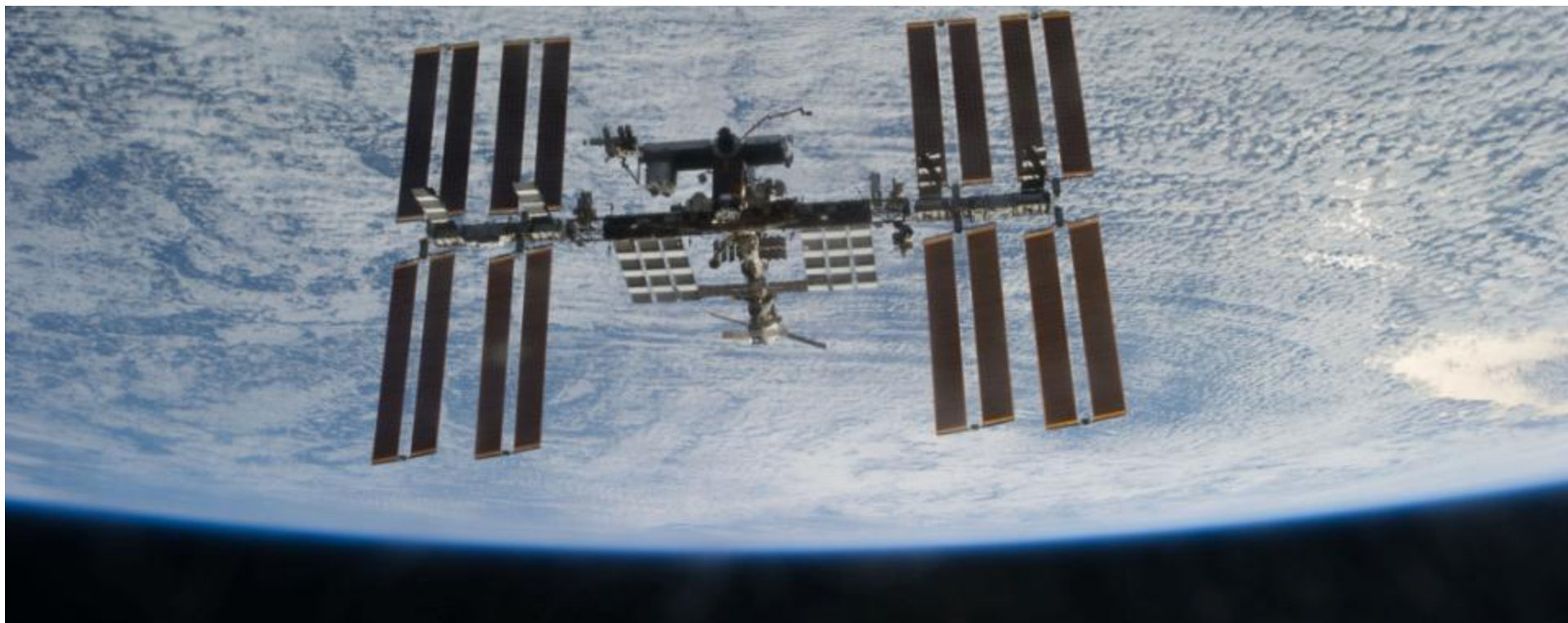




Benefits for Health; NASA

*Michele Perchonok, Ph.D.
Science Management Office Manager
NASA Human Research Program*





Human Research Program

The goal of HRP is to provide human health and performance

countermeasures,
knowledge,
technologies, and
tools

to enable safe, reliable, and productive
human space exploration.





Topics to Discuss

- Bone Health
 - Vitamin D
 - Fish Consumption
 - Exercise
- Medical Support in Remote Areas
- ISS Ultrasound
- Dry electrode EKG System
- Environmental Factors and Psychological Health



