

The Challenge of Global Systems Modelling

A Report on the CACOR Global Modelling Project

Robert Hoffman, Ed Napke, Bill Pugsley, Gail Stewart
March 18, 2010

In 1992, an *ad hoc* group interested in global modelling was formed under the chairmanship of Bob Fletcher. It included several members of the Canadian Association for the Club of Rome. It took its inspiration from the success of the Limits to Growth study, based, as it was, on the world model developed by Jay Forrester at MIT and the realization that, in the intervening 25 years, the model was unchanged in spite of the fact that much had changed in scientific understanding, information technology and modelling methods. The project group set for itself the following objectives: to design and implement a new global model and, most importantly, to promote its use as a vehicle to enhance understanding of at least some of the global issues at hand and to support exploration of possible actions. Its program of activities included review of other global models and approaches, issue scoping, model design, data research and acquisition, dissemination of the model, the development of user communities, and fund raising.

The first output of the group was a concept paper entitled, "[Concepts for a New Generation of Global Modelling Tools: Expanding our Capacity for Perception](#)" was published in Proceedings, September 1993. It proposed the use of global modelling tools as a means of expanding our collective capacity for perception.

Because broad based participation in the development and use of global modelling tools was considered integral to the success of a global modelling project, the paper was distributed to members of the Club of Rome and institutions that might be interested in collaboration, such as the Sustainable Development Research Institute at University of British Columbia, the Arboretum at the University of Guelph, the Global Change Program of the Royal Society of Canada, International Institute for Sustainable Development, the Global Business Network, the World Resources Institute, US National Academies of Science and Engineering, the Millennium Institute, Center for Science and International Affairs at Harvard University, the Tellus Institute, and the Stockholm Environmental Institute. Collaboration with the Global Commons Project, launched in 1993 by the US National Academy of Science in collaboration with the Houston Advanced Research Center was explored at a series of meetings.

Over the summer and early fall of 1994, Robert Hoffman and his colleague, Bert McInnis, designed and implemented a prototype global systems model, called the Global Systems Simulator ([GSS](#)) within the conceptual framework set out in the concept paper using modelling technology developed by their company, Robbert Associates (now whatIf? Technologies Inc.). The structure of the prototype is documented in [An Overview of the Global Systems Simulator, January 1995](#). This model was used by the Project Group to demonstrate proof-of-concept to potential collaborators.

The need for a not-for-profit institutional home for the development and dissemination of global systems models was recognized and a founding board of directors was established with Fred Belaire as its chair. This institution became known as the Global Systems Centre. Initially it was an entity within CACOR, but the ultimate objective was to establish an independent legal entity with a mandate to foster the understanding of the global problematique necessary for coherent intervention. An international advisory group consisting of a select group of experts with a wide range of domain knowledge and modelling experience was established. It was thought that models might be developed as tools to inform the community of policy analysts and researchers in both academic and government institutions and as educational devices in secondary schools and colleges.

Several activities were undertaken in order to explore the use of simulation models in educational institutions. In 1995, the GSS was used in an OAC course on global issues at Bell High School and, as a result, a proposal for cooperation and support was made to Industry Canada (SchoolNet), the Ottawa Carleton Research Institute (OCRI), and the Canadian Commission for UNESCO. Subsequently, experience with the GSS as an educational device has been gained at other Ottawa high schools. In 2003 and 2004, the GSS was used at the University of Toronto Schools, a private school affiliated with the Ontario Institute for Studies in Education at the University of Toronto.

The Global Modelling Project and the GSS have been presented on many occasions including to CACOR members in a series of workshops (1997), at a meeting of parliamentarians hosted by Hon David Kilgour (2000), at the Hanover World Fair (2001), at a meeting of the Guelph Mens' Club, at the Helsinki meeting of the Club of Rome (2004), at the System Dynamics Society Conference in Boston, 2005, at the World Order Conference, Ryerson University 1999, at the Pacem in Mirabus Conference, Halifax 1998, to name a few. They have also been featured in televised interviews on CPAC, Rogers, and WETV.

These efforts succeeded in generating positive, even enthusiastic responses, and were encouraging, but the funding and partnerships needed to proceed were not forthcoming. Effort was renewed with the establishment of the Global System Centre Development Committee as a committee of the CACOR Board. The founding meeting was held on May 11, 1999 under the chairmanship of John McRuer. Upon recommendation by the Committee, an agreement between CACOR and Robbert Associates was drafted, acknowledging that the GSS model and the underlying software platform, whatIf? are the property of Robbert Associates and that Robbert Associates granted non-exclusive rights to CACOR to use this property free of charge. A one-day workshop to consider the future of the project and to 'brainstorm' strategies for proceeding was hosted and facilitated by Maureen Beecher on June 17, 1999.

In 2000, the Global Systems Centre in collaboration with the Universities of Guelph and Victoria and Robbert Associates submitted a proposal for the development of a Global Integrated Systems Model for Greenhouse Gas Policy Analysis to the Canadian Foundation for Climate and Atmospheric Science (CFCAS), an NSERC-like granting council that had been established by the Government of Canada. The proposal "was considered to be of merit, but was considered by the CFCAS Board to be largely outside the mandate of CFCAS."

