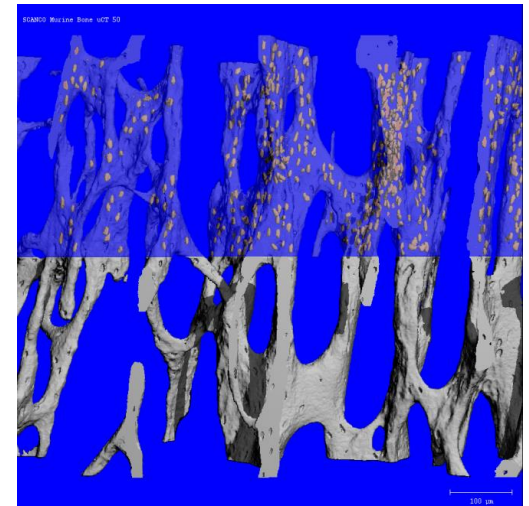


## Effects of a six-month spaceflight on bone density and bone microstructure: A clinical microCT perspective

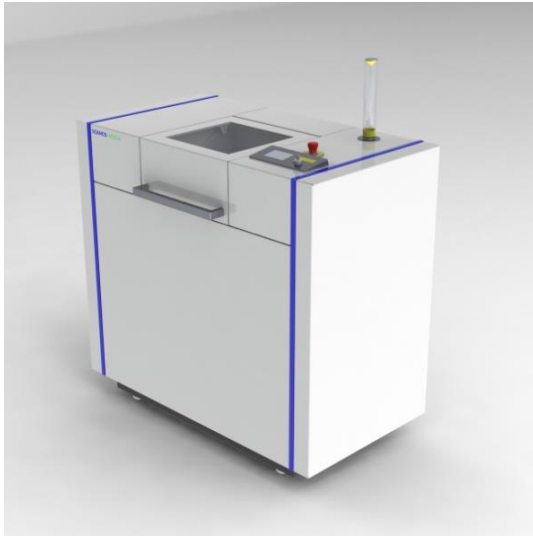


Dr. Martin Stauber  
SCANCO Medical AG

[www.scanco.ch](http://www.scanco.ch)



# Scanco Medical – System Classes



Specimen microCT

< 2  $\mu\text{m}$  @ 4 mm  $\emptyset$   
 < 50  $\mu\text{m}$  @ 100 mm  $\emptyset$



Preclinical microCT

< 14  $\mu\text{m}$  @ 32 mm  $\emptyset$   
 < 40  $\mu\text{m}$  @ 80 mm  $\emptyset$

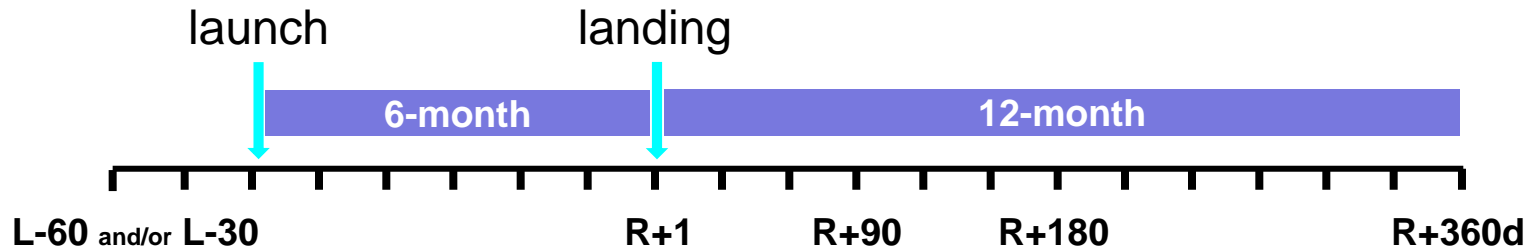


Clinical microCT

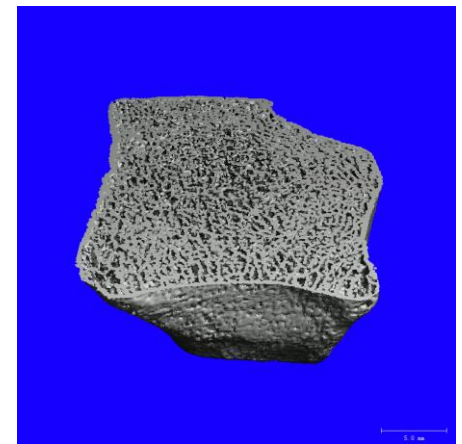
< 55  $\mu\text{m}$  @ 140 mm  $\emptyset$

Estimated resolution 10% MTF

# The EDOS Study

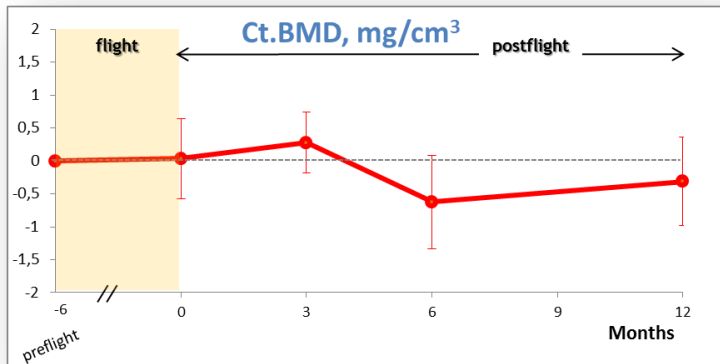


Thirteen spacemen scanned at radius and tibia with clinical microCT  
 Trabecular and cortical bone were evaluated as individual compartments