Bone Health

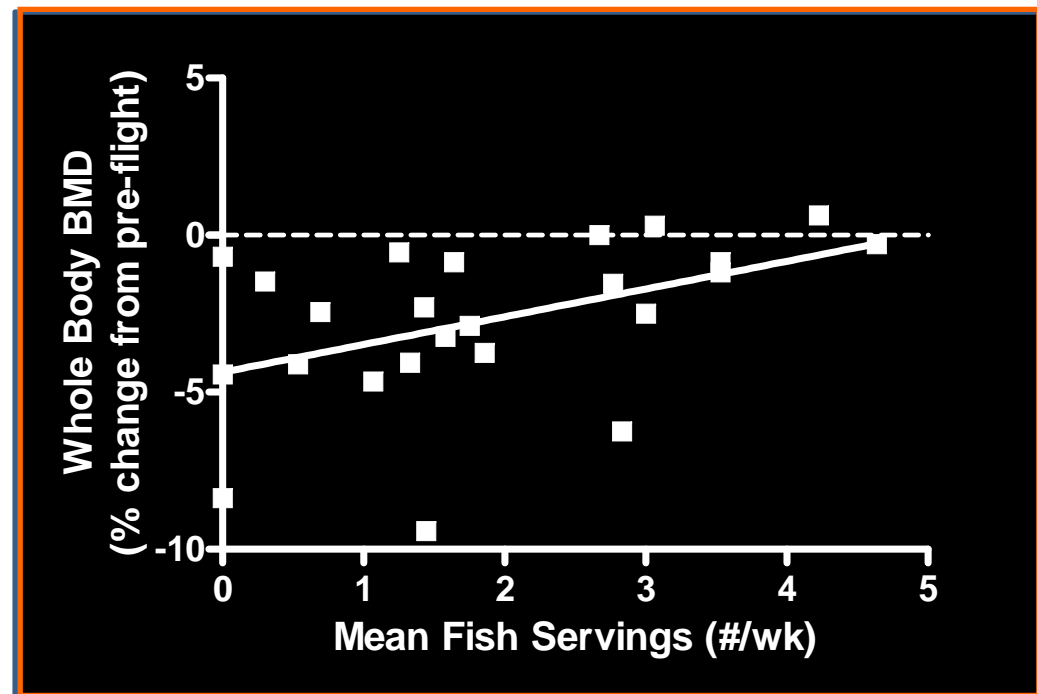
- The easiest approach to bone health is dietary
- Up to 30 – 35 years of age should have maximum bone health
 - Even more important for nursing and pregnant woman
- Bone health can be helped through
 - Vitamin D
 - Fish consumption
 - Exercise





Fish and Bone Health

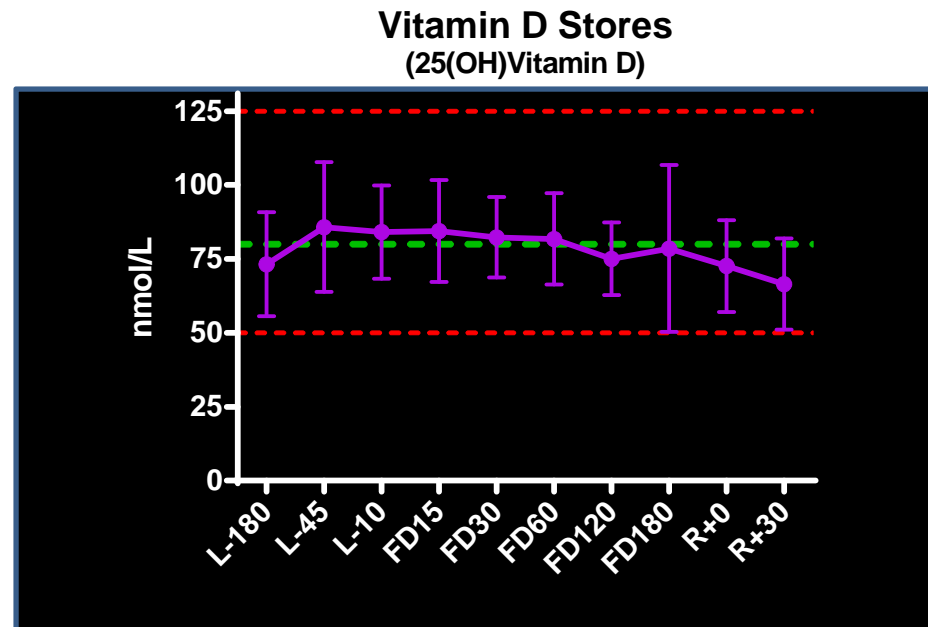
- An increase in fish consumption on ISS, resulted in less bone loss, likely due to the omega-3 fatty acids (fish oil).
- Ground-based, bed rest studies showed a similar relationship, that is, subjects with higher omega-3 fatty acid intake had lower rates of bone breakdown





Vitamin D and Bone Health

- Helping avoid vitamin D deficiency can have profound effects on disease incidence, including bone, and potentially other systems as well.
 - NASA sponsored research in the Antarctic helped support evaluation of vitamin D doses in individuals with limited sunlight exposure.
 - Research documented that supplementing a marginal diet with 800 IU vitamin D/day maintained vitamin D levels in ISS crewmembers.





