

VIRTUAL EXPRESS, Ltd. - Business Profile



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INTRODUCTION: WHAT IS VR?

Virtual reality (VR) was born in 1965 when a research paper by Ivan Sutherland described techniques to generate a virtual world "within which the computer can control the existence of matter." The technology remained unknown for over twenty years. Jaron Lanier coined the term virtual reality in 1988. On June 6, 1989, Lanier and Virtual Express founder William Bricken introduced VR to the general public at two separate trade shows.

VR is a new way for people to interact through computers. It is an advanced goal in the evolution of the human-computer interface. VR provides communication and learning through direct experience. The design goal of VR is to create an interface so compatible with individual human perception and performance that the computer itself is transparent. The user is allowed to directly interact with environments constructed from digital information. The data transformed and presented in VR may range from completely synthetic to fully geo-specific, and can originate from a remote location, a different time, or an alternative scale. The information may be nominally imperceptible or obscure from the traditional daily human experience. The environments have been dubbed virtual realities because they exist as if they are real. With the construction of virtual realities, digital information becomes a time, place, and characteristic.

1. EXECUTIVE SUMMARY

The opportunity exists to develop a \$25 million dollar business in virtual reality (VR) technology and applications over the next two years. The Virtual Express business opportunity can securely generate \$5 million dollars in profits by 1997 and has the long-term potential to claim more than 20% of the projected \$1 billion dollar VR marketplace by the end of the decade.

1.1. Corporate Objective

The mission of Virtual Express is to create and sell *TrueVR* at costs that are highly competitive.

Virtual Express products will meet these requirements for TrueVR:

1. Immersion: An accurate 3D representation that surrounds each participant and integrates physical activity with virtual experience.
2. Multiple Participants: Group presence and interaction within the virtual world.
3. Interaction: The ability to affect and be affected by virtual terrain, virtual objects, and intelligent virtual entities.

Virtual Express can achieve a highly competitive cost structure due to:

1. Extensive experience in the VR industry: The ability and experience to design and implement compelling virtual worlds within time and cost constraints.
2. Sophisticated software: Proprietary software tools that support rapid development of virtual world experiences and a generalized architecture for flexible, market-responsive product design.
3. Cooperation: An expansion of resources and capabilities through prudent acquisition and merger activities that complement long-term growth and profitability.

1.2 Products

Virtual Express develops VR products and leading-edge technologies that establish cost/performance dominance in the VR marketplace.

Virtual Express will develop two distinct revenue streams, both of which utilize a common base of proprietary VR software:

1. TrueVR Experiences:
 - 1.1. VRsport: TrueVR combined with fitness machines creates a new form of entertaining exercise for individuals or groups.
 - 1.2. VRcade: TrueVR arcade video-games meet growing entertainment expectations.
2. Custom Applications:
 - 2.1. Worlds: Virtual Express will build VR products for third-party applications.
 - 2.2. Software: Virtual Express will license software and support to third-party VR developers.

Both VRsport and VRcade applications support multiple participants with an optimized network of two to six users dynamically interacting. Each user system employs an application computer, sound and image generation sub-systems, and a head-mounted audio-graphical display with a built-in spatial tracking mechanism to support full user immersion. Since emphasis is placed upon delivery of a TrueVR experience, the complexities of the supporting hardware and software become invisible to the user.

These products will demonstrate a unique capacity to create high-quality virtual worlds at low cost, and will serve as examples of the power and efficacy of the Virtual Express software. Virtual Express has already been solicited by several companies to license its proprietary tools and techniques.

1.3 Strategic Advantages

Virtual Express has three primary strategic advantages, all of which stem from a common base of VR knowledge and understanding:

1. TrueVR at affordable costs: A strong balance of quality and accessibility.
2. VR Experience: Compelling virtual worlds create a demand for new experiences and insure repeat business.
3. Sophisticated Software: The tools to meet application demands and the architecture to support diverse markets.

There are many companies marketing products as VR, but very few have TrueVR. Virtual Express coined the term TrueVR as a standard to distinguish itself from competition. Within the TrueVR domain, Virtual Express has the lowest price point by 400%.

