal communications. Physiological recordings include spectral analysis of EEG, ECG, vagal tone, and EOG. Subjective measurements include SWAT, fatigue, POMS and specialized self-report scales.

The Aerospace Research Branch will use the system primarily to evaluate the effects on performance of drugs, work/rest cycles, and biocybernetic concepts. We will also develop performance assessment algorithms including those used with small teams. This system provides a tool for integrating and synchronizing behavioral and psychophysiological measures in a complex decision-making environment.

TOPICS

DEPENDENT MEASURES

BEHAVIORAL

PHYSIOLOGICAL

SUBJECTIVE

INDEPENDENT VARIABLES

APPLICATIONS

DEPENDENT MEASURES: BEHAVIORAL

ACCURACY

OMITTED TASKS

INCOMPLETE TASKS

FALSE ALARMS

SEQUENCING ERRORS

MISCOMMUNICATIONS

LATENCY

VISUAL

TARGETS

TEXT

AUDITORY

COMMUNICATIONS

ALARMS

ACTIVITY

AUDIO

VIDEO

TEAM

382

DEPENDENT MEASURES: PHYSIOLOGICAL

ELECTROENCEPHALOGRAM

 COMPRESSED SPECTRAL ARRAYS

 STEAD-STATE EVOKED POTENTIAL

 COHERENCE

 NEUROELECTRIC PATTERNING (GEVINS)

 OTHER

ELECTROCARDIOGRAM

 VAGAL TONE (PORGES)

ELECTROOCULOGRAM

 EYE BLINK (STERN)

 SACCADES

VOICE

 STRESS

 RECOGNITION

ACTIVITY

OTHERS

DEPENDENT MEASURES: SUBJECTIVE

SWAT

FATIGUE

POMS

OTHERS

INDEPENDENT VARIABLES

WORKLOAD USING EMBEDDED TASKS (SHINGLEDECKER)

DRUGS

      CHEMICAL DEFENSE

      PERFORMANCE ENHANCEMENT

         SLEEP AIDES

         DECONGESTANTS

SUSTAINED OPERATIONS

CONTINUOUS OPERATIONS

BIOCYBERNETIC FEEDBACK

DECISION SUPPORT SYSTEMS

OTHER

APPLICATIONS

CHEMICAL DEFENSE DRUG EVALUATIONS

SPACE STATION AND MISSILE SILO WORK/REST CYCLES

BIOCYBERNETIC COMMAND AND CONTROL

MENTAL STATE ASSESSMENT IN COMPLEX DECISION MAKING
      CORRELATION WITH UTC-PAB MEASURES

TEAM PERFORMANCE ASSESSMENT
      COMMUNICATIONS
      COORDINATION
      EFFICIENCY
      REORGANIZATION
      WORKLOAD BALANCING

VOICE RECOGNITION ALGORITHM DEVELOPMENT FOR
      COMPLEX ADAPTIVE TASK MANIPULATIONS
      COMPLEX TASK AUTOMATED TRAINING

OTHER