



# PSYCHO-NEURO-MOTOR APPROACH IN UNDERSTANDING AND DEVELOPING HUMAN PERFORMANCE



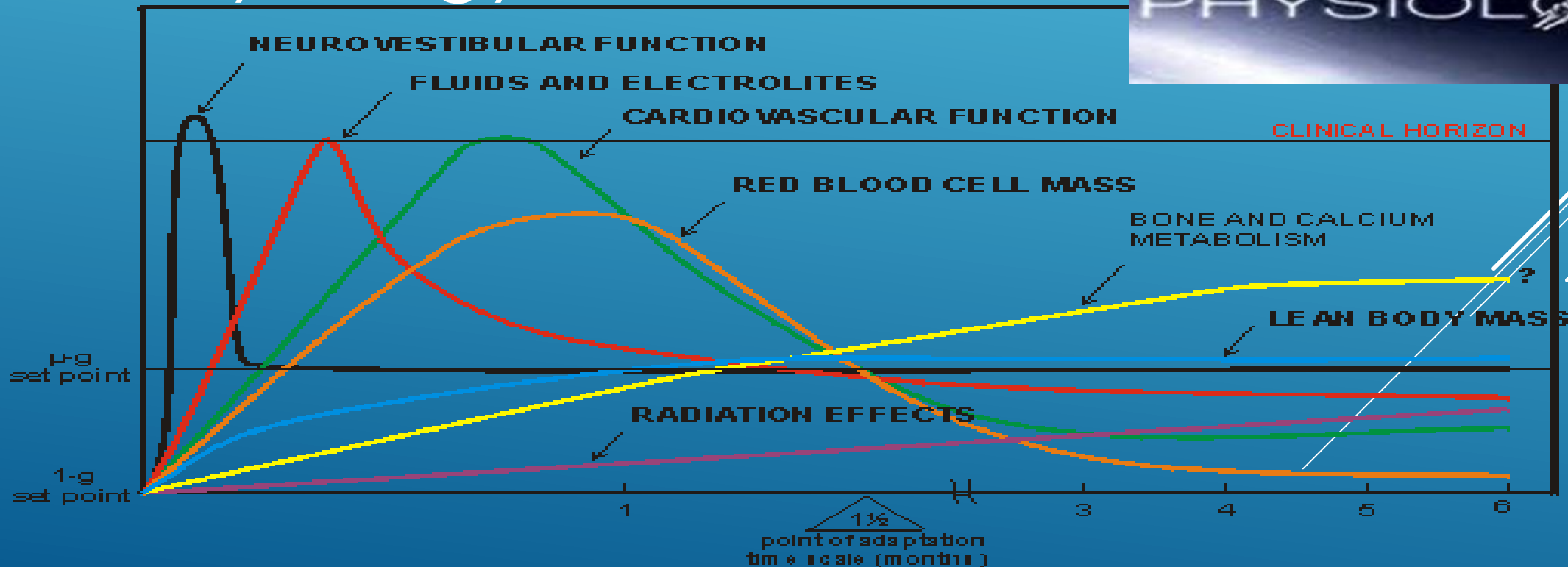
Switching to an unifying vision:  
**neuro-psycho-somatic**





