

# **The Silver Dart Project**

## **Analysis of a Partnership**

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### **Introduction**

The Silver Dart Project is the first on-line multimedia encyclopedia in a Canadian museum and one of the first such applications in any museum. This award-winning multimedia database encompasses information on the 118 aircraft in the Museum's collection, including text, images, video and audio files. It is the result of a unique partnership between the Museum, cultural sector organizations and private industry, and represents what is possible when interests and visions coincide.

### **Background**

In fall, 1992, the National Aviation Museum began to explore the idea of providing greater access to its collections through the development of an "electronic catalogue" of the aircraft collection. Like most museums, the Aviation Museum cannot display its entire collection on the main floor of its museum building. At present, 47 aircraft are on display, while the rest are either in storage or on loan, and inaccessible to the museum visitors. An aviation museum, like many other special interest museums, attracts an enthusiast clientele, and staff was forced to deal with innumerable requests for private showings of particular aircraft in storage, or complaints. By developing a database on all the aircraft we hoped to provide visitors with at least virtual access to the entire collection, and to provide them with additional information that would not be available during a regular visit. For example, we knew that many visitors wanted to look inside the cockpits, and while this was not feasible on the exhibition floor, we could make photographs of the cockpits available.

The "electronic catalogue" began modestly. We approached the Canadian Heritage Information Network (CHIN) to discuss the idea of joint development of an interactive database on the collection. CHIN has been working with the Canadian museum community for over twenty years, helping to build museum collections management expertise and developing a national database of collections information. The Technology Assessment Centre at CHIN agreed to help with the development of a

prototype. For the analogue of the application - analogy is an essential tool in the interpretive process for both traditional and multimedia exhibitions - we used the Museum's print catalogue of the collection, a Canadian best-seller in hard-cover. We surmised that since people seemed to like the kind of information they could access in the print version, they would probably like similar information in an electronic version. Using Toolbook, the Museum and CHIN created a subset of the catalogue. The demonstration prototype including 32 aircraft and was up and running by January, 1993. Each entry featured text descriptions edited from the print catalogue and a series of images digitized from slides in the Museum archives.

CHIN requested permission to demonstrate this prototype at a number of conferences, including one at Banff, Alberta in April of that year. Prowling the displays at Banff was Don MacNeil, from the Multimedia Division of STENTOR, a Canadian telecommunications company. STENTOR is in fact a consortium of provincial telecommunications companies, with a special interest in the development of the information highway and the provision of multimedia services over it. Don, like many people (89 million Americans and 19% of Canadians<sup>1</sup>) is an aviation enthusiast. Don went to Banff looking for partners in a technology trial that STENTOR was in the process of finalizing, and what we had was content that he loved.

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### **Phase One: The STENTOR Proposal**

STENTOR was (and is) interested in the transmission of multimedia information over telecommunications networks. STENTOR had acquired the rights to a digital video networking software called StarWorks. StarWorks allows shared access to video information over a LAN or Ethernet. With its research partner, Microintel Pacific Research (MPR Teltech), STENTOR was exploring this relatively inexpensive media server as a key component of new multimedia networks. In order to test the capabilities of the server and the networks, STENTOR needed multimedia content. STENTOR was not in the business of developing content, and had begun to look for readily accessible digitized content. The partnership began casually, but the courtship period was brief. After the first date, it became obvious that the Museum and STENTOR were talking matrimony. In July 1993, the partners concluded an agreement which saw STENTOR, MPR Teltech, the Museum and CHIN agree to a technology trial of the StarWorks video server, in which the Museum and its partner would provide content, and the telcos would provide the technology for the test.

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<sup>1</sup> This information is derived from a 1995 Gallop poll in the United States, and from a 1994 survey conducted in Canada by the National Aviation Museum.

