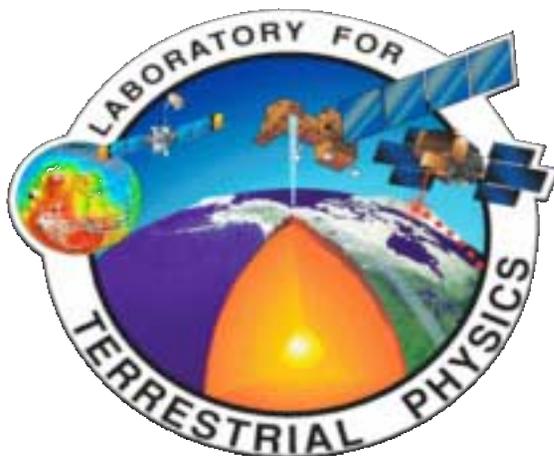
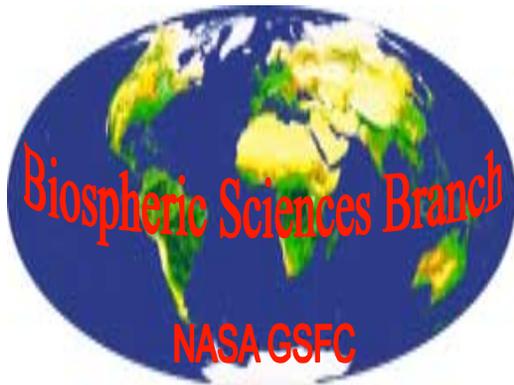


**BIOSPHERIC SCIENCES
BRANCH
Welcomes
NASA HQ Code Y**



Jon Ranson, Head

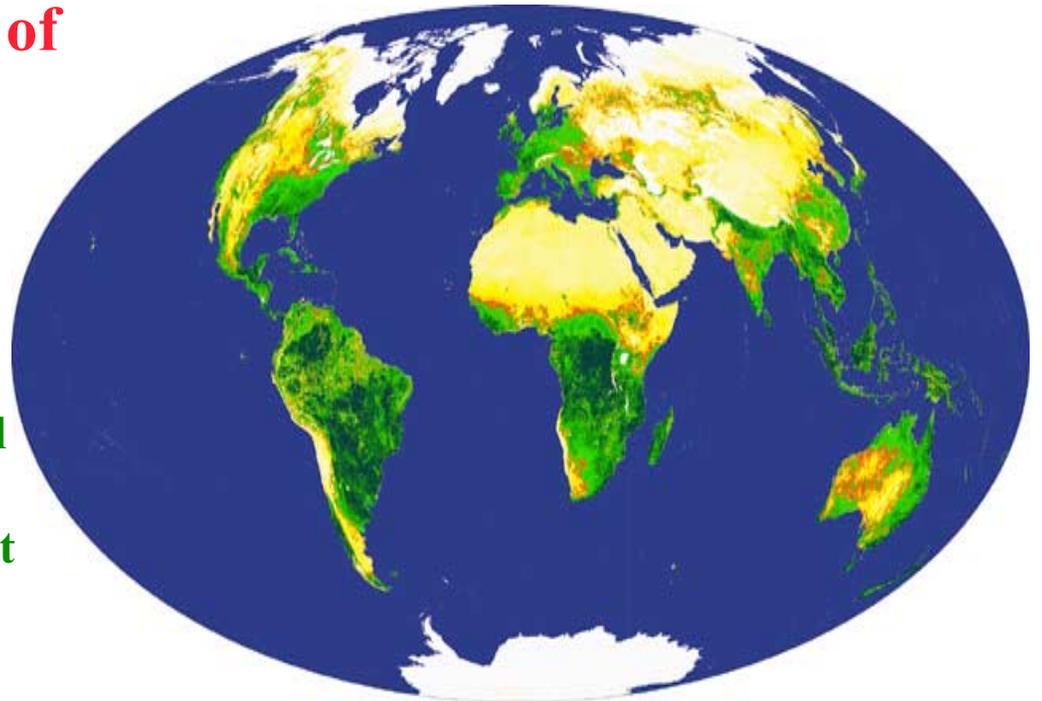
HQ Site Visit March 16-18, 2004

Biospheric Sciences

In the Laboratory for Terrestrial Physics

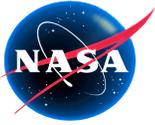
**Satellite remote sensing of land to
improve our understanding of
global processes**

- long term, consistent global vegetation data sets and analysis**
- global scale land-atmosphere interaction models**
- radiation interaction models and model inversion techniques**
- atmospheric correction and instrument / data calibration**
- science enabling of Earth observation missions**



GIMMS NDVI Data Set

Satellite observations
Parameterize & validate numerical models
Research & analysis using multiple data sets



Carbon Cycle & Ecosystems Focus Area Research Questions

- How are global ecosystems changing?
- What trends in atmospheric constituents and solar radiation are driving global climate?
- What changes are occurring in global land cover and land use, and what are their causes?
- How do ecosystems, land cover, and biogeochemical cycles respond to and affect global environmental change?
- What are the consequences of land cover and land use change for human societies and the sustainability of ecosystems?
- What are the consequences of climate change and increased human activities for coastal regions?
- How will carbon cycle dynamics and terrestrial and marine ecosystems change in the future?