# Competence Center target:

1. Integrated Human Space Physiology,



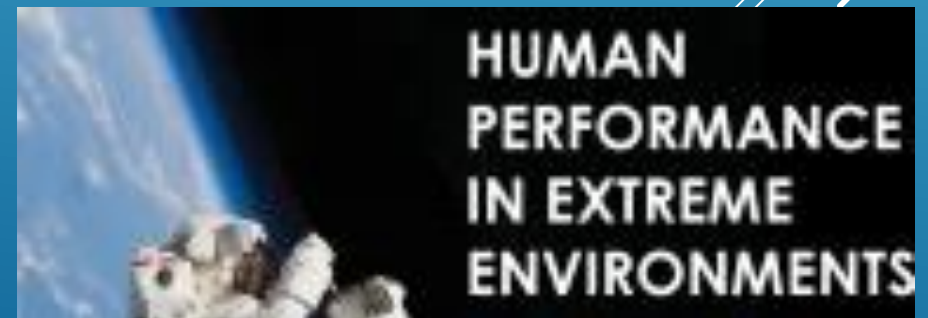


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## 2. Space Psychology,



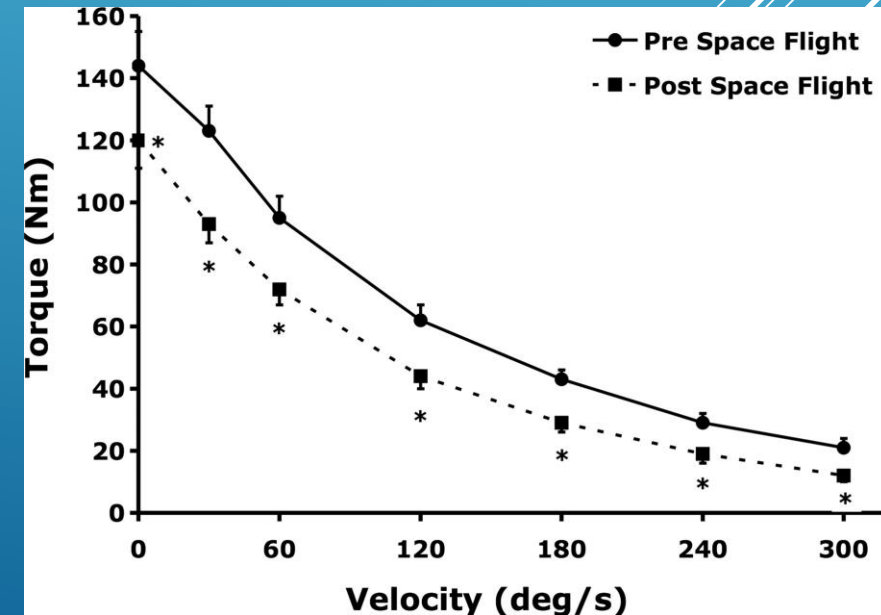
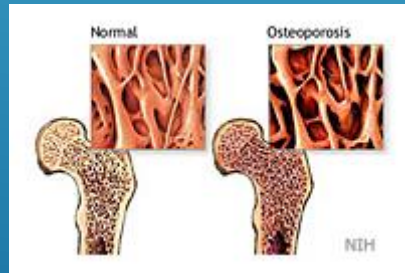
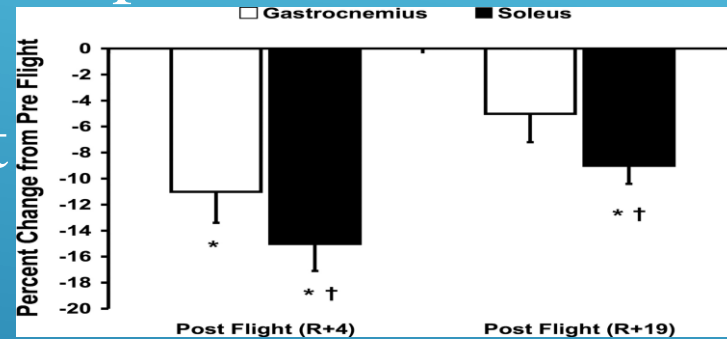
## 3. Human Performance under extreme conditions





## Some MICE physiological impairments:

- ❖ Cardio-vascular decompensation,
- ❖ Muscle volume lost
- ❖ Muscle force
- ❖ Bone calcium lost
- ❖ Loss of ability to adequately respond to tasks





Elucidation of processes and  
deepening the understanding of  
information role in neuro-muscular control and mental  
control training



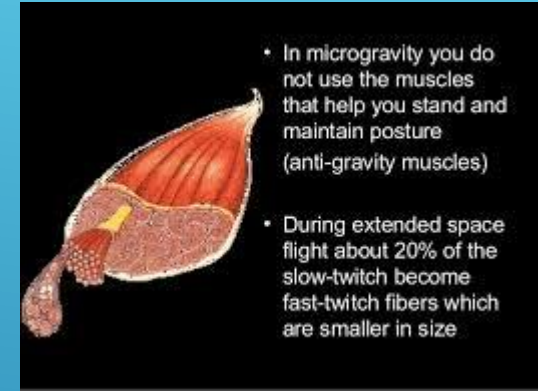
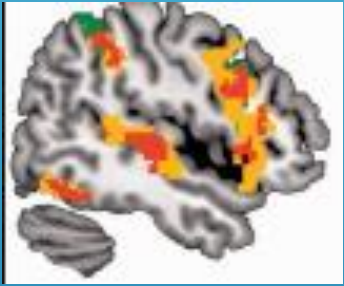
(in benefit of countermeasures and societal spin-off)



