Epidemic Planet

Interactively visualizing and comparing epidemic simulations.

Exhibit description - summary

Title of the exhibition: Epidemic Planet

Abstract

A better understanding and more accurate forecasting of the spread of an epidemic and the effects of mitigation measures is paramount in establishing an informed risk management and containment policy. The Epidemic Planet is the visualization application developed in the context of the GLEAMviz project for the study and modeling of the global spread of infectious disease epidemics, that enables its users to interactively compare and learn about the effects of a number of geographic and infection features, as well as intervention scenarios on a pandemic, simulated using GLEAM, the Global Epidemic and Mobility model.

Exhibit profile

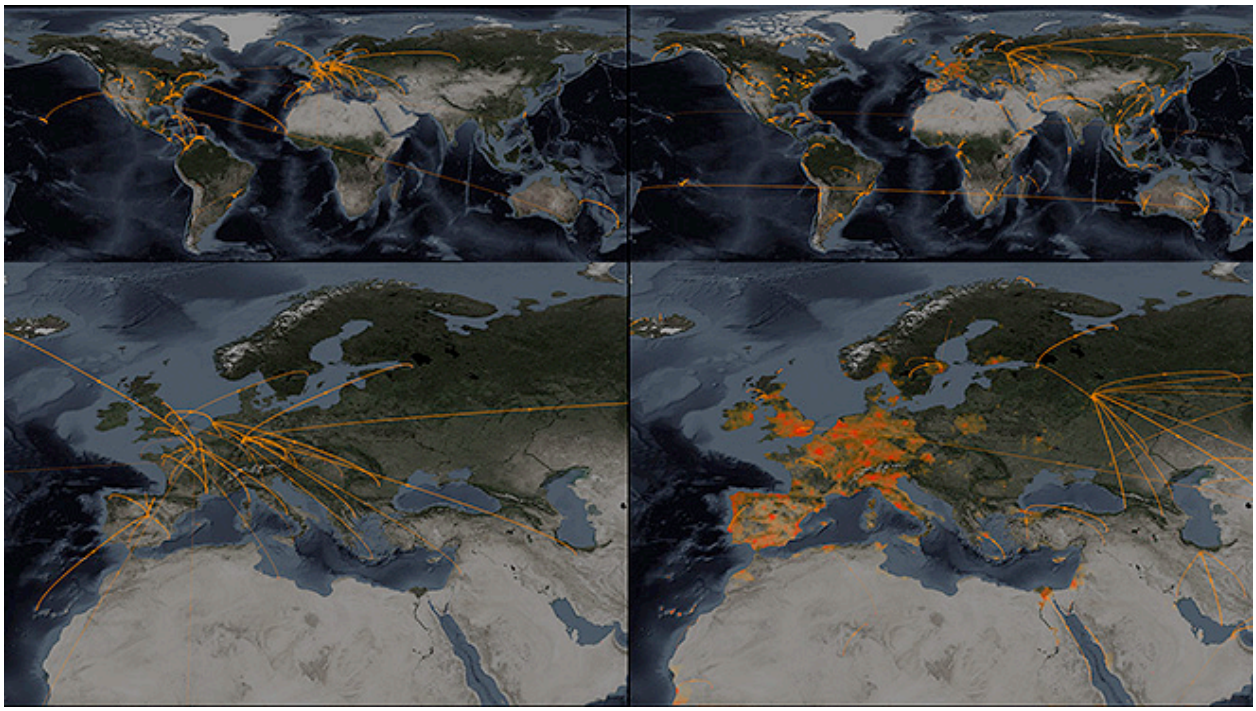
Visual form: Application running on a computer
Interactivity: Exhibitor and visitors interact with the demonstration
Ease of comprehension: Exhibit requires some explanation by the exhibitor
Time required for a single run-through of the demonstration take (in minutes): 5

Exhibit description – details

Detailed descriptions

What exactly will you show to the visitor?

The Epidemic Planet has been specifically designed for public display and interactive use directly by the visitors. This exhibit demonstrates the epidemic modelling functionality by way of a prototypical pandemic and a select number of intervention scenarios that were modeled and simulated in the GLEaMviz system. A touch-screen based interface allows the visitor to select scenarios she wishes to compare, while a large screen displays the dynamic visualisation of the precomputed simulation results for the selected scenarios side-by-side, to enable the visual comparison.

