



New Space Exploration Vision

*"This cause of exploration and discovery is not an option we choose;
it is a desire written in the human heart." – President Bush*



January 14, 2004

Biotechnology Drivers at NASA GRC

Goal 4 Explore the fundamental principles of physics, chemistry and biology through research in the unique natural laboratory of space



Goal 9 Extend the duration & boundaries of human space flight to create new opportunities for exploration & discovery



- ✓ Biological and Physical Research Rack (BPRR)
- ✓ Improved Science Imaging
- ✓ Advanced diagnostics
- ✓ Improved cell culturing systems



- ✓ Miniature, low power, reliable Vehicle & Human Space Systems
- ✓ Biomedical diagnostics & environmental sensors
- ✓ Radiation, bone loss countermeasures
- ✓ Medical applications



Biotechnology

Materials

Combustion

mG Measurement

Fluids

Enabling Technology for Fundamental Research

Increasing Technology Readiness Level

NASA BioScience & Engineering Institute

The John Glenn Biomedical Engineering Consortium

- ✓ Fluid Modeling of Physiological, Vehicle & Cell Culturing Systems
- ✓ Low gravity effects on fluid to cell environment
- ✓ Fluids & combustion sensor technology for biomedical & advanced life support
- ✓ 1g g-jitter measurement of bioreactors

- ✓ BioMEMS
- ✓ Bio materials
- ✓ Transport phenomena in biology & devices
- ✓ Lab-on-chip
- ✓ Molecular Nanosystems
- ✓ Tissue BioScience and Engineering

- ✓ Biomedical Issues
 - Medical diagnostics
 - Medical Treatment
 - Countermeasures

Glenn Research Center

at Lewis Field



GRC BioScience and Engineering Program

Code U
Office of Biological and Physical Research

GRC
BioScience and Engineering
Microgravity Science Division

Code U
Interdisciplinary Research

Established
Industry/Institutions

- Northeast Ohio
 - Case Western Reserve University
 - Cleveland Clinic Foundation
 - University Hospitals of Cleveland
 - MetroHealth System

- Regional
 - University of Michigan
- National

New Company
Start-ups

- N.E. Ohio BioEnterprise

**Collaboration/
Tech Transfer**

John Glenn
Biomedical Engineering Consortium

NASA BioScience & Engineering Institute

Inter-Agency Agreements

- NIH/NEI, FDA

Inter-Center Agreements

- ARC, JSC

SBIRs, Biomedical and BioScience

- Three Subtopics

NCMR

- R4D, ALS

Strategic Research Fund (SRF)

Collaboration

Code UB
Advanced Life
Support

Code UB
Crew Health, Safety,
& Performance

- NSBRI

Code UG and UF
Bio Research

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