

EARTH OBSERVATION, RISK ASSESSMENT AND GLOBAL CHANGE

Implications for the Insurance and Aerospace Sectors

“It is an indisputable fact that weather-related catastrophes are costing the insurance industry more than ever before...In order for insurers to understand the changing level of risk, good climate data from a variety of sources is absolutely vital and should be freely available.”

Lord Levene

Chairman, Lloyd’s of London

The Center for Strategic and International Studies (CSIS) and Chatham House (the Royal Institute of International Affairs) co-hosted an event on July 16, 2008, in London to examine the role and value of Earth observation data as a global public good. *“Earth Observation, Risk Assessment and Global Change: Implications for the Insurance and Aerospace Sectors”* brought together high-level participants from the public sector, scientific community and industry to promote discussion and debate among the full range of Earth observation stakeholders on the future of Earth observations. The event was co-sponsored by the International Astronautical Federation. The event agenda is attached in Appendix A and list of participants in Appendix B.

Estimates indicate that globally, roughly one-third of all economic activity is weather sensitive – not including long-term climate changes. As the world’s population continues to increase, along with global production, global changes such as natural disasters, resource scarcity issues and climate change present new challenges and opportunities for businesses and the insurance companies they rely on to help them assess and manage risk. These risks span physical, regulatory, reputation and litigation areas. As Lindene Patton, Chief Climate Product Officer at Zurich Financial Services, conveyed, due to ‘supply chain dependencies,’ actual risks for many sectors may be higher than currently perceived.

Insurance is a tool that allows people and businesses to assess and manage risks by permitting the transfer of risk and uncertainty in exchange for a premium. Insurers and insurance consumers need accurate, comprehensive, and timely information in order to be able to guess and manage risk. In particular, insurers rely heavily on Earth observation data and good models to assess the risks associated with many kinds of supply chain disruptions as well as global change, including climate variation, severe weather events, catastrophes, and environmental changes. The insurance industry’s use of Earth observation data has increased dramatically over the last ten years. The global insurance industry has increasingly assessed, adopted and adapted science-based information over the past 25 years, enabling a better understanding of events previously regarded as ‘random.’ This more systematic approach to risk assessment has increased the demand for Earth observation data.

Indeed, Earth observation data is essential for modeling many kinds of risk. The catastrophe modeling companies that support the re/insurance industry always need more data and use it in many key aspects of their modeling processes. The continuity and quality of Earth observation data are essential to

producing models and decision support tools that enable the insurance industry to successfully manage entire families of risk. Before the catastrophic impacts of future climate change can be accurately assessed, much more needs to be done to reduce present-day risk uncertainty in risk assessments. While the modeling community is very good at developing mathematical models, limitations to current data availability requires them to be able to deal with data sets that are noisy, incomplete, and sparsely populated in some areas.

Furthermore, “Earth observation measurements have all proven that our modeling is conservative,” said Professor Sir David King, Director, Smith School of Enterprise and the Environment, University of Oxford. “Global changes are occurring much more rapidly than we anticipated. The baseline temperature is now climbing, so one in a hundred year events are now much more frequent. The estimate of losing all summer ice in the Arctic has gone from 50 years to five years, which in turn will result in a stepwise increase in temperature. These demonstrate our critical need for continuous acquisition of Earth observation data to improve our scientific understanding of the global changes occurring.”

The relationship between use of capital by insurance companies and levels of public confidence of their risk assessments is very important. The larger the uncertainty in the risk profile, the higher the ‘judgment’ of how much capital has to be reserved so that it is available in event of a catastrophe. The more company capital held means less capital is available for investments – including investments that could be used for adaptation and mitigation. Improving data quality, which would improve modeling accuracy, would in turn increase the availability of capital to underwrite risks – capital that could be used to support a wide array of approaches to risk management and support public policy objectives. These include innovative strategies such as supporting adaptation to global change and coverage for increased risk, previously excluded risks and new business opportunities. Moreover, the development of new Earth observation technologies can allow for the development of entirely new business areas and concepts. For example, the advent of GPS now allows for pay-as-you-go auto insurance, which provides an entirely new set of tools not only for insurance but also for traffic management and pollution abatement.

Importantly, there is an expectation on the part of the insurance industry that Earth observation data will continue to be available at no cost as a global public good. “It’s very important that Earth observation data remains available,” said Lindene Patton of Zurich. “The idea that the data supply chain would disappear is almost unthinkable – we’re reliant on it.” Earth observations are being increasingly assimilated into global information infrastructure that is critical for the sustainment of societal infrastructure.

