

Santa Fe Complex Business Plan (Draft)

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Executive Summary

Santa Fe Complex is a nonprofit organization dedicated to creating collaborative relationships between the many communities of Santa Fe and Northern New Mexico. It is a problem-solving organization that applies the tools of complexity science to the issues and questions that affect each of us in our daily lives. In brief:

- sfComplex provides a venue that will focus and facilitate its scientific talent for the advancement of science education and engineering industry in Santa Fe itself and in the nation.
- sfComplex will provide a place where personnel from the major national governmental, industrial, academic national institutions that surround Santa Fe, from these institutions can interact with the wealth of complexity knowledge and other computational talent in Santa Fe.
- sfComplex will provide a place for the myriad independent experts and entrepreneurs in Santa Fe to collaborate in their pursuit of the innovative and creative uses of complexity sciences and other computational technologies.
- sfComplex will provide a place where young people can join learn and grow as interns and apprentices in the exploration and development of new technologies to solve social, economic, and industrial problems.
- sfComplex will be a place for all of Santa Feans to participate in workshops, lectures and performances that explore complexity in the human and natural world and demand with the most elaborate and up-to-date tools of communication and visualization.

This effort is overseen by a board of directors drawn from the area's leading research, financial and scientific organizations. It is supported by an active network of volunteers who constitute an advisory board that counsels the board on sfComplex's programs and direction. The advisory board also serves as a reservoir of expertise for

Santa Fe Complex is located on Agua Fria in a natural extension of the Railyard District. Its organizers consciously choose this location as a symbol of the organization's commitment to the community and its intention to be part of its growth and renewal.

sfComplex was incorporated as a nonprofit entity in New Mexico on December 14, 2007. It expects to file its application as a 501(c)(3) corporation in the first quarter, 2008. Its Federal Employer Identification Number (EIN) is 26-1619267. Its New Mexico incorporation number is 2977833. sfComplex is headquartered at 624 Agua Fria.

Vision, Mission & Strategic Goals

sfComplex operates in the tradition of the *bottegas* in Renaissance Italy that nurtured Leonardo da Vinci and Michelangelo. It is a workshop simultaneously engaged in the craft, in building the tools and discovering the techniques that advance and support the craft, and teaching that craft to apprentices. Noisy with multiple projects and activities. its walls and benches are covered with works in progress and exemplars of the craft. It is filled with the tools of the craft (add computers and digital displays to the easels, brushes, hammers, chisels, carving, forges, kilns, model making, etc. tools found in a typical Bottega) with room for lounging and eating facilities as well. This intellectual center is a "must visit" for masters, scientists, and thinkers visiting the area.

This vision is embodied in sfComplex's mission to create a collaborative workspace that fosters applied complexity science through interdisciplinary education, outreach, and development of innovative technologies that address real-world problems, enable social cooperation and create economic opportunities.

sfComplex has three strategic goals that guide this effort:

- o Create virtual and physical spaces to foster the application of advanced computational tools, including complexity science, to artistic creation, education, problem solving, group development, and conflict resolution.
- o Provide the leadership, scientific expertise, infrastructure and technological tools needed to support applied complexity science; and
- Educate the general public and the scientific community about the use of complexity science to solve real world problems, enhance economic & artistic growth, and support social cooperation.

The notions of creativity, innovation, and multi/inter-disciplinary investigation are critical to sfComplex's mission—and the expectations, personal traits and commitments of the individuals to be found at sfComplex.

Need

Modern society lets individuals retreat into silos of personal interest that eliminate the need for contact with people of differing interests or beliefs. Computer technology creates an explosion of data that is available at the click of a mouse button without any filters to evaluate this material. Both trends tend to Balkanize society, creating an environment with minimal social cohesion.

We can counteract this trend. Creativity, innovation, and multidisciplinary investigation—notions that are critical to SFC's mission—can create a new commons for people of all ages, interests and backgrounds in the 21st century. Our growing understanding of complex processes and the increasing power of modern computers power give us tools and methodologies to advance this effort.

sfComplex's goal is to create a collaborative workspace to foster this new commons. By combining interdisciplinary education, outreach, and innovative technologies, it addresses real-world problems, enables social cooperation and creates economic opportunities in Santa Fe and New Mexico.

Key Activities & Facilities

sfComplex history

sfComplex is a nonprofit New Mexico corporation incorporated on December 14, 2007. It expects to file its application as a 501(c)(3) corporation in the first quarter, 2008. Its Federal Employer Identification Number (EIN) is 26-1619267. Its New Mexico incorporation number is 2977833.

sfComplex grew out of a network of scientists and researchers loosely affiliated through the FRIAM group, which meets every Friday morning to share information on technical problems, new discoveries and commentary relevant to complexity, and to develop theory and practice that will help elucidate the mechanisms underlying complex phenomena. The FRIAM mailing list, which is home to an ongoing series of discussions among the group's members, has participants all over the globe. Both the list and the meetings are stable entities that have been continuously active for more than half a decade. Thanks to this network, Santa Fe is renowned as an emerging center for complexity science.

