



Visual Impairment/Intracranial Pressure (VIIP) Monitoring and Diagnostic Capabilities Aboard the International Space Station

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Disclosure Information

84th Annual AsMA Scientific Meeting
Jennifer Fogarty



I have no financial relationships to disclose.

I will discuss the following off-label use and/or investigational use in my presentation:

- Use of ultrasonography for ophthalmic examinations



Agenda



- Current ISS Capabilities
- Future ISS Capabilities
 - Overall Process
 - Functional Requirements Review
 - Market Survey Review
 - Product Selection
 - Implementation Schedule



Current ISS Capabilities



- Functional Vision Testing
 - Vision Questionnaire
 - Near and Far Visual Acuity
- Fundoscopy
- Tonometry
- Non-invasive Eye Ultrasound



Current ISS Capabilities



- Functional Vision Testing
 - Near and Far Visual Acuity Chart
 - Amsler Grid

Test For Distance Vision

TEST DISTANCE 20 FEET
TEST DISTANCE 10 FEET

H V

R H S O N

K S V R H

H N K C D

N D V K O

D H O S Z

O R Z S K

Ask your doctor for a Blind Spot Amsler Grid®/Letter Chart to use at home.

TEST DISTANCE 16 INCHES

20/200 — K C R H N
20/100 — R H S O N
20/80 — K S V R H
20/60 — H N K C D
20/50 — N D V K O
20/40 — D H O S Z
20/30 — O R Z S K
20/20 —

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Blind Spot Amsler Grid® for Macular Degeneration

Please cover one eye.

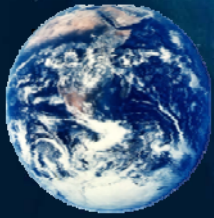
Hold the chart in front of you at arms length. Stare at the center white dot.

While staring at the center dot, slowly bring the chart toward your uncovered eye until one of the red ovals "FIRST" disappear.

- ❶ While staring at the center white dot, do you see the entire dot, or is part or all of it blurry or missing?
- ❷ While staring at the center white dot, do you see all four arrows or are some of the arrows missing?
- ❸ Is the center of the grid blurry, distorted, or are parts of it missing?
- ❹ Do you see the four corners and sides of the grid?
- ❺ Do the lines appear to be straight and continuous from top to bottom and side to side or are some distorted, wavy, blurred or broken?
- ❻ Are there any holes, blurry spots, different sized or irregular small squares anywhere in this grid?
- ❼ You should only see one red oval as you take this test and answer the questions.

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ILLEGAL TO PHOTOCOPY OR REPRODUCE IN ANY FORM
TRADEMARK NAME: BLIND SPOT AMSLER GRID®

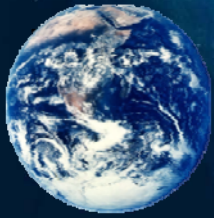


Current ISS Capabilities



- Fundoscopy
 - ProVizion Optics modification of Welch Allyn PanOptic with camera



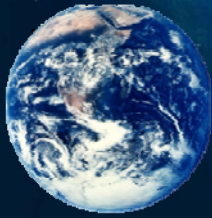


Current ISS Capabilities



- Tonometry
 - Reichert Avia Tono-pen



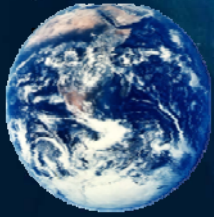


Current ISS Capabilities



- Non-invasive Eye Ultrasound
 - General Electric Vivid q

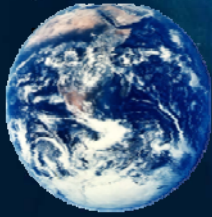




Future ISS Capabilities



- Functional Vision Testing
 - Vision Questionnaire (Augmented)
 - Near and Far Visual Acuity (Augmented)
 - Contrast Sensitivity (New)
 - Threshold Visual Field (New)
- Fundoscopy (Augmented)
- Tonometry
- Non-invasive Eye Ultrasound
- Optical Coherence Tomography (New)

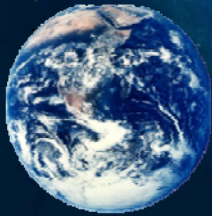


Future ISS Capabilities

Overall Process



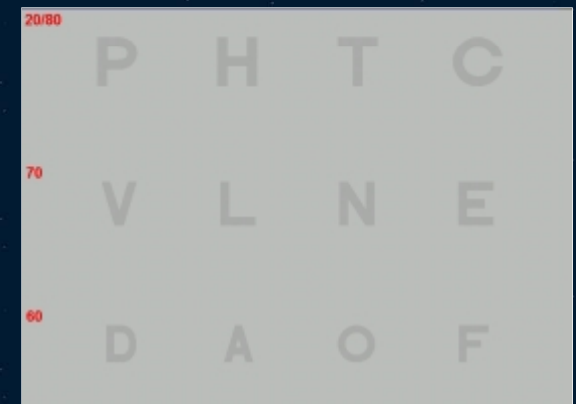
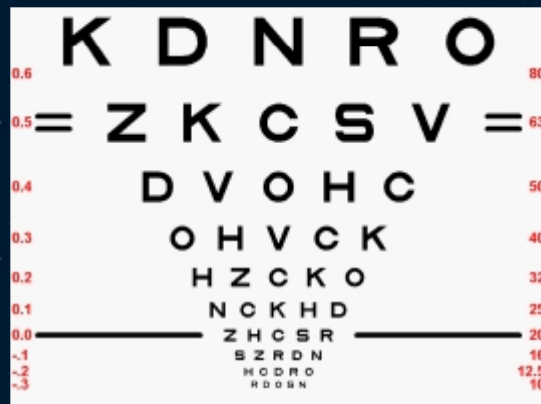
Task	Deliverable
1) Functional Requirements Review	Functional Requirements Document
2) Market Survey Review	Product Survey Matrix
3) Product Selection	Product Procurement
4) Flight Certification and Implementation	Flight Hardware

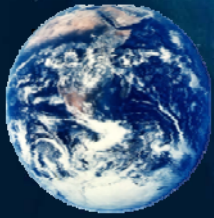


Future ISS Capabilities



- Near and Far Visual Acuity
- Contrast Sensitivity
 - VisionScience Software Acuity Pro



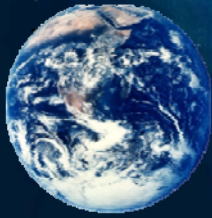


Future ISS Capabilities



- Fundoscope
 - MERGE EyeScan





Future ISS Capabilities



- Optical Coherence Tomography
 - Heidelberg Spectralis

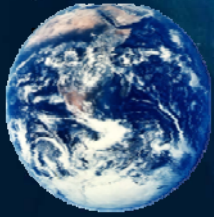




Future ISS Capabilities



- Threshold Visual Field
 - Currently in functional requirements generation phase



Future ISS Capabilities



- Estimated In-flight Implementation Schedule
 - Acuity Pro – June 2013
 - MERGE EyeScan – Summer 2013
 - Heidelberg Spectralis – Fall 2013
 - Threshold Visual Field – Winter 2013



Thank You



Q&A



QUESTION

Which of the following capabilities is not currently available on the International Space Station?

- a) Fundoscopy
- b) Non-invasive Ultrasound
- c) Optical Coherence Tomography
- d) Tonometry
- e) Functional Vision Testing

ANSWER

- c) Optical Coherence Tomography