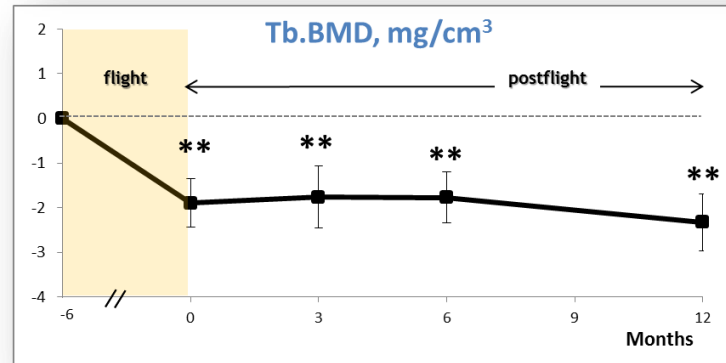
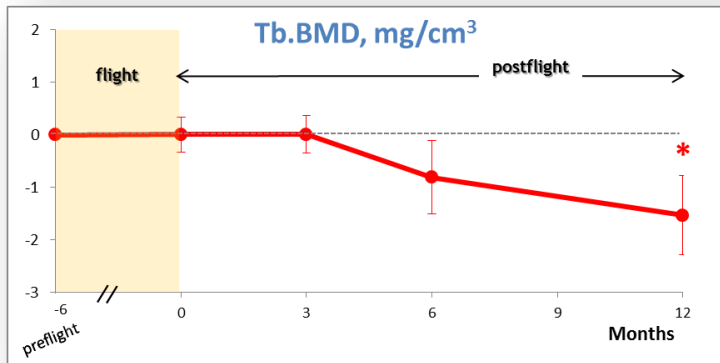
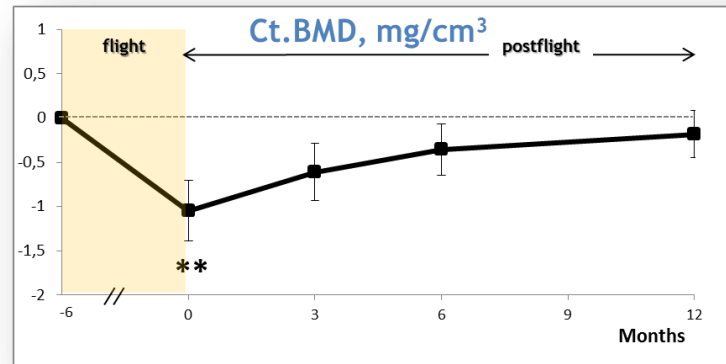


# The Main Result

## Radius



## Tibia



Differences in % vs preflight (mean±SE), \* p<0.05 ; \*\* p<0.01

# The Main Conclusion

---

- During a six month space flight
  - ✓ Weight-bearing bone site (tibia) shows high bone loss
  - ✓ Non weight-bearing bone site (radius) remained intact
- During the twelve month recovery phase
  - ✓ While weight-bearing bones (tibia) partly recover, non weight-bearing bones (radius) show pronounced bone loss
  - ✓ → Hypothesis: Compensation effect (radius to tibia)?
- Clinical microCT gives new insight in space-flight related changes in bone density and microstructure
- Results might be translated to long term bed-rest patients

# Acknowledgments

*INSERM U1059, St-Etienne University Hospital **France***

Laurence Vico  
 Myriam Normand  
 Hervé Locrelle  
 Marie-Thérèse Linossier  
 Maude Gerbaix  
 Thierry Thomas

*Eindhoven University of Technology **Netherlands***

Bert Van Rietbergen

*SCANCO Medical AG, Brüttisellen **Switzerland***

Nicolas Vilayphiou

*Faculty of Medicine Ibn-El-Jazzar, Sousse University **Tunisia***

Mohamed Zouch

*Institute of Biomedical Problems, Russian Academy of Science, Moscow **Russia***

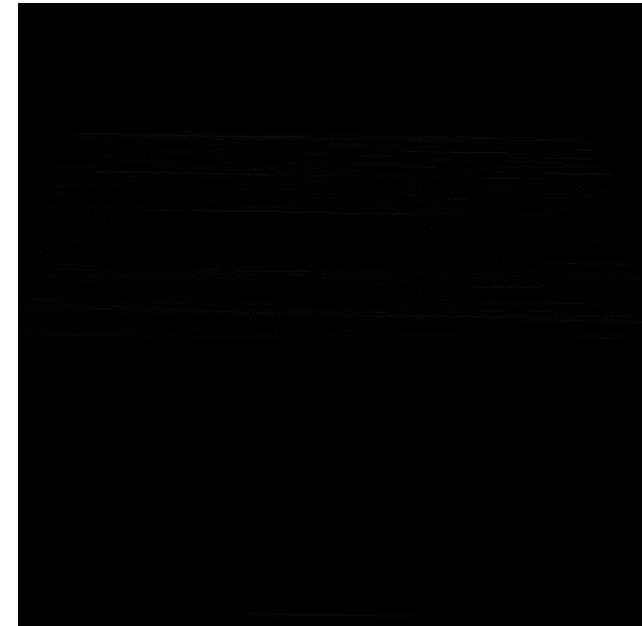
Galina Vassilieva  
 Valery Novikov

*Division of Bone Diseases, Geneva University Hospital, Geneva **Switzerland***

Nicolas Bonnet

*Charité - Universitätsmedizin Berlin **Germany***

Dieter Felsenberg



Funding



CENTRE NATIONAL D'ÉTUDES SPATIALES