An offshoot of the FRIAM network joined with non-scientists in the Santa Fe area to conceive of sfComplex. Known as the sfComplex Advisory, this collection of artists, educators, journalists and others realized that the esoteric interests of FRIAM could be used in local communities to expand their educational, economic and political growth.

Their vision is derived in large part from the efforts of Stephen Guerin, the president of sfComplex's board of directors. Stephen recently served on the National Science Foundation's Human & Social Dynamics Grant Review Committee and lectures on agent-based modeling and visualization as a faculty member of Santa Fe Institute's Complex Systems Summer School.

Between 2000 and 2002, Stephen worked as a Senior Software Developer at BiosGroup and participated as a member of Stuart Kauffman's research group. Stephen Guerin started researching chaotic systems as they applied to economic systems and business cycles in 1989. He founded Redfish Group in 1991 to provide special effects animation, video editing and commercial printing. Operations were shifted to Beijing in 1994 to develop a series of Chinese language translation tools. Redfish Group went on to provide Internet programming and consulting to multinational and Chinese firms with presences in Beijing and Shanghai. After returning from China in 1997, Stephen spent a few years of research in Cognitive Science looking for applications to distributed software systems. Redfish Group's long-term mission is to create living software systems.

Facilities

Santa Fe Complex is housed at 624 Agua Fria. It is negotiating a lease for the adjacent facilities at 632 Agua Fria, a newly remodeled building that once was an engine repair station for the railroad spur from Lamy, The facilities will provide working space for the individuals and organizations participating in sfComplex's efforts. They will include voice and data communications, audio-visual equipment, workspaces with desks and furniture, and gathering areas. The facility at 632 also has a large open space that will be a focal point for the large scale collaborative initiatives we expect to grow. The area will be easy to reconfigure to provide a broad range of usages from individual desks to project areas to audio visual presentation and development to classrooms and lecture halls to exhibit space. The exact utilization will depend on the needs of the members and will likely change dramatically over time.

An important part of the facility will be to provide low cost space to the community for meetings and classes on topics that support sfComplex's goals. The facilities will also house

advanced audio-visual and computer equipment that will be used for member and student projects and will be made available where necessary for classes and other community events.

Strategic Goals

1. Education

Education is a primary mission at sfComplex. Through community project-based learning, formal classes and frequent public talks, sfComplex will offer an opportunity to researchers and artists-in-residence to share their craft with local students. After discussions with local educators, sfComplex expects to offer the following for-credit and interest-based programs to local students:

- · CSF, SFCC and high school credit classes
- · Software Architecture
- Intro to Complex Systems
- Survey of Interactive Art
- · Survey of Computational Aesthetics
- Intro to Computer Simulation
- · Applied Complexity Projects
- · Computer Game Design
- Statistics and Data Analysis
- Discrete Math and Computer Science (Matrix Theory, Combinatorics, Graph Theory, Optimization and Search, Probability Theory)

sfComplex will also offer a variety of student- and youth-based programs in addition to formal and semi-formal. They include supporting the New Mexico Supercomputing Challenge and Project Guts as well as offering internships and mentorships for highly-motivated students. By developing a complexity apprenticeship program, sfComplex will contribute directly to the ability of local students to enter this growing field. Some of the uses and users who have expressed their desire to work in sfComplex include:

- David Stout and Cory Metcalf Noisefold Computational art
- · David Dunn Sonification, Education
- · Charles Buki CBZ Consulting
- City of Santa Fe Kellogg Foundation Project
- · Roy Wroth immersive 3D Santa Fe, virtual museum
- Orlando Leibovitz music visualization
- Dennis Dollens adaptive housing for evacuees
- · Dave West College of Santa Fe
- Mesa Analytics Pharmaceutical molecule design
- Simon Mehalek robotic tables and distributed systems design
- Lone Pine Mesa Credit Prediction
- Little Globe Community-based Media Projects
- Redfish Group
 – Venice Traffic project, UK National Health Service
- Supercomputing Challenge projects
- · Project GUTS education
- NSF Illuminated Cities Project

2. Public policy

Complexity science offers policy makers the opportunity to examine real-world scenarios in a hands-on virtual reality. By modeling the complex issues policy makers face, sfComplex creates a common ground for interested parties to exchange their views. Using three-dimensional, interactive visualizations, the parties can see the impact of the scenarios they

identify and develop mutually acceptable solutions to those issues. Issues that lend themselves to this approach include:

- 3D wildfire simulation and emergency response systems
- · Water and resource management
- Community development, in-fill and sprawl impact
- · Traffic patterns, zoning effects

3. Arts

Santa Fe's fame is a center for the arts is well-known. Less understood is the growing use of computers and other intelligent electronics to blend the distinction between traditional arts and new technology. In a manner similar to the invention of photography in the late 1800's, computers are redefining artistic boundaries. sfComplex will work with local artists to exchange ideas across this boundary and open the door to new and innovative forms of artistic expression.