Same versions of

## Experimental Workbench for

neuro-muscular studies and training



as countermeasure for physiological and psycho-cognitive

impairments induced by MICE



Hardware and software elements

to be included in the workbench for

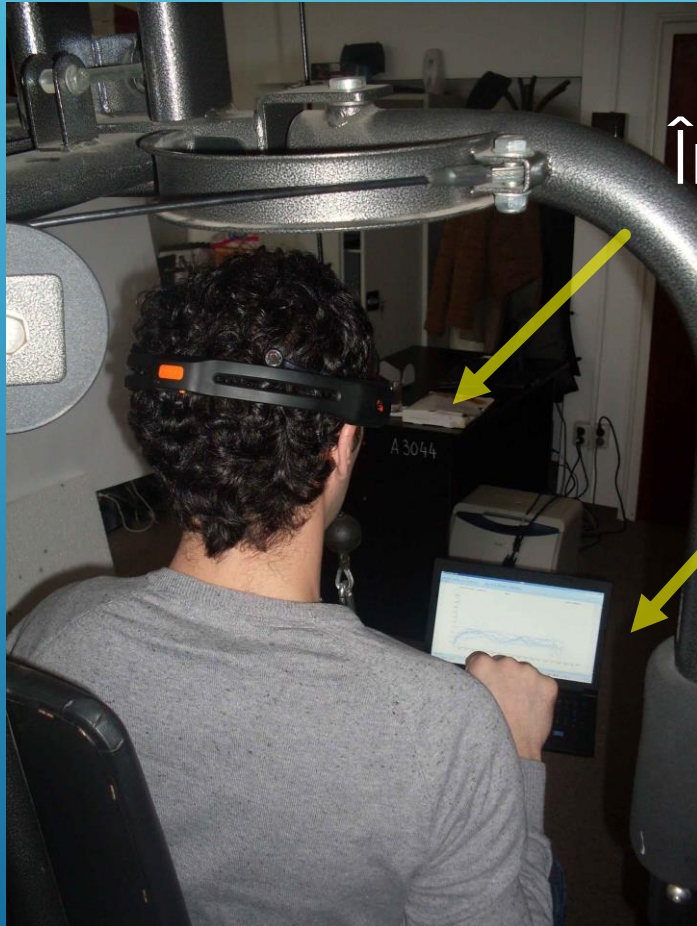
**complex psycho-neuro-motor applications**

(Center in-house integration)



