

# **EFFECT OF MICROGRAVITY ON THE VISUAL NEAR POINT**

**Visual Function Tester - Model 4  
(VFT-4)**

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## **BACKGROUND**

- **Duntley Study (GEMINI)**
  - **No Significant Changes in (Far) Vision**
  - **EXCEPT Complaints by 2 Astronauts of Blurred Vision While Reading (Anecdotal)**
- **Reports of Blurred Near Vision Continue**
  - **25 - 40% of Shuttle Astronauts**
    - **CR Gibson, FK Manuel (NASA-Contracted Optometrists)**
    - **MP Caputo (KRUG Life Sciences)**

## **BACKGROUND**

- **Potpourri of Blurred Near Vision Reports**
  - **No Concurrent Blurred Far Vision (Duntley Studies, VFT1, VFT2)**
  - **Immediate Upon Orbit**
  - **Attenuates After Several Days**
  - **Normal Upon Return To Earth**
  - **40 and Older**

# **PROBLEM**

- **Anecdotal Reports Without Supporting Data**
- **Possible Etiology**
  - **Loss of Accommodation**
    - **Parasympathetic Nervous System**
  - **Shift Towards Hyperopia**
    - **Physiological Cause (Choroidal Swelling)**
    - **Vegetative Cause (Water Balloon)**
      - **Flatter in Gravity**
      - **More Circular in Space**
- **Course Unknown**

# **OBJECTIVES**

- **Near Term**
  - Verify Astronaut's Complaints**
- **Determine Category of Cause**
- **Provide Data Base Concerning Extent and Range of Effects**
- **Long Term**
  - Determine Specific Cause**
  - Develop a Quantitative Model that Predicts On-Orbit Visual Changes**

# **APPROACH**

- **VISION FUNCTION TESTER - Model 4 (VFT4)**
  - **Investigate Ground - Space Differences:**
    - **Far Point of Vision**
    - **Near Point of Vision**
    - **Speed (Facility) of Accommodation**

## **BENEFITS**

- **Gain Knowledge Concerning MicroGravity Effects on Vision**
- **Better Prescribe Prophylactic Spectacles In Support of Space and Hypersonic Crew Stations**
- **Identify Crew Members Who Could Benefit From Vision Training Prior to Flight**

## **STATUS**

- **Software - Completed**
- **Hardware**
  - **3 Units**
    - **2 Units are Fully Functional & Validated Optically**
    - **1 Unit Near Completion**
  - **All Units Will Be Converted from Battery Power to Orbiter Power**
  - **DOS Computer with RS-232 Serial Port (NASA-Supplied PGSC)**
  - **Half-Locker (VFT4 Unit & 2 Floppy Disks)**