Exercise and Bone Health



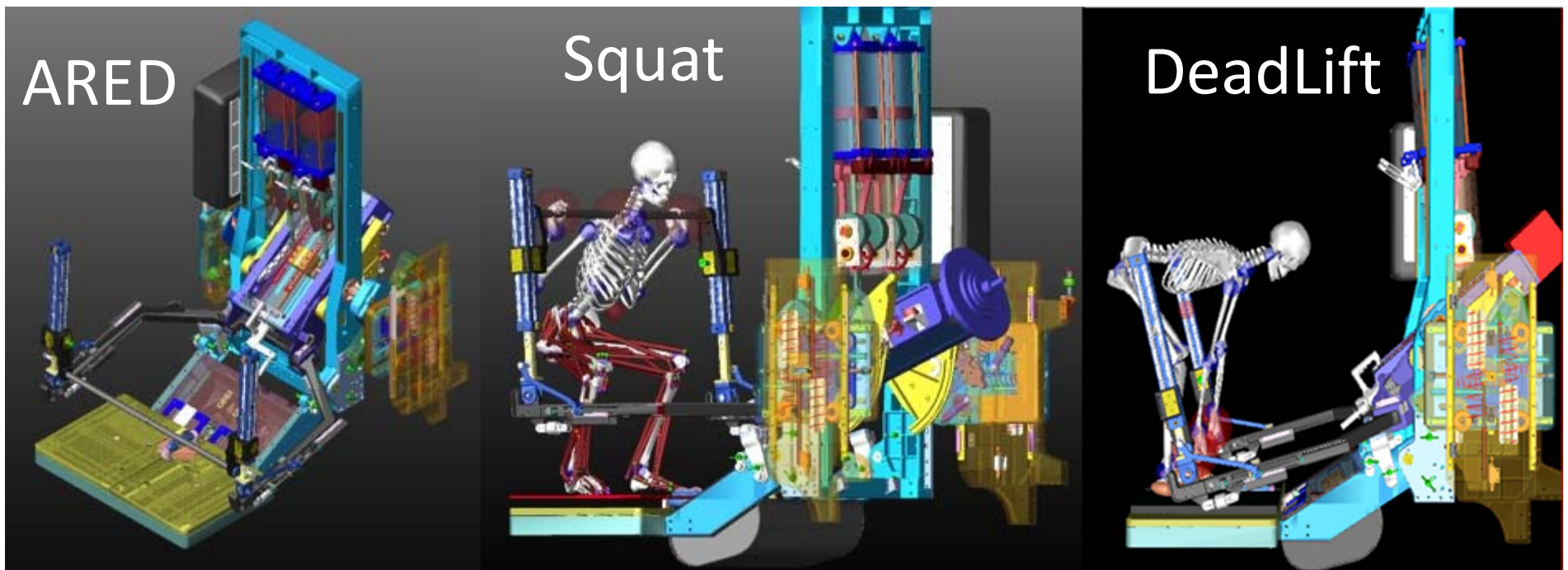
- Optimizing exercise with dietary intake can help maintain bone and muscle health.
- Quality of bone may not be the same.

Advanced Resistive Exercise Device (ARED)



Digital Astronaut Models Exercise

- Modeling can aid in determining exercise device requirements.