VR is a rapidly evolving technology with new hardware capabilities, software techniques, design rules, and market opportunities appearing monthly. In response, Virtual Express is ready to deliver a plethora of exciting interactive virtual world experiences. With Virtual Express tools, virtual world creation is efficient and inexpensive. The Virtual Express development language is flexible and adaptive, allowing rapid generation and modification of high-quality applications for any market.

The Virtual Express team includes several VR industry pioneers who have invented many of the VR techniques now widely in use. Their pioneering innovations form the basis of the Virtual Express TrueVR software suite:

1. A comprehensive operating system with multi-participant networking.
2. A general purpose hierarchical database for virtual world representation.
3. A concise and creative language for virtual world implementation.

1.4 Current Status

Virtual Express was incorporated in the State of Minnesota in August 1993 to capitalize on the emerging virtual reality industry. The company currently employs 11 people with offices in Seattle and Minneapolis.

Virtual Express currently has a working prototype of the VRsport product that meets the requirements for TrueVR.

2. PERSONNEL

Virtual Express is a congregation of experienced management and technical expertise.

2.1 Management Team

William Bricken, Ph.D., Chief Technical Officer

Dr. Bricken is a widely respected expert in virtual reality technologies, artificial intelligence, computational mathematics, and education. He is a founder of the VR industry and has advised and trained many VR companies. He is currently a Research Professor of Education at the University of Washington and on the editorial boards of several professional VR publications. Dr. Bricken's prior positions include Principal Scientist at University of Washington's Human Interface Technology Laboratory, Director of the Autodesk Research Lab, Principal Scientist at Advanced Decision Systems, Associate Professor of Education at Rusden University, and Principal of Coonara Community School. Dr. Bricken has a multi-disciplinary degree from Stanford in Research Methodology, Computer Science and Educational Psychology. His current work addresses the fundamental issues of VR systems: the development of a mathematical foundation for virtual reality, design of VR software architectures and interaction tools, massively parallel VR, embedded narrative, divergent worlds, and experiential mathematics. He is the chief architect of the Virtual Environment Operating System (VEOS), which uses entity-based behavioral programming. Dr. Bricken has pioneered innovations in parallel inference techniques, visual programming languages, instructable interfaces, and modeling of cognitive errors. He is the developer of boundary mathematics, a reworking of the foundations of mathematics using spatial representations and void-based computation.

2.2 Technical Team

2.3 Consultants

In addition to the principal members, Virtual Express will utilize a broad base of experienced technical and design consultants.

3. VR MARKET

3.1. Industry Overview

VR is a fast growing industry with many active market areas including entertainment, training and simulation, exercise, medical, prototyping and visualization, and general multimedia.

The VR industry has a projected value of \$250 million in 1994, and is expected to grow to exceed \$1 billion by the turn of the century. In its growth, virtual reality is expected to absorb a share of the multiple billions of dollars currently spent on personal computer hardware and software, video game arcades, amusement parks, movies and compact discs. A significant portion of these financial resources will be channeled into VR systems and software because VR will encompass the capacity of the previous technologies.

Analysts predict that VR may be the most important technological advancement since television. This revolutionary technology is a direct result of new enabling hardware and software advancements. The consistent and rapid improvement of computer cost/performance suggests that TrueVR systems will reach a \$10K retail cost by 1996. However, VR software development may remain an esoteric skill for the rest of this decade, and widely accepted VR standards are unlikely for several years.

3.1.1. Fitness

IRSA, the association of quality clubs, estimates the athletic and fitness club industry to be a \$7 billion annual industry. IRSA estimates that more than 12.5 million consumers in the United States regularly use health clubs and fitness centers. Trends in commercial fitness equipment have been in the generation of products with improved electronics, offering more entertainment value and information while exercising. Several interactive multimedia aerobic products have recently entered the marketplace, with virtual reality predicted to be the next generation in aerobic fitness equipment. According to a 1993 survey, IRSA member clubs are expected to spend over \$247 million on equipment in 1994. Virtual Express intends to capitalize on this trend by introducing the first totally immersive virtual reality fitness products, offering a multitude of exercise experiences.

