3. STAFFING, ORGANIZATION, AND FACILITIES

Staffing

The current Laboratory staff is comprised of 98 civil servants: 73 of these are scientists with 68 holding doctoral degrees and 9 are engineers. In addition, there are 70 visiting scientists (NRC, ESSIC, JCET, USRA) and 204 non-civil service specialists supporting the various projects and research programs throughout the Laboratory.

Organization

The present Laboratory organization is shown in Figure 1.

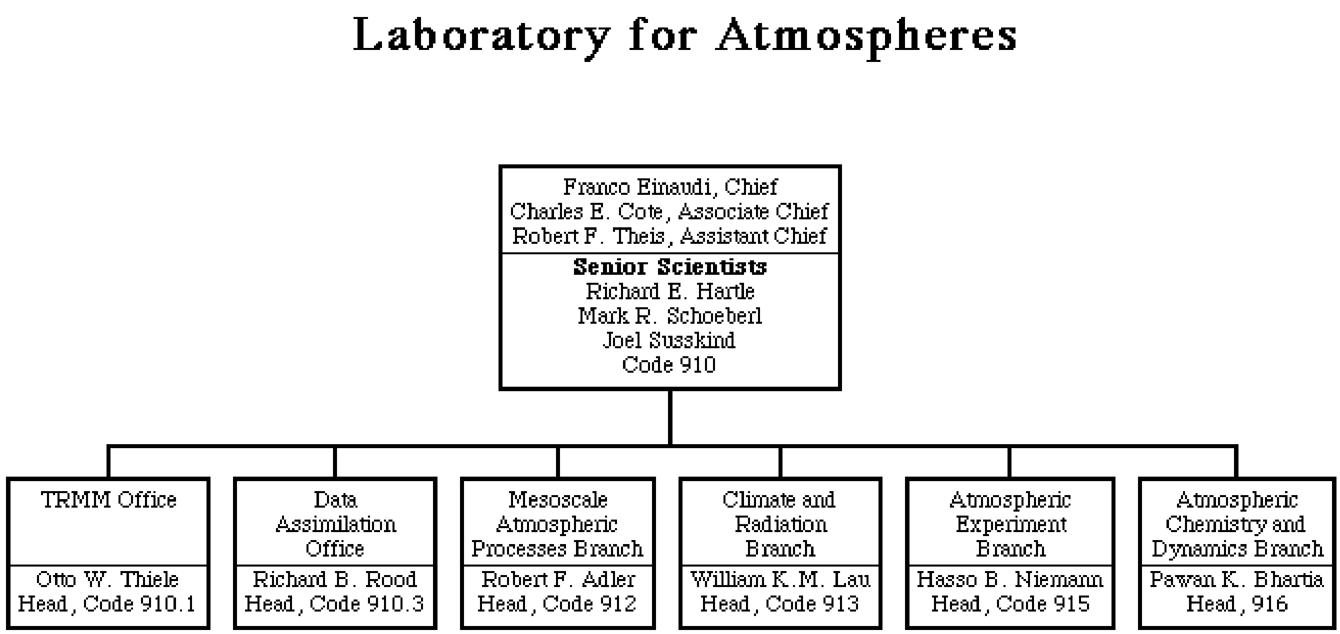

Figure 1

Descriptions of these organizational units are as follows:

Tropical Rainfall Measuring Mission Office, Code 910.1

The Tropical Rainfall Measuring Mission (TRMM) Office provides the infrastructure for planning and implementing a Global Validation Program (GVP) to support the Mission itself, and to support the TRMM Science Team. The Office also conducts relevant scientific studies, including rain measurement technology research, precipitation processes studies, radar algorithm development, and the development of methodologies for validating satellite measurements of rainfall. Information on TRMM Office activities can be found on the World-Wide Web at http://trmm.gsfc.nasa.gov.

Data Assimilation Office, Code 910.3

Data assimilation combines all available meteorologically relevant observations with a prognostic model to produce accurate time series estimates of the complete global atmosphere. The Data Assimilation Office (DAO) advances the state of the art of data assimilation and the use of data in a wide variety of Earth system problems, develops global data sets that are physically and dynamically consistent, provides operational support for NASA field missions and Space Shuttle science, and provides model-assimilated data sets for the Earth Science Enterprise. Information on the Office activities can be found on the World-Wide Web at http://dao.gsfc.nasa.gov/.

Mesoscale Atmospheric Processes Branch, Code 912

The Mesoscale Atmospheric Processes Branch studies the physics and dynamics of atmospheric processes through the use of satellite, aircraft, and surface-based remote sensing observations and computer-based simulations. This Branch develops advanced remote sensing instrumentation (with an emphasis on lidar), and techniques to measure meteorological parameters in the troposphere. Key areas of investigation are cloud and precipitation systems and their environments--from the scale of individual cloud systems, fronts, and cyclones, to the scale of regional and global climate. Information on the Branch activities can be found on the World-Wide Web at http://rsd.gsfc.nasa.gov/912/code912/.