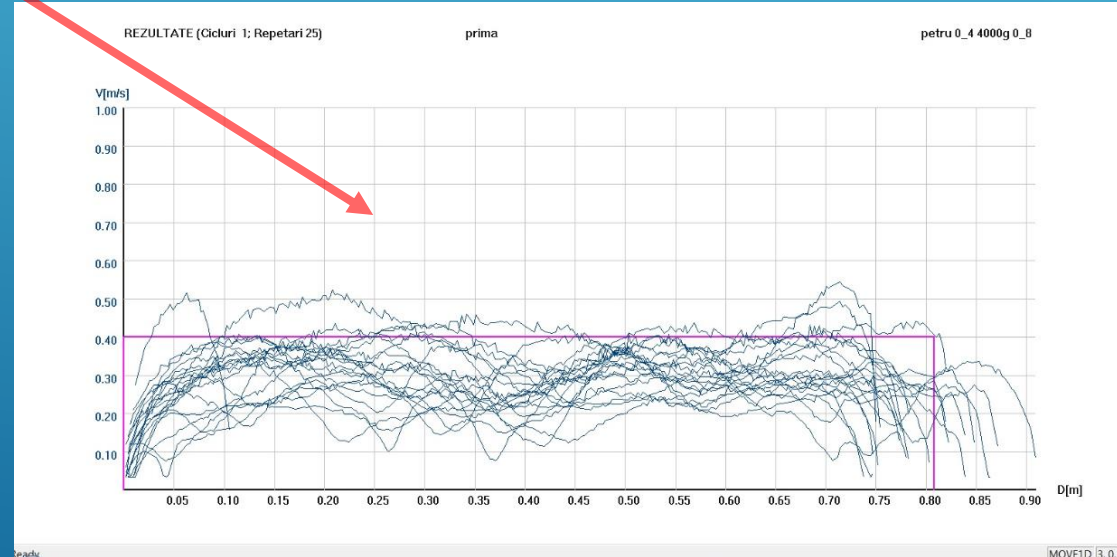


Experimental arrangement for **cerebral areas activation**  
in psycho-neuro-motor training  
(Center in-house integration)

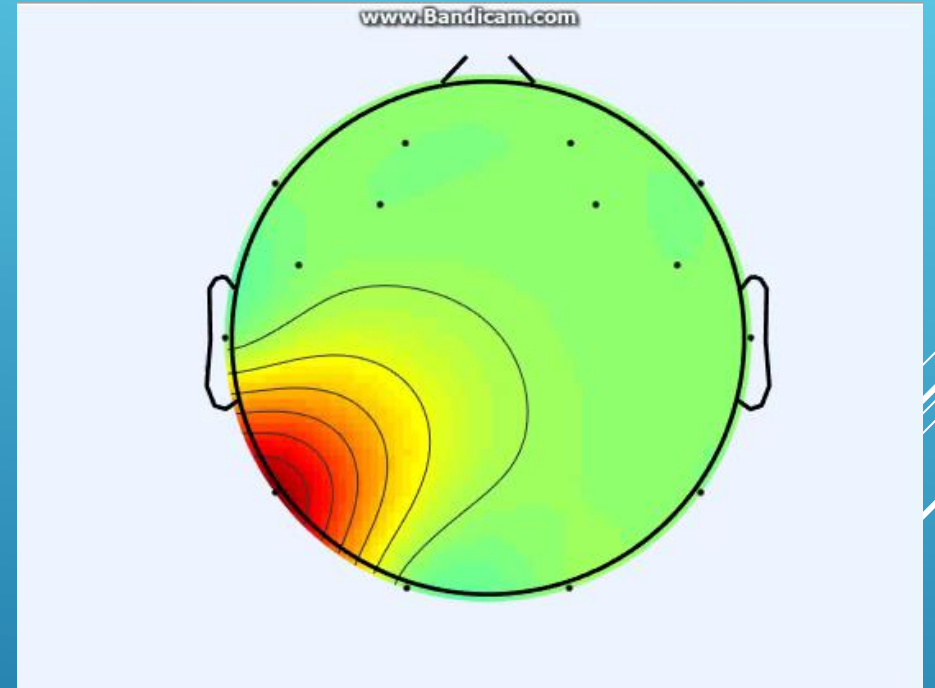
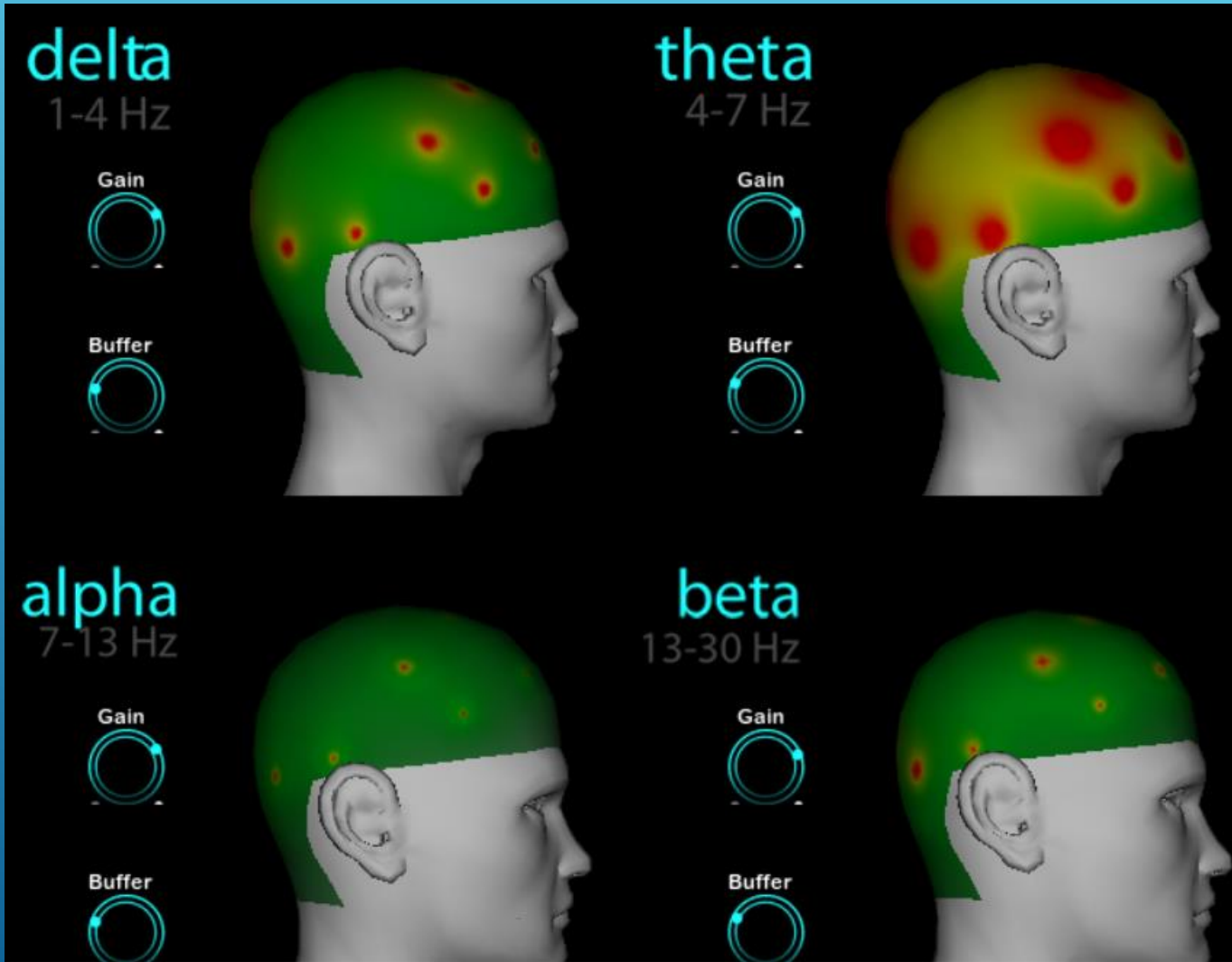