Exercise equipment manufacturers such as Universal, Cybex, Life Fitness and StairMaster will supply VR-ready versions of their existing units. The Virtu-series exercise systems will consist of a VRsport computing platform and head mounted display attached to a VR-ready exercise device.

To date, no other companies are marketing TrueVR fitness equipment. Several are currently developing partial VR experiences, featuring external video monitor with interactive games.

3.1.2. Location-based Entertainment

Wall Street analysts estimate that the video arcade industry generates \$5 to \$7 billion annually. 4th Wave, Inc. predicts that initially 76% of the virtual reality revenues will be in entertainment products. Entertainment is the biggest VR market since it requires only a low sophistication level. Only two companies have true VR arcade products on the market; both are location-based games at a price point averaging \$30,000 per unit with a two unit purchase requirement.

3.2. Market Strategy

Virtual Express will position itself in the center of the VR arena, where its technical merit will be most valuable. In order to do so, Virtual Express will harness technological progression with advanced software. The flexibility of this software is the essential component to the success of Virtual Express. In the next century, there will be thousands of VR markets and applications. Virtual Express is prepared to redefine entertainment value, increase human interactivity, improve education and training programs, and the redefine the human-computer interface experience. Companies with a technological lead in virtual reality applications now may very well turn into the entertainment and telecommunications giants of the 21st century. See figure "Virtual Express Ltd. Market Strategy.

3.2.1. Strategic Position

The opportunity exists to secure a key position in the emerging high growth industry of virtual reality technology. Virtual Express has selected a balanced cost/performance level in the overall VR marketplace; a low-cost (\$15K - \$20K), high-quality TrueVR system. Although construction of such a system is a difficult engineering feat, it will place Virtual Express in a unique area of the VR Industry. Current competition falls into one of these two extremes:

1. Systems that cost more than \$250K and provide adequate performance. (SGI-Disney)
2. Systems that cost less than \$50K and provide inadequate performance or only partial VR experiences. (W-Industries, 3DO)

