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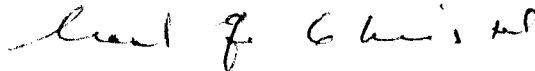
College of Letters, Arts
and Sciences

Political Science

Dear Charles D. Siegal, John E. Noyes, Roger Alford, and Leila Nadya Sadat:

Enclosed is a copy of the Report of the ILAAB Space Law Committee for
2006. It is entitled "Remote Sensing and Weather Forecasting."

For the Committee,



Carl Q. Christol

Distinguished Emeritus Professor of International Law and Political Science

REMOTE SENSING AND WEATHER FORECASTING

REPORT OF THE SPACE LAW COMMITTEE, 2006

The exploration, use, and exploitation of outer space opened a new dimension to human creativity. Accepting this challenge the U. S. government has engaged in critically important remote sensing activities. Among them has been the gathering of data and the dissemination of analyzed information relating to weather conditions. Numerous federal agencies have participated in these functions.

The importance of weather and climate sensitive industries, both directly and indirectly, has been measured in terms of the United States' GNP, namely, about one-third or about \$3 trillion. The areas range from finance, insurance and real estate services, to retail and wholesale trade, and manufacturing. Any such assessment must also take into account the availability and quality of air and water as well as energy use and food shortages.

With the rise of sea-surface temperatures in the Southern Atlantic Ocean, particularly in the Caribbean and in the Gulf of Mexico, and with the increase in the number and the intensity of hurricanes, weather reports having a high degree of accuracy and disseminated in a timely fashion have provided very substantial benefits to human needs. Lives have been saved and property damage somewhat minimized.

There has been an increase in the number of South Atlantic storms with 12 in 1969, 21 in 1983, and 27 in 2005. The very heavy damages beginning in 2000 were exceeded in 2004 and again exceeded in 2005. The devastation caused by the loss of lives and property damage to the Gulf Coast states has produced circumstances challenging the recovery capabilities of the affected areas and American well-being.

The hurricanes of this area have produced large scale detriment for many years going back to a storm in the Lesser Antilles in 1780 where 22,000 deaths were reported, one in Galveston in 1900 causing 12,000 deaths, and Katrina, a category 5 hurricane, in August and September 2005, which resulted in 1,300 deaths and a reported \$80 billion in property damage. It was the most costly in history with winds measured at 160 miles per hour with accompanying tidal waves. Major destruction occurred to both off-shore and on-shore properties.

In order to identify the formation and the predicted direction of hurricanes the government has relied on geostationary operational environmental satellites (GOES) for short-range warning and on Polar-orbiting environmental satellites (POES) for longer term data. The National Oceanic and Atmospheric

Administration (NOAA) has primary responsibility for gathering data on the formation and direction of hurricanes. The National Operational Hydrologic Remote Sensing Center is supervised by the National Weather Service, a functional element of NOAA. The Center ascertains and reports on weather fronts and precipitation occurring six days and one day offshore, and establishes the basis for prospective hurricane activity. The National Weather Service also operates the National Hurricane Center, which, through its Tropical Prediction Center, issues tropical cyclone reports. Its concern for forecast accuracy has resulted in after-action reports dealing with track forecast verification and sensing verification. They cover forecasts at 12 and 120 hour periods.

Since high altitude winds in the storm area influence the development of hurricanes the use of satellite imagery has been augmented by radar, meteorological analyses, and weather observations. The employment of satellites to identify strong winds is critical since high velocity upper-level shearing winds cause storms to dissipate.

The early dissemination of scientifically based forecasting enables governmental authorities to determine what mandatory actions are called for in order to require the removal of residents to inland areas and for the protection of property. The early gathering of data via remote sensing and the dissemination of analyzed information have served such goals.

The Principles Relating to the Remote Sensing of the Earth from Outer Space were adopted by the UN General Assembly in its Resolution 41/65 on December 3, 1986. Principles 10 and 11 give special status to the protection of human life and the environment.^[1]

The World Meteorological Organization has addressed the issue of weather data. It adopted Resolution 40 in 1995 dealing at two levels with access with tier one focusing on data and products necessary for the maximization of severe weather and tropical cyclone warnings.

The International Committee on Earth Observation Satellites (CEOS) in November, 2002, adopted an International Disaster Charter designed to facilitate inter-governmental cooperation in disaster mitigation. Since 2000 more than 55 notices have been disseminated by national and international agencies allowing crisis-struck regions to take corrective measures. Joining in these extensive operations has been the regional undertaking between the United States and European countries.^[2] Based on the Joint Polar System Agreement it has produced humanitarian benefits as well as demonstrating the concern of scientifically oriented leaders to go beyond the legal principles identified in the

1986 U. N. Resolution.

The U. N. principles are undergoing review at present to determine to what extent, if any, they may require changes in order to cope with current needs and practices. Among the bodies reviewing the issue are the Legal Subcommittee of the UN Committee on the Peaceful Uses of Outer Space, the International Institute of Space Law, and the Space Law Committee of the ILA. In 1999 the UN Office of Outer Space Affairs convened the Third UN Conference on the Exploration and Peaceful Uses of Outer Space at which time remote sensing of the human environment received careful study. Developing countries have been particularly attentive to this subject and in November, 2004, representatives participated in a workshop in Brazil. Their role has been summarized: "Participation in these activities enables developing nations to take action that can establish evidence of State practice to enhance and protect the right to access data for territory under a sensed State's jurisdiction as international law."^[3]

During the on-going reconsideration of the UN principles attention will be drawn to the role played by remote sensing in hurricane forecasting and reporting. Undoubtedly any review will conclude that no changes should take place which might modify free international access to weather data and information. The principal legal role of the United Nations will be strengthened by considering the context of other agreements and practices and operating institutions, both national and international—both public and private. Past experience should provide the basis for policies designed to serve individual and community needs.

^[1] G. Winter, "Access of the Public to Environmental Data from Satellite Remote Sensing," 6 J. Envtl. L. 51-52 (1994). A related article will appear in a forthcoming 2006 issue of the Journal of Space Law.

^[2]^[2] J. I. Gabrynowicz "Space Law: Its Cold War Origins and Challenges in the Era of Globalization," 37 Suffolk U. L. Rev. 1041 (2004).

^[3] J. I. Gabrynowicz, U. N. Doc. A/AC.105/847, Feb. 1, 2005.

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