STENTOR was relatively content to develop the trial using an expanded version of the prototype, but the Museum insisted on developing multimedia documents for all aircraft in the collection. We saw this as an opportunity to create a multimedia database on the entire collection, and because our collection of aircraft, though occupying 135 000 square feet, consisted of a relatively small number of units, this would be a comprehensive and useful exhibit in the Museum. We also insisted on true multimedia content that included not only text and graphics, but also sound, video and animation. The Museum was responsible for the development and digitization of all content, and despite our assurances to our corporate partners that this could be accomplished with relative ease, the magnitude of the task was daunting. First, there was the assembling of the content which in the end included over 2000 text files in both French and English<sup>2</sup>, almost 500 images, 30 minutes of video and 28 different sound bites. Second, there was the issue of the timetable. Because STENTOR's fiscal year coincided with the calendar year, the trial had to begin by mid-November, 1993. We realized very early that we would be unable to compile the assets without additional help. The need for archival film footage of aircraft in operation led us to the National Film Board (NFB), who agreed, in return for credit, to allow the museum to use NFB footage rights-free in the application. The need for digitized images led us to another STENTOR partner, Kodak Canada. While the Museum did have an indexed database of its archival holdings, all the images were stored in analog format. Like many archives, the Museum tended to acquire and store material in a number of different forms, from 35-mm slides to 4" x 5" transparencies, positive prints, glass plate negatives, etc. In order to create a digitized image database in the relatively short development time of three months, we had to convert all the archival material to consistent format then digitize it to standard resolution. Kodak agreed to convert all our disparate archival images to 35-mm slides, then to run them on a drum scanner and turn them into photo-CDs. Convincing the curatorial staff to relinquish the original images, even for a short time, was no easy task, but Kodak provided an excellent service with short turn-around times.

Compiling digitized assets was one thing, making them accessible another. Neither the Museum nor CHIN had a great deal of experience in developing multimedia applications. The Toolbook prototype was rough and importing video files would be difficult. STENTOR suggested that we work with a company soon to become a Bell partner - Digital Renaissance of Toronto. While the Museum made the decisions on the kind of navigation and the nature of the linking to be provided, Digital Renaissance used IconAuthor to design the interface. It was Digital Renaissance's expertise in working with multimedia assets and networked architecture that made their contribution crucial.

Despite an array of hardware, software and burnout problems, the Museum, Digital Renaissance and the other partners did deliver the application on time. Silver Dart premiered at the National Aviation Museum on November 25, 1993. What made the application unique was not simply its contents, but

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2 As a national museum, NAM is obliged to provide all services and exhibits in both official languages.

its mode of transmission. Guests at the launch, and visitors to the Museum, accessed the collections database on touch- screen terminals at kiosks, but the content was stored on a StarWorks server and delivered over a LAN Ethernet. Each kiosk accesses the database simultaneously, providing each user with a “custom-tailored” delivery of information. Software embedded in the server and kiosk terminals manage the storage and transmission of data and guarantees the delivery of synchronized sound, motion, and video animation, in addition to text and graphics. Digital Renaissance and STENTOR insured that industry-standard equipment and software configurations were used at each step of the design process. The kiosks use PCs, the Ethernet LAN is in a star configuration, running Novell software. Audio and video are digitized in MPEG-1. The quality of the still images, sound and video are superlative, and with the exception of a three-second delay on video and large 640 x 480 images (during which a “Loading” message appears), access is instantaneous.

Important to the Phase One development was the testing of the server and the transmission hardware, but equally important for both the Museum and STENTOR was an evaluation of the user experience. Here the Museum could bring the skills of audience evaluation developed by the museum community since the 1930s. Using a variety of methods<sup>3</sup>, museum evaluators produced one of the first formal evaluations of a networked multimedia application in a public venue. The results of this Phase One evaluation were encouraging. Despite an absolute dearth of front-end evaluation or audience testing, the developers had created a relatively successful interface. Users rated the application easy to use (4.4 on a five-point scale), enjoyable (4.1), with a good interface (4.5). The average use time at the Museum was 245 seconds, exceptionally high for any museum exhibit. Not surprisingly, visitors appreciated the video most, followed by the audio, images and text. There was a slight suggestion that women seemed to have a more positive experience than men. Museum educators theorized that women generally have less expertise concerning aviation than male visitors. The multimedia encyclopedia provided them with a means of acquiring technical information in a user-directed interface with minimal gender bias. The evaluation also pointed out some areas, particularly in user feedback and screen design, where improvements might be made. For example, some visitors perceived the applications as “slow,” despite the very fast response time of the database. What did seem slow was the three-second delay when starting the video, and thus a “Loading” message was required to reduce frustration and multiple screen touches. Fortunately we were able to incorporate many of these changes into the second version of Silver Dart used in Phase Two of the trial.