In 2001, the Global System Centre Development Committee decided to seek the advice of a professional fundraiser as funding for the Centre was deemed to be essential if the project was to move forward. A contract was awarded to James Patterson, to be funded by project-specific contributions solicited from CACOR members with the approval of the CACOR Board. In 2004, Patterson concluded that because of the nature of the project (essentially the establishment of a new institution) and the nature of CACOR (an association of volunteers without permanent staff), it would be difficult, if not impossible, to raise funds for a Centre that was part of CACOR. He recommended affiliation with an established institution, such as a university based research centre and worked toward that goal.

In 2004, a proposal for the establishment of a Global Systems Laboratory in the Trudeau Centre for Peace and Conflict Studies at the University of Toronto was developed in collaboration with Professor Thomas Homer-Dixon, founding Director of the Trudeau Centre. The proposal was accepted and efforts were made to recruit a research director for the Laboratory and renovate the premises on the U of T campus.

The Global Systems Centre Development Committee was dissolved by motion of the CACOR board in June 2005. The record of the meeting reads “The Board reviewed the progress report on the project in the light of the recent developments with the University of Toronto and the University of Toronto School and concluded that the project having been nurtured by CACOR is now in a position to move forward in a very positive manner. It also noted that funding prospects for the project are far more promising in the university environment. It was agreed therefore that there is no longer a need for the CACOR Committee on the project. The Board agreed that Mr. McRuer be thanked for the progress report and for his untiring work on the project.”

When it became clear that Homer-Dixon would leave the Trudeau Centre, plans for the Global Systems Laboratory at the University of Toronto were shelved.

Since 2005, a group of CACOR members from the Guelph region, Ken MacKay, Jim Goring and John McRuer and Robert Hoffman have continued to promote the global modelling project as a component of the Global Issues Project of Science for Peace and Canadian Pugwash, at IIASA, and at the University of Guelph. Regrettably, John McRuer passed away in 2009; the energy and insights he devoted to the Global Modelling Project are missed. Thomas Homer-Dixon was appointed Centre for International Governance Innovation (CIGI) Chair of Global Systems at the Balsillie School of International Affairs in Waterloo, Canada. The possibility of locating the modelling activities at the University of Waterloo is being pursued.

In 2007, 08 and 09, a module of a distance learning course on systems methods offered by Royal Roads University was based on the GSS and web-based supporting materials were developed. See the News item on the whatIf? Technologies web site by clicking [here](#).

Important lessons were learned from the experience of the Global Modelling Project. Projects involving collaboration between CACOR and corporate partners need to be carefully and transparently managed, particularly when individuals are affiliated with both entities. To those close to the project, there was obvious synergy between the mandate of CACOR and the capabilities and interests of the corporate partner in the pursuit of such an enterprise. But the

perception of conflict-of-interest, shown upon examination of the project to be without grounds, was damaging.

At another level, the difficulty of articulating, framing and promoting a worldview for which there was little extant demand was already well known to the Club of Rome from its experience with the publication of the 1972 Report and the CACOR project went further. In attempting to develop and promote the use of a new method to illustrate the challenges inherent in the “problematique” facing humankind, the Association found that institutions both government and academic were not organized in such a way as to support or, in some cases, even to understand a non-partisan, meta-sectoral, meta-national global approach based on bio-physical rather than economic and market relations.

However, the learning and the public exposure involved in the attempt remain assets both to the Association and to whatIf? Technologies, and the project represented a major effort to which both can look with some satisfaction. With a small (albeit growing) number of individuals and organizations in all sectors now developing interest and concern about the future of humankind in a world of planetary limitations, and modelling having its own role to play, the possibility of future cooperation between the two organizations remains open.

Note

Active participants in the Global Modelling Project include Paul Baack, Fred Belaire, James Blondeau, Bob Fletcher, Terry Gigantes, Fred Gault, Dave Henderson, Robert Hoffman, Art Hunter, Ralph Idema, Stan Isbrandt, Allan Jones, Momo Jovic, Wayne Kines, Steve Kurtz, Ken MacKay, John Maskell, Don McAllister, Max McConnell, Bert McInnis, John McRuer, Mike Murphy, Ian Nalder, Ed Napke, David Nostbakken, Bill Pugsley, Bruce Squires, and Jerzy Wojciechowski.

References

1. Draft Memo of Understanding between the Chair of CACOR and the President of Robbert Associates Ltd. regarding the development of the GSS by Robbert associates and the use of it by CACOR
2. Final Report by James Patterson concerning fundraising for CACOR's GSC Project.
3. Hoffman, Robert *et al.* "Concepts for a New Generation of Global Modelling Tools: Expanding our Capacity for Perception” Report of the CACOR Global Modelling Project Team published in CACOR Proceedings, Series 1, No. 7, September 1993.
4. Hoffman, Robert and Bert McInnis, An Overview of the Global Systems Simulator, January, 1995.
5. Belaire, Fred. The Strategy of Engagement: The Global commons: From Consciousness to Understanding. CACOR Proceedings, Series 1, No. 17, March 1996.

6. Hoffman, Robert. "Modelling as an Instrument of Change". Presented at the Pacem in Mirabus XXVI, Halifax, November 30, 1998 and published in CACOR Proceedings Series 1, No. 28, Winter 1998-99.
7. Hoffman, Robert. "Interacting with the Global Systems Simulator". CACOR Proceedings, Series 3, No. 2, March, 2001.
8. McRuer, John D. A Strategic Appreciation for the Global systems Project. Discussion Paper, November, 2005.