EFFECT OF MICROGRAVITY ON VISUAL CONTRAST THRESHOLD DURING STS SHUTTLE MISSIONS

VISUAL FUNCTION TESTER - MODEL 2 (VFT-2)

LT COL MELVIN R. O'NEAL, O.D., Ph.D.
H. LEE TASK, Ph.D.
COL LOUIS V. GENC0, O.D., M.S.
PURPOSE (VFT-2)

- Previous contrast threshold studies, both U.S. and Soviet, at different test distances and may be affected by age, lighting, and method of target presentation

- Determine effect of microgravity on distance visual contrast threshold over mission duration

- Use variable contrast adjustment device under controlled lighting condition to obtain more precise threshold measurement

- Test at multiple spatial frequencies and with additional target types to more completely evaluate
VISUAL HETINA LGN CORTEX

UNIFYING NORMAL VISION / VISUAL ABNORMAL VISION

THRESHOLD AND SUPRATHRESHOLD TARGET ACQUISITION AND IMAGE PROCESSING

NORMAL VISION ← UNIFYING METRICS
ABNORMAL VISION ← VISUAL STANDARDS
THRESHOLD AND SUPRATHRESHOLD ← IMPROVED VISION
TARGET ACQUISITION AND IMAGE PROCESSING

CONTRAST SENSITIVITY

SPATIAL FREQUENCY

VISUAL CHANNELS

ILLUSIONS

ORIGINAL CONTRAST BASIC FORM

IDENTIFICATION DETAILS: TEXTURE + EDGES
METHODS (VFT-2)

SUBJECTS

- 5 Flights, 12 STS Astronauts
  -- 3 subjects with no post flight data
  -- 1 uncorrected (no glasses)
  -- 1 SCL, 1 Toric-SCL

APPARATUS

- Visual Function Tester - Model 2 (VFT-2)
  -- Small, hand-held, battery powered
  -- Three target types:
    - Square-wave gratings (detection task)
    - Disks (detection task)
    - Tribars (orientation task)

PROCEDURE

- SAME AS VFT-1
RESULTS

VISUAL CONTRAST THRESHOLD

- Insufficient number of subjects for report at this time

- VFT-2 manifested on STS-53 (2 astronauts) scheduled to fly Dec 92

- Preliminary reporting of visual psychophysical study may affect subsequent data and should be avoided