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3 Three types of evaluation tools were used: the internal data log in the PCs; a self-completed questionnaire; video recording of screen interactions.

## Phase Two: WAN Trial

While the initial success of the content and the networked application was encouraging, STENTOR was most interested in the viability of networked applications over a wide-area network (WAN). In the second phase, the Museum agreed to locate three additional public venues in which the application could be tested. After some discussion, three additional sites were chosen, two in the Ottawa area and one in Toronto. In Ottawa, a kiosk was installed at the National Capital Commission (NCC) Visitor Centre in the downtown core, and at the Earl of March High School library in the west end of the city. In Toronto, a kiosk was incorporated into the exhibits at the Ontario Science Centre (OSC), one of the world's great science education institutions. The two Ottawa sites were linked to the Museum server via ISDN network, while the OSC and the Museum were linked with a dedicated broadband ATM connection. Phase Two began in July 1994, and again the Museum and STENTOR undertook the evaluation of the trial at the three venues.

After some initial problems with switches, the technology performed well. The three-second delay was also a feature of real-time access at the ATM-linked kiosks. At the ISDN sites, the application was downloaded onto the hard drives, with updates made over the network. Visitor reaction to the interface was again positive but there were real surprises in the way in which visitors at all three sites used the application. At the Museum use continued as it had been, with high usage times, and a real use of text files. At the Ontario Science Centre usage times were much shorter (a bit less than 90 seconds), and probably reflected the "push-button" environment of a science centre. At the NCC Visitor Centre, usage times averaged about 180 seconds, but most users were children, waiting for their parents to complete their discussions with staff. Usage times at the high school were high, but dissatisfaction with the amount of information was also high. Students in the school library demanded more hyper-linking and more "drill-down" ability to access more and more information. Museum evaluators concluded that venue was one of the most important factors in application success, and we have come to acknowledge that venue will in large part determine use. Another surprising finding on this second phase was the technology is not necessarily transparent or easy. Users at the OSC and NCC were provided with direct telephone links to the Museum Information Desk. Users had only to pick up the telephone attached to the kiosk to be connected directly with a Museum host. Most users assumed that the telephone, despite signage to the contrary, provided a recorded message, and while some very young children asked to speak with their parents, most people hung up when confronted with a real rather than virtual response. Telephone handsets embody powerful messages about use, and real-time connections might be better handled through a window on the computer screen than through an attached handset.

## The Partnership

Realizing the Silver Dart Project over the last two years demanded the combined talents and resources of a number of partners. What was gratifying for the Museum was that we were not the least of the partners. Museums have important assets, both of content and of expertise, that can be brought into the world of new media. We also have connections with other cultural agencies which are content holders in their own right, and can provide secure and well-used public spaces in which these new technologies can be installed and assessed. Our corporate partners, however, may not be as cognizant of these strengths as we ourselves are. While our relationship with STENTOR was excellent, primarily because the project managers from both sides made it their business to learn each other's corporate culture and concerns, our other forays into the world of telcos and network purveyors have not been as successful.