Biospheric Sciences Branch (923)

Major Thrusts:

- Satellite remote sensing of land to improve our understanding of global processes
 - focus on developing / improving:
 - processed-based models of vegetation / climate interactions
 - radiation interaction models and model inversion techniques
 - atmospheric correction and instrument / data calibration
 - significant science enabling of Earth observation missions (*Landsat, Terra, ESSP, NPP, NPOES, SAR, Lidar*)
- Parameterize & validate numerical models
 - conduct large-scale field experiments (FIFE, BOREAS, LBA)
 - develop global data sets (Pathfinder, NDVI) and models (SiB2)
- Research & analysis using multiple data sets
 - land use / land cover change
 - human impacts and sustainability of ecosystems

Branch Vital Statistics

21 civil servants, 17 PhD, 3 MS

18 visiting or university affiliate scientists in Biospheric Sciences & a combined workforce of ~ 100 people

~\$20M annual budget, including 50% pass-through

Publications: ~ 89/yr

Biospheric Sciences Branch Civil Service Personnel

John Barker (PhD, U. of Chicago, '68)

Tom Brakke (PhD, Kansas St. U, '80)

Jim Collatz (PhD, Stanford, '82)

Don Deering (PhD, TAMU, '78)

Nadja Hardy

Brent Holben (MS, CSU, '75)

Marc Imhoff (PhD, Stanford, '93)

Jim Irons (PhD, U of MD, '93)

Arlene Kerber (MS, U of Mich., '66)

Dan Kimes (PhD, CSU, '79)

Bob Knox (PhD, U of N.C., '87)

Elissa Levine (PhD, Penn St., '84)

Brian Markham (MS, Cornell, '78)

Jeff Masek (PhD, Cornell)

Betsy Middleton (PhD, U of MD, '93)

Ross Nelson (PhD, Va.Tech, '94)

Jeff Pedelty (PhD, U. of Minn., '88)

Jeff Privette (PhD, U. of Colo., '94)

Jon Ranson (PhD, Purdue, '83)

Compton J. Tucker (PhD, CSU, '75)

Steve Ungar (PhD, U of MD, '71)

Sensor Sys. / Cal/Val. / Landsat

Opt. Modeling / EO-1 Mission Deputy

Bio. - Atm. Models / Global Carbon

BRDF Meas. / NEESPI

Secretary

Atmos Corr. / Global Ecology / AERONET

Eco. Analysis / Radar / ESSP Proj. Sci.

Opt Soil Models / Landsat 7 & LDCM

Satellite Vegetation Analysis / Branch mgmt.

Optical Canopy Modeling / Artificial Intel.

Forest Ecosys. Dynam / Veg. LIDAR

Soil Models. / GLOBE/Asthma Proj.

Sensor Sys / Cal/Val / Landsat

Land cover / LDCM Deputy

Forest Biology / Fluorescence/ UV exp.

Forest Ecology / Assessment / Lidar

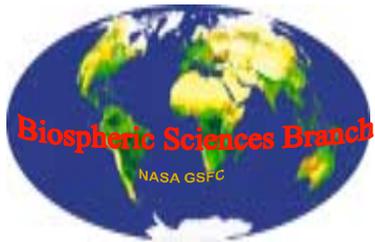
Computer Sys. / Astrobiology / Landsat

BRDF / NPP / EOS Cal/Val

Branch Head/ Forest Ecosys. / Terra

Global Ecology / Global Carbon/GIMMS

Sensor, Data Sys & Anal. / EO-1 Scientist



Biospheric Sciences Branch (923)

Code 923 Publications Statistics

	Journals	Book / Chapters	Proceedings	Total
'98	43	3	42	88
'99	32	3	45	80
'00	45	4	30	79
'01	54	3	25	82
'02	56	1	38	95
'03	83	0	28	111

	AERONET	36 (17)
	GIMMS	11 (12)
2003	Flight Proj. (Landsat, EOS, EO-1)	9 (10)
Journal	Applications	8 (6)
Publications	New Sensors/techniques	6 (6)
	Carbon Cycle/Climate	9 (5)
<p>Comment: number of first authorships has declined over past few years as management/enabling activities have increased.</p>		