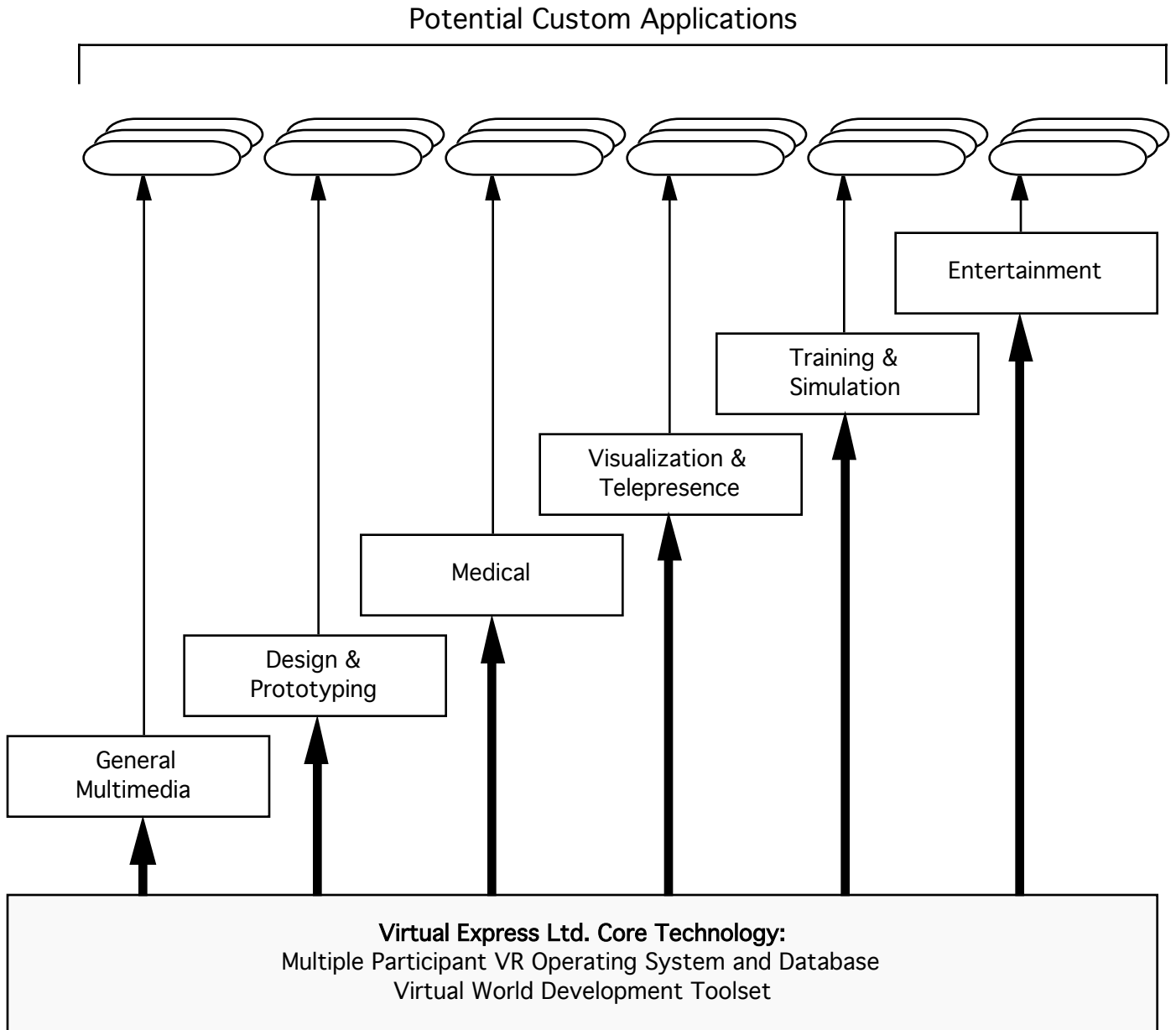
The public has extremely high expectations for the quality of VR experiences. To date, no product below \$50K provides high-quality TrueVR. Virtual Express intends to satisfy the demand for quality and maintain product accessibility. By doing so, Virtual Express establishes credibility and seeds brand awareness.

3.2.2. Core Technology

Virtual Express has already overcome the biggest obstacle to VR growth: lack of development experience. The majority of VR companies fail within a year due to the difficulty of VR development and inaccurate cost projections. To avoid such errors, all Virtual Express products emerge from a centralized base of core technology. Virtual Express has a unique software infrastructure that provides development opportunities in every VR market. Core technology development assures Virtual Express the broadest possible market penetration with the least amount of financial exposure. Additionally, Virtual Express will be able to extend its application territory by reapplying the core technology, without rewriting code or forcing incompatibility.

Internal application development will insure the functionality of the core technology, while custom development contracts and licenses will support the growth of general capabilities. Virtual Express expects the value of the software to decline over the next six years, as the techniques become more widely known. As the VR market grows, these tools will transfer to a widening application population, aided by the lower costs. The sale of development licenses for Virtual Express software provides revenue and installs an invested cadre of quality control experts. Most importantly, the company takes on a relatively small number of clients, who in turn manage the end-user market. Core technology provides maximum exposure and profit potential, with minimum risk.

Virtual Reality Market Potential



3.3. Product Focus

Virtual Express has identified entertainment, fitness, and custom development as the focus for initial marketing efforts. Virtual Express will provide beta-test systems for all VRcade and VRsport products on a short term lease to gain exposure. As systems become used, they will generate a need for different experiences.

3.3.1. VRsport

Fitness clubs have a pressing need: overcome boredom during exercise. VR is an appropriate solution because time is known to pass quickly in quality virtual environments. Virtual Express established an excellent lead in the VR fitness market when it fielded the first TrueVR demo in the fitness community in March 1994 at the IRSA trade show in Reno.