Before describing some of the less happy insights we have acquired, it is important to understand the nature of partnership with corporate giants. The National Aviation Museum is a national institution with a world-renowned collection, expert staff and resources, and the prestige that implies. We have a large modern building, priceless fixed assets and very small budget. We felt often that partnering with a major telecommunications company was a little like dancing with an elephant; if we weren't fast and clever enough, we'd be crushed and our partner wouldn't even notice. We danced very quickly indeed, to maintain an image with STENTOR of a professional, expert organization. Our resource base was so slender that the addition of a project of this nature halfway through our fiscal year strained our budgets to their maximum. It is important to note that a partnership is not about donations or even a sponsorship; it is about sharing a vision. The Museum was expected to pull its weight, to provide all content, install its own LAN and pay for all kiosk-based hardware, to undertake the evaluation, and to share some of the network costs. In return STENTOR paid for all research and development costs, all server hardware and software, the installation of network services (including broadband lines to the Museum), and all technical evaluation. We were well into the trial before we realized that what amounted to a sizable chunk of our programmes budget was for STENTOR only petty cash. Despite the disparity in our budgets, however, we paid our own way. Even at the end of the trial in fall, 1995, the Museum and STENTOR agreed, like all partners separating by mutual consent, to a dividing of assets, in which the Museum acquired almost all the trial hardware not for free, but at very reasonable rates.

There was one aspect of the trial that both STENTOR and the Museum shared equally - risk. Testing the server over LAN and WAN services in highly visible public venues was risky for STENTOR. The transmission of this kind of multimedia content is, after all, what the information highway is supposed to be about. The telecommunications companies are very concerned to show that their networks can respond to this new content as quickly as the cable companies, and this trial was important in showing the power of the broad-band telephone services. For the Museum, embarking on a new project in mid-year with no guarantee of either technical or popular success was very risky. As are most museums, we are judged on the number of visitors using our facility. Would a multimedia encyclopedia entice as many visitors as a new exhibit? (The cost was about equivalent to a small 1000-square foot interactive

exhibit.) Fortunately for us, the Project received critical acclaim, a number of awards<sup>4</sup>, and was seen by senior management as a new direction for the museum corporation as a whole.

Although our formal agreement with STENTOR ended in fall, 1994, we continue to be in regular contact with the corporation through the former project manager, and to collaborate with the company and its partners in a variety of multimedia trials. The Silver Dart Project remains one of the few networked MPEG applications available for technology testing. We have also learned some harsh realities about the world of new media. We have been approached a number of times by new companies, some large and some small, about partnerships. We have found few as willing as STENTOR to share equally in the costs of a project. The Silver Dart Project was classified as "R & D", and to a certain extent the company was able to help us develop a far more sophisticated product than we might have on our own. Because we were involved in a technology trial, we were also fortunate in being able to share a common vision. We wanted to make museum material available over the information highway; STENTOR wanted to test its version of the highway. Most corporations, however, are more interested in a business plan that has profit to the shareholders as the bottom line. We explained over and over to various officials at telecommunications and new media companies that our bottom line is not about profit, that our business plan is an Act of Parliament, and that our main corporate goal is to provide access to knowledge as freely as possible. This fundamental divergence in the world view of the private for-profit corporation and the museum may make some partnerships difficult. It may also make museums more than ever responsible for their own fate on the information highway. Our experience leads us to believe that most corporations have yet to understand the importance of non-commercial content, and the high costs of providing it. Few museums have begun the large-scale digitization of records and collections that will make multimedia networked applications possible, and fewer still have the resources to develop high-quality interactive databases for the new public.

The National Aviation Museum continues to build on the foundations laid by the Silver Dart Project. Our CD-ROM version is now on the market, we have been tasked by the corporation of which we are a part<sup>5</sup> to develop a new corporate strategy in the use of new media and information technologies, and we are developing a real-time interactive application for visitors at the OSC and NAM over our ISDN connection. We are also adding new databases to our server and exploring further the use of multimedia

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4 Silver Dart Project received a Canadian Museums Association Award of Excellence in 1994, A Silver Medal at COMDEX in 1994, and a Government and Technology Award for Partnership in 1994. The Project received special notice as well in the Report of the Auditor General of Canada for 1994-5.

5 The National Aviation Museum is part of the National Museum of Science and Technology Corporation along with the National Museum of Science and Technology and the Agricultural Museum.

databases for visitor information in exhibits. And we are looking for new partners who share our vision that information highway is about access to knowledge and new understandings.