However, while global changes are occurring more rapidly and the private sector is increasingly reliant on Earth observations to assess and manage the associated risks, there are no established programs to provide long-term, continuous Earth monitoring. National and international demands for action on global change are growing, yet funding is inadequate to meet monitoring requirements. One specific policy regime that is affected is greenhouse gas and carbon management. The current Earth observation

capacity is not sufficient to provide a national and international monitoring system to underpin basic carbon management strategies.

In addition, not all government-sponsored Earth observation data is freely available, a situation which impacts the capacity of the insurance industry to manage risk. For the good of society, if governments wish to maximize the ability of the insurance industry to reduce the amount of economic dislocation arising from global change, governments must encourage insurers to base their pricing on the latest view of risk, in particular by ensuring the free availability of data. Otherwise, there may be little incentive to move away from less refined risk models; indeed, in some cases, it can be to an insurer's disadvantage to do so.

Northrop Grumman Space Technology President Alexis Livanos said "global change is a global problem that demands a global solution." With one third of total insurance risk related to catastrophes, "an Earth observation system to monitor and forecast changes in the global environment can provide the critical information needed to support decision making and risk management." Livanos called on the international community to create a comprehensive global change monitoring system to ensure a comprehensive set of observations and to enable forecasters and scientists to share, compare and evaluate data effectively.

Mike Keebaugh, Vice President, Raytheon Intelligence and Information Systems, notes the "growing consensus" from both international and U.S. organizations for action and increased investments in energy efficiency, alternative energy, caps on greenhouse gas emissions, carbon trading systems, and sustainable agriculture "Policy decisions on these issues must be made on a firm foundation of facts and data. Our ability to make the right decisions, to take the most efficient and effective course of action, critically depends on our ability to monitor our environment and predict the impact of global change. This will require increased and sustained investments in global Earth observation, data management, modeling and forecasting, and decision support systems."

"Key issues concerning improvement of current Earth observation capacity, the provision of long-term, continuous Earth monitoring and the actual availability of Earth observation data through the implementation of suitable data sharing principles worldwide are understood and are in the process of being addressed by the Group on Earth Observations (GEO)," reported Giovanni Rum, Senior Program Officer at the GEO Secretariat. GEO is developing a Global Earth Observation System of Systems (GEOSS) to provide data and information for all applications of social and economic relevance (including risk assessment and global change). The success of GEOSS, however, will depend on the support and funding from its 74 Members (73 Countries plus the European Commission).

The insurance industry needs fundamental improvement in the reliability, continuity and quality of long-term Earth observation products – including improvements in data, modeling, scientific understanding integrated for decision support -- to ensure the sustainability of their business in a time of increasingly dynamic global climate change and catastrophic weather events. The sustainability of the insurance industry provides a fundamental means for the private sector to adapt to global change in decades to come. And it is in governments' interest that the insurance industry can serve their communities -- or

managing risk will become a government responsibility, which transfers losses associated with global change directly to current and future taxpayers. Governments now have the opportunity to deliver on the potential of Earth observations to continuously monitor global change in order to understand why it is happening and what is likely to happen next. This will enable decision makers in government and business to predict, assess and manage risk.

Appendix A: Agenda
EARTH OBSERVATION, RISK ASSESSMENT AND GLOBAL CHANGE:
IMPLICATIONS FOR THE INSURANCE AND AEROSPACE SECTORS
Wednesday 16 July 2008 14:00-17:15

13:30 – 14:00 Sign-in and registration

14:00 – 14:15 Opening Remarks

Speaker: **Dr. Robin NIBLETT**
Director, Chatham House

14:15 – 14:45 Keynote Speaker

The role of insurance in the matter of risk assessment and management for enterprises faced with the direct and indirect consequences of Global change provides a valuable perspective on the many complex relationships associated with Global Change. For Earth observations to be an effective tool for addressing Global Change, the entire range of Global change stakeholders must be engaged to discover the business, policy, and legal models that must be adapted and created to facilitate the goals of Earth observation public policy.

Speaker: **Ms. Lindene PATTON**
Climate Product Officer, Zurich Financial Services

14:45 – 15:15 Panel 1: Financial, Insurance and Reinsurance Communities

It is difficult to underestimate pervasiveness of influences on and impacts of Global Change. Earth observation is critical in managing and assessing the risks associated with Global change issues. These factors illustrate the sheer number of stakeholders to whom Earth observation is – either knowingly or unknowingly – of critical importance.

Speakers: **Mr. Barend VAN BERGEN**
Director, KPMG Sustainability
Mr. Trevor MAYNARD
Manager, Emerging Risks, Lloyd's of London
Mr. Man W CHEUNG
Principal Consultant & Service Leader, Modeling Analysis and Design, Marsh Ltd.