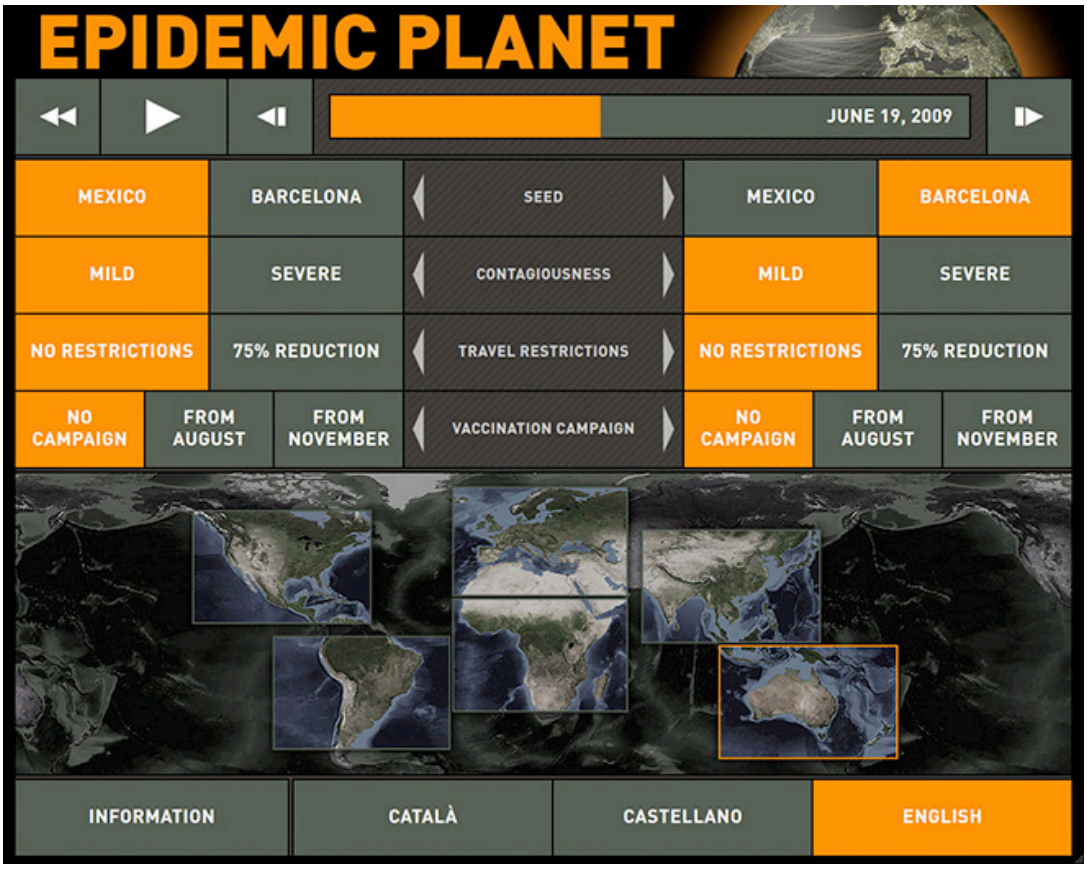


Sample of the side-by-side maps with the animated pandemic spread shown in the Epidemic Planet exhibit.

The current setup includes the following options to be chosen by the user on the touch-screen:

- the geographic origin for the disease - La Gloria, Mexico, where the 2009 H1N1 influenza pandemic originated, or a major European city like Barcelona, Spain;
- the contagiousness of the disease, mild or severe (which corresponds to different values of the transmission of the virus);
- whether to apply travel restrictions or not, reducing the travel flows of the global airline transportation system by a 75% factor;
- whether to consider a worldwide vaccination campaign or not and, if yes, whether to start it in August or in November.

Multi-language options can be implemented.



The touch-screen interface of the Epidemic Planet exhibit. The visitors can use this interface to select the epidemic scenarios to compare.

What is innovative about the technology/activity that you will show?

The GLEAM model elevates the computational modelling of infectious diseases to a whole new level by allowing arbitrary compartmental models of the infection dynamics, integrating detailed real-world socio-demographic and population mobility data, and considering other time-dependent features such as seasonal effects. It resulted from a multi-disciplinary collaboration of epidemiologists, computational modellers, computer scientists, designers and physicists, applying recent insights in the role of multi-scale mobility and contact patterns on the dynamical behaviour of diffusion processes, as well as exploiting recent advances in distributed high-performance information and communication technologies. The Epidemic Planet represents a simplified and interactive way of access to such a sophisticate modeling framework developed for scientific research purposes. It is meant to facilitate the rapid adoption of this powerful scenario evaluation and training tool by a wide audience.

Technical requirements

- PC Windows 7
- Minimally 4 GB memory

- Graphics card with two DVI ports, such that two monitors can be attached.
- A 1280 by 1024 pixels touch-screen monitor.
- A 1920 by 1080 pixels wide-screen monitor.
- USB mouse & keyboard during installation.

Previous public appearances.

- INFECTIOUS: STAY AWAY, Science Gallery, Dublin, April-July 2009;
- International Science Festival, Edinburgh, U.K., April 2010;
- Science beyond Fiction: An Excursion into Future and Emerging Technologies, European Parliament, Strasbourg, France, April 2010;
- CosmoCaixa Mòbil Tecnorevolución, Spain, September 2010;
- International Conference for High Performance Computing, Networking, Storage and Analysis (SC10), New Orleans, Louisiana, USA, November 2010.
- CosmoCaixa Barcelona, March 2012 - February 2013
- Planetarium of Turin, Museum of Astronomy and Space, Exhibit 'End of the world', May 25 – September 2013.

Links and documents

GLEaMviz project http://www.gleamviz.org
Epidemic Planet http://epifor.eu/page/pg/8

Exhibition description - contact details

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