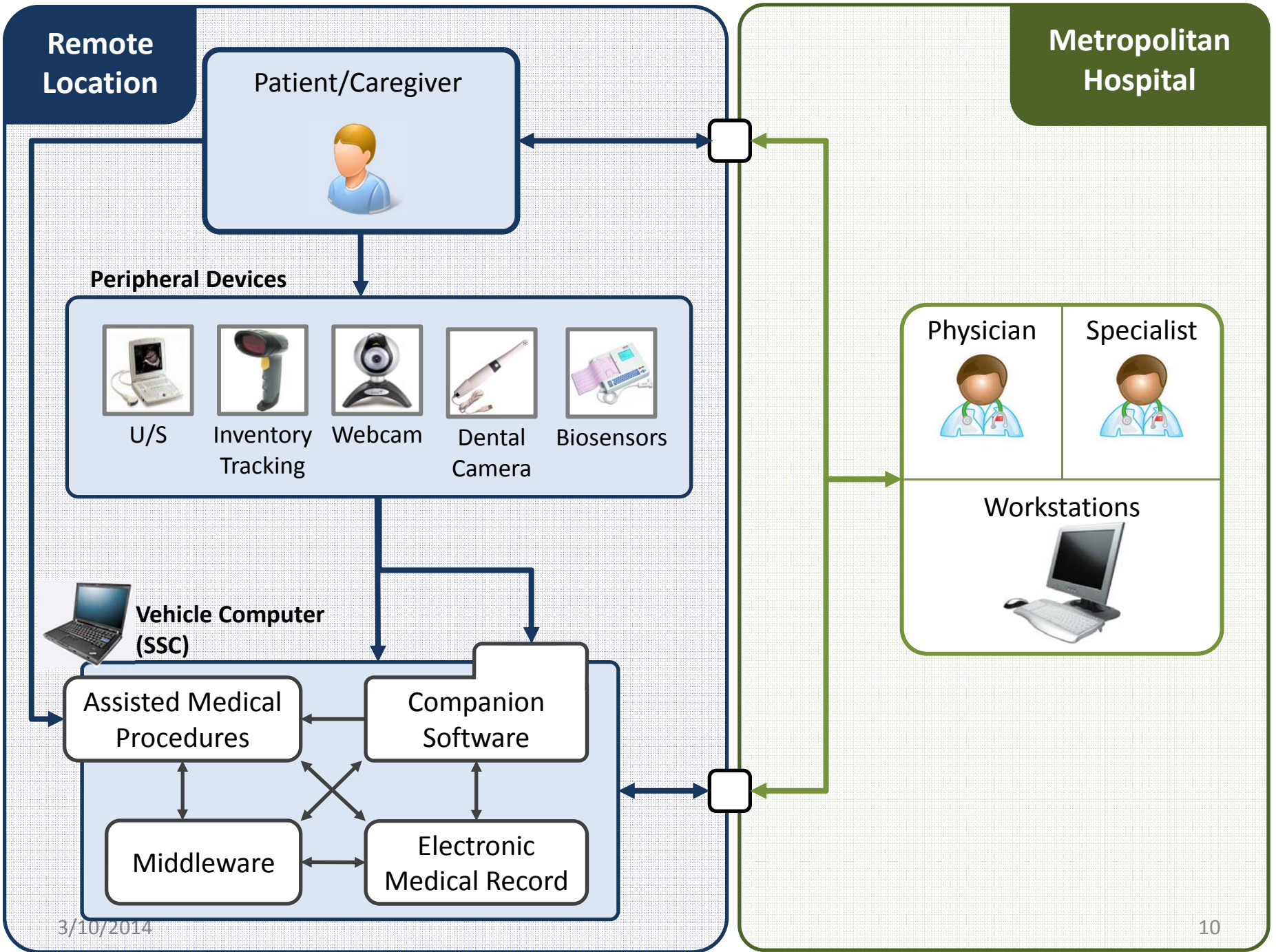


Medical Support in Remote Areas

- The Exploration medical system includes guided medical procedures, electronic medical record, medical consumables tracking along with software to enable seamless integration of the components.
- The integration of hardware with software would enable an individual patient's entire medical case (complete with pictures, vital signs, written notes, EKG, etc.) to be electronically transmitted to their ground support team.
- Ground demonstration is scheduled for late 2014.



3/10/201





ISS Ultrasound

- A multipurpose imaging device equipped with four different probes.
 - minimal crew training coupled with remote guidance
- Current applications include imaging of the spine, muscles, and the eye, among many others
- It can double as a medical diagnostic tool.



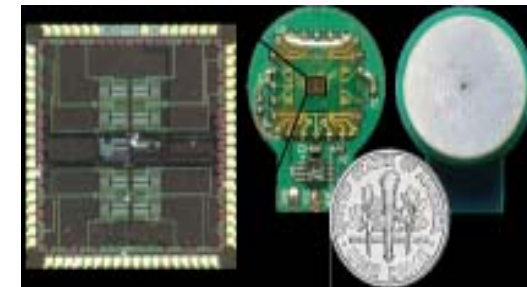


Dry Electrode ECG System

- This system, in a harness configuration, can be used for ambulatory cardiovascular monitoring and requires no skin preparation or consumables.
- The device integrates with software to transfer data to an Electronic Medical Record.
- This configuration is very compact and portable, and you also reduce the consumable aspect of using wet gel electrodes.



IMED Cardiax System



Cognionics dry electrode technology



Environmental Factors and Psychological Health

■ Categories of effective countermeasures

- Social support and interaction
 - Group cohesion and positive dynamics
 - Interaction with nature
 - Interior design including private space and windows
-
- Implementing these factors can alleviate affects of overcrowding in dwellings and workplaces

Private Space



Training

Immersive Environments & Social Connections