15:15 – 15:45 Panel 2: Scientific and Modeling Communities

At a more practical level, the ability to assess and manage risk associated with global change is strongly dependent on the accuracy and timeliness of input provided by Earth observation decision support tools, modeling, and data. Yet, even while the

consequences of global change are projected to grow more severe, public policy failures may jeopardize the Earth observations infrastructure.

Speakers: **Dr. Shree KHARE**

Lead Catastrophe Risk Modeler, Risk Management Solutions, Ltd.

Professor Sir David KING

Director of the Smith School of Enterprise and the Environment, Oxford University

previously Chief Scientific Adviser and Head of the Government Office of Science, UK

15:45 – 16:00 Tea Break

16:00 – 16:30 Panel 3: Aerospace and Space Industry Communities

By virtue of the importance of space-based observation and other sensors to Earth observation, the aerospace industry has an important role as stakeholder in discussion of global change. In particular, technological bounds of the current and future state future of Earth observation, can be well understood and addressed in the Earth observation public policy creation process, provided that the aerospace community is substantially involved at an early stage.

Speakers: **Dr. Alexis LIVANOS**

Vice President, Northrop Grumman Corporation

President, Northrop Grumman Space Technology

Mr. Mike KEEBAUGH

Vice President, Raytheon

President, Raytheon Intelligence and Information Systems

16:30 – 17:00 Panel 4: Political and Policy Communities

The nature of Earth observation data and its utility in addressing issues of global change combine to suggest that there are a range of new legal and regulatory regimes and business and social models which will need to be explored. The ability to engage with a sufficiently broad range of stakeholders early and effectively in the policy creation process will be a key challenge for the public sector in addressing both Earth observation and global change.

Speakers: **Mr. Greg WITHEE**

Senior Advisor to the Administrator of the National Oceanic and Atmospheric Administration and the Undersecretary of Commerce for Oceans and Atmosphere

Dr. Peter STOTT

Head Climate Monitoring and Attribution, Met Office Hadley Centre

Mr. Giovanni RUM

Senior Programme Officer, Disasters, GEONETCast, Science and Technology

Committee, and Working Group on Tsunami Activities. Group on Earth Observations

17:00 – 17:15 Closing Remarks

Speakers:

Ms. Bernice LEE

Head, Energy, Environment and Development Programme, Chatham House

Mr. Vincent G. SABATHIER

Senior Fellow, Director of Space Initiatives, CSIS

17:15 – 19:00 Reception

Agenda B: Attendees
EARTH OBSERVATION, RISK ASSESSMENT AND GLOBAL CHANGE:
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Wednesday 16 July 2008 14:00-17:15

Randy Belote, Northrop Grumman Corporation
Ron Birk, Northrop Grumman Corporation
Maggie Bolotin, US Embassy in London
Man Cheung, Marsh Ltd.
Emma Craddock, JLT Reinsurance Brokers Limited
Royce Dalby, The Avascent Group
Klaus Danneberg, American Institute of Aeronautics and Astronautics
Anthony Dennis, Infoterra
Ryan Faith, CSIS
Darryl Fraser, Northrop Grumman Corporation
Bruce Gerding, Northrop Grumman Corporation
Dougal Goodman, Foundation for Science and Technology
Benji Guy, Chatham House
Maureen Heath, Northrop Grumman Corporation
Rob Jutson, Griffin Cap
Mike Keebaugh, Raytheon
Shree Khare, Risk Management Solutions, Ltd.
David King, University of Oxford
Thomas Legge, Chatham House
Keith Leung, JLT Reinsurance Brokers Limited
Alexis Livanos, Northrop Grumman Corporation
Debby Lloyd, EcoSearch
Shigekazu Matsuura, Japanese Embassy in London
Ryan Marshall, Control Risks Group
Trevor Maynard, Lloyd's
Rachel Newton, Royal Society
Robin Niblett, Chatham House
Cleo Paskal, Chatham House
Bhavini Patel, King's College, University of London
Torkel Patterson, Raytheon
Lindene Patton, Zurich Financial Services
Andy Poulton, JLT Reinsurance Brokers Limited
Elliot Pulham, Space Foundation
Michael Rose, British National Space Centre (BNSC)
Giovanni Rum, Group on Earth Observations
Vincent Sabathier, CSIS
Andy Shaw, Natural Environment Research Council
Dave Stainforth, University of Exeter
Peter Stott, Met Office Hadley Centre
Swenja Surminski, Association Of British Insurers

Barend van Bergen, KPMG

Lyn Wigbels, CSIS

Greg Withee, National Oceanic and Atmospheric Administration

David Zabalaoui, Northrop Grumman Corporation

Mitch Zahnow, Northrop Grumman Corporation

Ben Zala, Chatham House

Jim Zimmerman, International Astronautical Federation

Dimitri Zenghelis, Chatham House