Science enabling of Earth observation missions



J. Ranson
Project Scientist



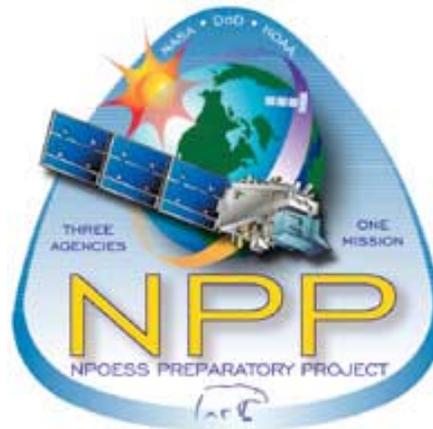
S. Ungar, Mission Scientist
T. Brakke, Deputy Mission Scientist



M. Imhoff, Project Scientist



D. Williams 920, Project Scientist
J. Irons, Deputy Project Scientist



R. Murphy 920, Project Scientist
J. Privette, Deputy Project Scientist



AERONET

B. Holben, P.I.



J. Irons, Project Scientist, J. Masek, Deputy Project Scientist.



J. Butler 924, Calibration Scientist

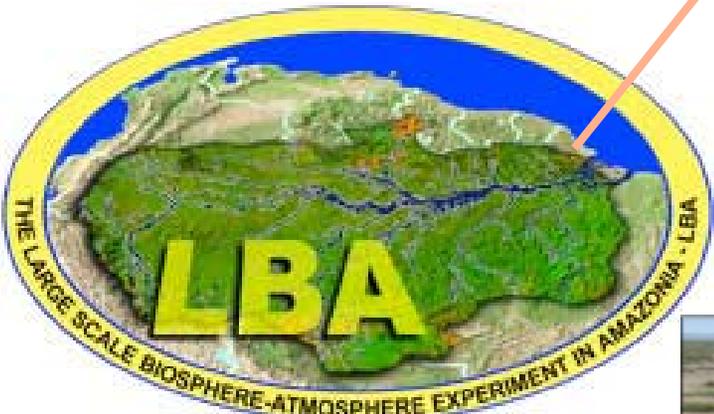
FIRST ISLSCP FIELD EXPERIMENT



BOREAL ECOSYSTEM-ATMOSPHERE STUDY



● CEOS Ca/Val Sites



MODIS



HQ Site Visit March 16-18, 2004

Biospheric Sciences Branch (923)

New Branch Head in place since August 2003 after 18 months and a nation wide search.

Secretary hired Jan. 2004.

Branch Members Submitted 11 proposals with potential value of over \$10M, full cost) since January 1, 2003. Unsolicited + NRAs

**Successes: NPP 2, REAsoN CAN 2, EOS (NRA2) 2, IDS 0, Unsol. 3
Some still pending**

Carbon NRA

923 has >10 NOI's

More about this Thursday

New Hire Packages Submitted For 920 advertisement

Carbon/Ecosystem Modeler

Land Cover Observations (ala GIMMS)

Aerosol Expert (hire already in system per Franco's direction)

Much agitation regarding full cost reporting during latest round of NRAs and subsequent budget negotiations.

Concerns over ability to remain competitive under full cost rules and increasing assessment burdens.

Future Activities

Regional/ Global vegetation mapping with Landsat-like data

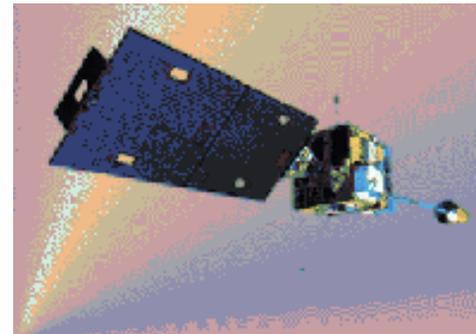
Global, meso- and local scale land-atmosphere data sets and associated models

Hyperspectral ESSP mission for carbon science and management

Lidar for global vegetation structure and function

Geostationary hyperspectral imager for light use efficiency and ET.

Exploration support – remote sensing science and modeling applied to NASA’s new direction. (BRDF, hyperspectral , lidar, soil modeling)



The Biospheric Sciences Branch studies terrestrial ecosystems and their interactions with the atmosphere using multiscale remote sensing, modeling, and advanced analytical techniques. Specifically, the Branch

(1) *utilizes ground, aircraft, and satellite remote sensing instruments to measure variables that describe the temporal and spatial dynamics of natural ecosystems as well as human impacts on these systems*

(2) *develops mathematical models which predict land surface conditions and processes related to rates of vegetation, soil, and atmosphere exchanges (e.g., radiation, heat, water, greenhouse gases, net primary productivity) as functions of remotely sensed and ground-based observations;*

(3) *acquires, produces, and distributes comprehensive, integrated land data sets incorporating ground, airborne, and/or satellite observations to facilitate model development and validation;*

(4) *ensures the scientific integrity of new Earth remote sensing systems to improve space-based Earth observation; and*

(5) *performs research which leads to the definition and development of new technologies, sensors, and missions.*

Through the above activities the Branch assesses and predicts environmental changes due to natural and anthropogenic processes at local to global scales.



<http://ltpwww.gsfc.nasa.gov/bsb/>