Climate and Radiation Branch, Code 913

The Climate and Radiation Branch conducts basic and applied research with the goal of improving our fundamental understanding of regional and global climate on a wide range of spatial and temporal scales. Research emphasis is placed on radiative and dynamical processes leading to the formation of clouds and precipitation, and their effects on the water and energy cycles of the Earth. Currently, the major research thrusts of the Branch are: climate diagnostics, remote sensing applications, hydrologic processes and radiation, aerosol/climate interactions, and modeling the seasonal-to-interannual variability of climate. Information on Branch activities can be found on the World-Wide Web at http://climate.gsfc.nasa.gov/.

Atmospheric Experiment Branch, Code 915

The Atmospheric Experiment Branch carries out experimental investigations to further our knowledge and understanding of the formation and evolution of various solar system objects such as planets, their satellites, and comets. Investigations address the composition and structure of planetary atmospheres, and the physical phenomena occurring in the Earth's upper atmosphere. Neutral, ion, and gas chromatograph mass spectrometers have been developed and are continuously being refined to measure atmospheric gas composition using entry probes and orbiting satellites. Information on Branch activities can be found on the World-Wide Web at http://webserver.gsfc.nasa.gov/Code915.

Atmospheric Chemistry and Dynamics Branch, Code 916

The Atmospheric Chemistry and Dynamics Branch develops remote-sensing techniques to measure ozone and other atmospheric trace constituents important for atmospheric chemistry and climate studies, develops models for use in the analysis of observations, incorporates results of analysis to improve the predictive capabilities of models, and provides predictions of the impact of trace gas emissions on our planet's ozone layer. Information on Branch activities can be found on the World-Wide Web at http://hyperion.gsfc.nasa.gov/.

Facilities

Computational Capabilities

Computing capabilities in the Laboratory range from high-performance supercomputers to scientific workstations to desktop personal computers.

The supercomputers are operated for general use by the NASA Center for Computational Sciences (NCCS). Their flagship machine is a Cray T3D, with 512 DEC 21064 Alpha microprocessor processing elements, each with 128 Mbytes (MB) of random access memory. Supercomputer resources are also available through special arrangement from NASA's Ames Research Center's Numerical Aerospace Simulation (NAS) facility.

Each Branch maintains a distributed system of workstations and desktop personal computers. The workstations are typically arranged in large clusters involving 30 or more machines in the larger branches. These clustered systems provide an enormous available computing resource, both in regard to performance and data storage, that is economical to maintain and easy to use.

These machine clusters have been acquired to support specific programs, but may be made available upon request for other research on a limited basis.

Mass Spectrometry

The Laboratory for Atmospheres' Mass Spectrometry Laboratory is equipped with unique facilities for the design, development, fabrication, assembly, calibration, and testing of flight-qualified mass spectrometers used for atmospheric sampling.

The equipment includes precision tools and machining, material processing equipment, and calibration systems capable of simulating planetary atmospheres. The facility has been utilized to develop instruments that have been used for explorations of the atmospheres of Venus, Saturn, and Mars (on orbiting spacecraft), and on Jupiter and Titan probes. The Laboratory also has flight instrument assembly and clean rooms, and hazardous gas handling equipment for poisonous and explosive gases.

Lidar

The Laboratory has well equipped facilities to develop lidar systems for airborne and ground-based measurements of aerosols, methane, ozone, water vapor, pressure, temperature, and winds.

Lasers capable of generating radiation from 200 nm to beyond 10 microns are available, as are a range of sensitive photon detectors for use throughout this wavelength region. Telescopes with primaries up to 30 inches in diameter, high speed counting systems for detecting weak signals, and associated hardware are utilized.

Lidars developed in the Laboratory include the Airborne Raman Lidar (ARL), to measure atmospheric methane, water vapor and temperature; the Stratosphere Ozone Lidar Trailer Experiment (STROZ LITE), to measure atmospheric ozone, temperature, and aerosols; the Large Aperture Scanning Airborne Lidar (LASAL), to measure clouds and aerosols; the Cloud Lidar System (CLS), to measure clouds and aerosols; Scanning Raman Lidar, to measure water vapor, aerosols and cloud water; and the Edge Technique Wind Lidar System to measure winds.

Radiometric Calibration and Development Facility

The Radiometric Calibration and Development Facility (RCDF) supports the development and calibration of Space Shuttle demonstration flights for new techniques for ozone measurements operating in the ultraviolet (UV), visible (VIS), and infrared (IR) regions of the electromagnetic spectrum.

As part of the Earth Observing System (EOS) calibration program, the RCDF will provide calibrations for future Solar Backscatter Ultraviolet/version 2 (SBUV/2) and Total Ozone Mapping Spectrometer (TOMS) instruments.

The RCDF contains state-of-the-art calibration equipment and standards traceable to the National Institutes for Standards and Technology (NIST). Calibration capabilities include wavelength, linearity, signal to noise (s/n), instantaneous field of view (IFOV), field of regard (FOR), and goniometry. Capabilities also exist to characterize such instrument subsystems as spectral dispersers and detectors.

The Facility includes a class 10,000 clean room with a continuous source of N_2 for added contamination control.

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The responsible NASA official is Bob Theis.