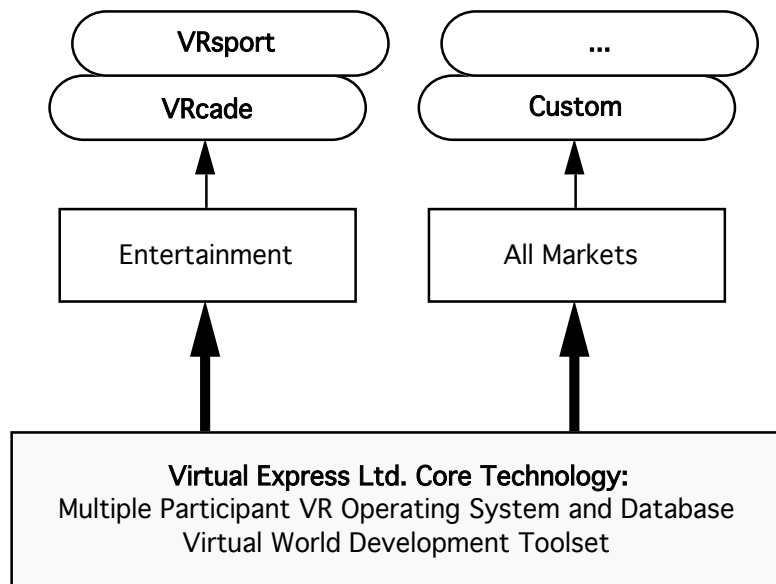
3.3.2. VRcade

The performance of entertainment systems is constantly increasing. Virtual Express will be at the forefront of public expectation, able to provide TrueVR at arcade prices.

3.3.3. Custom Applications

Virtual express has been approached by several major companies with the intent of developing strategic relationships for customized virtual reality products. The company will take advantage of these opportunities through licensing agreements, custom designed products and strategic partnerships. This activity promises to secure revenue generating streams and establish the Virtual Express platform as the standard in high quality TrueVR.

Virtual Express Ltd. Initial Products



4. COMPETITIVE ADVANTAGE

The VR industry is characterized by rapid evolution and scarce expertise. Virtual Express is prepared to meet the pace with high-quality TrueVR developed by qualified personnel.

4.1. Affordable TrueVR

Immersion:

It seems real! Virtual Express platforms use 3D surround graphics and sound to create a sense of presence in a virtual world.

I feel good in here! Virtual Express specializes in accurate physiological modeling, taking into account body size, physical constraints, perceptual cues, and cognitive expectations.

Multiple Participants:

We're all in here together! The most interesting things in a virtual environment are other people. With the Virtual Express Participant System architecture, all participants can freely interact within the same virtual environment. Adding participants does not degrade the quality of the individual VR experience.

Interaction:

I can move everything! Virtual Express provides complete interactivity. A participant has unlimited access to interaction with objects in the virtual environment.

I can go anywhere! Virtual Express platforms allow unconstrained exploration of virtual worlds. Participants can choose an endless variety of experiences, because navigation is not limited to predetermined paths.

Everything is alive in here! Intelligent virtual entities can perform requested tasks, provide drama and humor, and encourage participant involvement in the virtual world. The Virtual Express Behavioral Systems architecture provides the capability of real-time, interactive modeling, animation, and scripting.

Cost:

I can afford it! Virtual Express products are designed to deliver a 400% cost/performance improvement over current VR systems.

4.2 VR Experience

While working in industrial research environments over the last six years, the Virtual Express technical team invented many of the software paradigms used in current VR systems. The Chief Technical Officer of Virtual Express developed the initial VR tools that evolved into the software products of two primary software competitors (Sense 8's WorldToolKit and Autodesk's Cyberspace Development Tool kit). People of all ages from all over the world have experienced the virtual worlds developed by Virtual Express principals. This base of expertise means that Virtual Express products can avoid the pitfalls of novice development, and provide high-quality TrueVR at low prices.

4.3 Sophisticated Software

Virtual Express VR application solutions are based on revolutionary software tools that provide unparalleled capabilities for rapid prototyping of specific worlds, assurance of reliable and pleasant experiences, and extendibility to diverse VR experience needs. The multi-participant operating system will be portable to various platforms. The hierarchical database will easily adapt to increasing hardware performance levels. Finally, the language and techniques for virtual world implementation will apply to every VR system, forever.