SPACESHIP EARTH

“There are no passengers on spaceship Earth. We are all Crew”

Herbert Marshall McLuhan (Canadian educator, philosopher, and scholar)
RESOURCE MANAGEMENT ON SPACESHIP EARTH

“The future depend on the understanding and development of innovative technologies that will enable the sustainable management of our resources”
OUR KNOWLEDGE-BASED SOCIETY

“Exploratory spaceflight puts scientific ideas, scientific thinking, and scientific vocabulary in the public eye. It elevates the general level of intellectual inquiry”

Carl Sagan - Astrophysicist and author
Cooperating with ESA and NASA
Trondheim – One of 9 Centers in Europe

ISS (International Space Station)
• USA
• Russia
• Europe
• Japan
• Canada, Brazil, Italy, and others.
NTNU Samfunnsforskning AS

• The company was established in 2004
  • Building on the Allforsk research foundation established in 1988

• Owned by NTNU 100%
  • The Head of Faculty for Social Science and Technology Management (SVT) at NTNU represents the owner.

• 120 employees in full-time position
  • 100 permanent employees
  • 16,5 man year and 17 persons at CIRiS

• Approx. 114 mill. NOK revenue in 2010
  • Approx. 13 mill. NOK revenue at CIRiS in 2010
Since 2011 the company has received a public grant.
2.8 million kr. allocated for 2011
NTNU - Norwegian University of Science and Technology is renowned for its high international standards in energy and environmental R&D, medical technology, materials science, marine and maritime research and information and communication technology. World class research generates products and solutions worth billions of dollars a year.

NTNU SF - NTNU Samfunnsforskning AS is a non-profit research company owned 100% by Norwegian University of Science and Technology (NTNU). Approximately 100 associates perform research and development projects commissioned by the Research Council of Norway, businesses, organizations, public administration and international initiators.

CIRiS - Centre for Interdisciplinary Research in Space is a department of NTNU Samfunnsforskning AS with the mandate to promote and perform research and development relevant to the human exploitation and exploration of space.

N-USOC - The Norwegian User Support and Operations Centre is the major activity at CIRiS, and its goal is to provide qualified support to the users of EMCS & AIS in specific and to science activities in micro-g environments in general.
Main Activities at CIRiS (1/3)

Control Room - and Cooperation Technology

- Technical infrastructure to support ISS activities
- Strong synergy with R&D related to other sectors / industry
- Data management and standardization
- Human factors and “Work process oriented” management.
Main Activities at CIRiS (2/3)

The International Space Station (ISS)

- Contributes on a daily basis to the utilization of the ISS
- Basic research utilizing microgravity as a research tool
- Utilizing ISS as an “observation platform”
- R & D related to the further exploration of space

External NORAIS antenna on ISS

EMCS Flight Model on ISS
Main Activities at CIRiS (3/3)

Controlled Cultivation Systems

• Plant biology related research and technology development
• Safe and reliable food production and recycling
• Strong technical and operational focus
• Strong synergies between space and ground based research.

ORF Genetics, Iceland

“Food Complement Unit”, Mars Base (2035)
CIRiS - History

• 1985 - 2000: Weightlessness as a tool
  • Basic research at NTNU, Institute of Biology and Institute of physics
  • Internationally recognised research group with focus on biology
  • The role of gravity for function and development in plants
  • 6 experiments have been executed on the Space shuttle.
• **2000 – 2007: Tools in weightlessness**
  
  • Increased focus on scientific protocols, methods and equipment
  
  • Activities organized as part of the Allforsk foundation.
  
  • The Norwegian USOC (User Support and Operations Centre) is established and become a part of ISS ground segment.
  
  • Official opening of N-USOC and the EMCS (European Modular Cultivation System) is installed on ISS in 2006
2007 – 2012: Spaceflight finds a home Trondheim

- **CIRiS** is organised as a department under NTNU Samfunnsforskning AS.
- **A**n interdisciplinary research community gathers around the common interest and fascination for Human Spaceflight.
- **New research areas with a MTO (Man, Technology, Organization)** aimed at based on N-USOC competence.
Thank you for your attention!

Visit www.ciris.no