HIGHWIRE PRESS,
THE INTERNET IMPRINT OF STANFORD UNIVERSITY

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What is HighWire?

HighWire Press is the Internet imprint of Stanford University, and a program of the Stanford University Libraries/Academic Information Resources (SUL/AIR). Its mission is to:

- Foster research and instruction by providing a more direct linkage between the writers and readers of scholarly materials.

- Use innovative network tools for capture, publishing, retrieval, reading and presentation.

- Affect the economics of provision of scholarly information to researchers, especially science, technology and medical (STM) research information.

- Ensure that the nascent marketplace for electronic communication among scholars does not develop along the semi-monopolistic lines of current STM publishing.

- Build new technological, economic and programmatic partnerships with others investigating related problems.

Origins of HighWire

HighWire's origins spring from the desire of Michael Keller, Stanford Libraries' director, to find an opportunity to leverage the intellectual capital of the institution for the benefit of the institution and user community, rather than for the benefit of publishers.

Conversations with Dr. Robert Simoni, a Stanford faculty member and editor of the Journal of Biological Chemistry (JBC), provided the impetus. Dr. Simoni reported that the expense of publishing JBC— 52 issues a year, with the average issue totaling more than 800 pages—was beginning to have a serious impact on the journal and had negative implications. Simoni and Keller discussed this fact, and wondered at the same time about how libraries might begin to create an environment for scholarship and research that existed completely on line. Such a publication and research space might begin to comprise a "knowledge environment" for an area of limited, but specific breadth.

Over the course of months that these conversations took place, advances in technology and technical infrastructure began to take place, technology advances that we now know as the Web. The availability of the Web, of real, high speed network connections, and the relatively low startup cost of Web publishing seemed to offer a number of opportunities for society publications. The content, already being created and managed in

electronic form could be disseminated over the Web: the transmission environment was in place, software to access the information was readily available and did not require additional development, what remained was to transform the data for the Web and build a path to it.

Keller put together a team consisting of librarian Michael Newman, Sandra Senti from Network Services and Ann Mueller from the Stanford Data Center who developed a technical model and cost estimates. After a year of discussion, the American Society for Biochemistry and Molecular Biology (ASBMB) board agreed to a joint venture with Stanford Libraries. But the board insisted that the prototype be finished in time for the society's annual meeting - only three months away.

To head the project Keller tapped Sack, then director of the Stanford Data Center. Sack came up with the name HighWire, which he says was appropriate because the group had taken on a very ambitious project and was working without a net.

With the help of SUL/AIR and funding from both SUL/AIR and the Office of the President, the Web version of the Journal of Biological Chemistry was previewed at the May 1995 meeting of the (ASBMB). With that kick-off, HighWire was born, and the addition of *Science Online* in the fall of 1995 continued the venture.

STM Publishing and Patterns of Collection Building

The importance of *electronic publications* and their place in the publication environment is not just important to content creators. Those in the information acquisition arena—libraries in particular—are aware of the explosive growth in STM publishing over the last 10 years. The JBC is not the only journal to have taken on a weekly paper throw-weight close to the average metropolitan telephone directory, nor is it the only one to have experience cost increases. There has been an equally explosive cost explosion for journals and information, particularly in the areas of science, technology, and medicine (STM). Here the increases in the same period have been running at rates more than 3 times the average rise in inflation.

For libraries and other information providers there is a growing imbalance between the cost and perceived benefit of publications. Most, if not all, of the major academic libraries have already undertaken serious reviews of their journal and serial literature holdings; most have made cuts in the number of journals they hold, and have taken other actions to regain funds for new materials and new formats.

As the amount of material of import to the scholar *increases,* the ability of most libraries to acquire such materials *decreases.* As a result, the amount of material available as a percentage of the whole is held by fewer and fewer scholarly research libraries. For materials in the STM print world, the situation is even worse. It is safe to say that we have entered into a post-crisis environment here, where *no* research institution is able to afford all of the materials their researchers might want without seriously, if not fatally, endangering their overall collection profile.

The importance of the HighWire experiment and experience is that it begins to move the model of high-impact journals—and by high-imact, we mean those journals that are the most frequently cited in their respective areas—out of the hands of for-profit publishers, and

back into the hands of the scholars, researchers, and scholarly societies from which the information comes. The benefit is not merely economic, however. When libraries work hand in hand with researchers and scholarly societies, it becomes possible to create a *community* and an *information space*, as well. That is, the preconditions for a fundamental change in how scholarship is conducted have been set, and can be exploited.

HighWire's User Communities

HighWire has from the very start set out to improve scholarly communication by direct interaction with users of its services. The original Web implementation of May 1995 has rapidly evolved and grown through very close connections with on questions of functionality and design: e-mail with users, focus groups, and targeted user testing all played major roles.

Similarly, close co-ordination with scholarly societies and their views of their own user communities, coupled with a desire to return responsibility for scholarly publishing to those committed to its creation lay at the top of HighWire's agenda.

HighWire Technology

For the consumer of the site, HighWire has chosen, as a strategic plan, to develop its Web delivery mechanisms using the best available options of HTML publishing. From the client end, the expectation was that the average user would not have the best or quickest network connection, nor the latest version of "hottest" browser in the continuing browser wars.

Instead, HighWire has seen the mid-level client with decent, but not fabulous throughput as its target client. This has meant that HighWire journals use tables, but not frames; JavaScript and Cookies *very* occasionally (and only when necessary to ease authentication and retain user settings), and Java applets not at all (at least not *quite* yet).

For the data producer, HighWire has developed independent production streams for each journal publisher. Each is tailored to the data supplied, whether it be SGML or other formats. While the Web may be a good development environment, and certainly did permit a relatively low-cost start up, the emerging architectural concerns, given the rapid success of HighWire—there are currently 24 HighWire journals, and more than 100 more are expected with the next year—must include:

- serious thinking about networks and network connectivity, particularly for sites outside of the US

- mirror sites

- automatic linking protocols/linking databases

- modeling efforts for new, related services, such as

  - alerting
  - document delivery

HighWire Partnerships

Naturally, the continuing growth and development of HighWire and the HighWire model require partnerships for institutions like SUL/AIR. The relevant user communities have members all over the world, and are subject to the vagaries of the Internet within their own countries. SUL/AIR has established partnerships with a number of organizations to help meet some of these needs. These partners include:

- Harrassowitz
  Represents HighWire to European publishers, and operates a European help desk

- Griffith University
  Represents HighWire to Australia, operates a HighWire mirror site, and may become a HighWire production site in Australia

- Digital Island
  Provides high speed digital connections to sites outside of North America, specifically in Australia, Brazil, France, Germany, Hong Kong, Israel, Japan, Russia, Singapore, South Korea, Taiwan, and the UK