Înregistrare EEG

Feedback vizual în timp real









## Human Performance training:

- ❖ Through real time Computer Assisted informational reaction
- ❖ **Exploiting cortical electrical** activity reflection of
  - movement,
  - emotions and
  - cognition and with

extensive use of advanced methods of modulating sensory perception

**(Physical Virtual Environments, Virtual Reality, Augmented Reality)**



## 1. MUSTONE-A

(in cooperation with NISR and Pitești University)

- ❖ The project proposes the development of a muscular myotonometric measuring device, at a Proof-of-Concept level,
- ❖ targeting the evaluation of human muscles under extreme conditions, that astronauts are subject to, during prolonged exposure to micro-gravity.



## 2. CORTDYM

(in cooperation with CINETic and independent experts)

- ❖ investigate the Psycho-Neuro-Motor training of extreme human performance by examining:
  - the dynamics of electrical activity at cortical level and
  - the reciprocal influence between physical movement and
  - the capacity of cognitive modification.



### 3. MICROTRAD

(in cooperation with Transilvania University of Braşov and  
VISION SYSTEMS Ltd)

Propose the PoC of a  
Microgravity Enabled Training Device  
with  
Synthetic Opposable Force

that is expected to accomplish physical training schedules that  
will maintain physical condition during prolonged flights in  
microgravity.



## 4. Integrated training system based on real-time computer-assisted information feedback and motor anticipation for microgravity countermeasures

(In preparation by STARWALKER, in cooperation with CEOspaceTech, for Romanian Industry Incentive Scheme Call, fall 2016).



Cognition

Psiho –Neuro - Motor



Voluntar  
Movent



Neural  
Support





Psychic

Psiho – Neuro - Somatic



Somatic system



Nervous system







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Thank you!