4. Complexity research

Thanks to the influence of the Santa Fe Institute, which has pioneered much of the research into complex systems, Santa Fe is internationally known for its complexity science-based businesses. Much of their work is project-based, which creates an ebb-and-flow in the demands for talent and resources.

sfComplex applies the Hollywood model to this situation. Much like entertainment professionals work move from production to production as producers and directors implement their projects, sfComplex will provide a meeting ground—a studio—for the people behind these businesses to collaborate in future work and expand the boundaries of their trade. Because their work is international in nature (two current complexity projects being launched from Santa Fe are an examination of traffic flows in Venice and an evaluation of British health care systems), sfComplex will expand Santa Fe's fame and influence in this rapidly developing field of intellectual research.

Benefits

sfComplex will provide Santa Fe and New Mexico benefits ranging from public policy to educational options, career development and economic growth.

1. Educational opportunities

This effort begins by educating potential participants about complexity science. Based on discussions with local educators, SFC expects to offer the following for-credit and interest-based programs to local students:

- 70 students a year in for credit classes high school, SFCC and CSF classes
- 200 students through Project GUTS involvement
- 300 statewide students reached through Supercomputing Challenge presentations
- · 100 creative professionals exposed to new techniques in applied complexity
- 40 students directly involved in NSF Digital City.

2. Skills Development

These students will develop skills that provide them an opportunity to find high quality jobs in simulation, visualization, software design, web programming and design, computer animation, 3D modeling, data analysis, and city planning, among others. SFC plans to offer 20 apprenticeships that can move into journeyperson and master craftperson roles; typically, these positions earn:

· Journeyperson: \$45/hour

- Master craftsperson: \$90/hour
- Project sales & managers: \$150k/year.
- The educational component extends to the broader community. SFC expects to offer 50 public lectures annually (reaching 600 community members) in applied complexity; seven public workshops; and six school visits reaching 300 students.

3. Economic development

SFC will also have a broad and beneficial impact on economic development. The complex will support:

- Up to 35 for-profit projects per year with an average budget of \$150,000 for a total of five million dollars in annual in economic activity
- A number of spinout/startup businesses per year derived from these projects
- Establishing Santa Fe as the international leader for applied complexity, simulation and complex systems visualization.

Market

Segmentation

sfComplex's market is as wide as the field of complexity science. It can be segmented into the four strategic areas: education, public policy, arts and complexity research.

1. Supporters

While Santa Feans are justifiably proud of their support for its many nonprofit organizations, the city as no nonprofit aimed at the junction of education science, technology, art and public policy. For a city so full of highly skilled technologists, artists and concerned citizens, sfComplex offers a new venue to express their support for collaborative and multidisciplinary activities. sfComplex expects to develop an active base of supporters who do not engage in direct research or complexity projects but who want to attend its outreach programs, learn more about the fields being explored at sfComplex and support its efforts with their generous donations

2. Project-based activities

Santa Fe's unique global role as a leader in complexity science creates a strong need for a central organizing place for collaborative research and projects. Using the Hollywood model as an organizing principle, sfComplex offers a studio of researchers, experts and interested professionals who can staff projects for their duration. This fluid constituency give project managers the opportunity to bid on contracts without the overhead of a traditional business model. It also gives professionals the opportunity to participate in a variety of activities and, when the business situation is appropriate, serve as a pool for startup enterprises.

This arena is not limited to complexity scientists. Large-scale projects require a variety of skills from clerical and secretarial to graphics designers, writers and publishers. The sfComplex project model creates an open, collaborative environment that needs people of all skills, backgrounds and interests can work together and expand their professional horizons.

3. Long-term memberships

sfComplex offers a primary work place to individuals and businesses who want long-term access to its facilities and environment. This includes a range of services including fixed desk and storage space, use of common space, priority use of AV and computer equipment, technical assistance, etc. Long-term members may be project managers who use sfComplex

for a central studio and rely on its resources and affiliations to staff their work. Conversely, they may be practitioners who are available for porject-based and consultant work.

4. Short-term memberships

sfComplex offers a secondary work place to individuals and businesses who want drop-in or short-term access to its facilities and environment. They mirror the long-term category but want to make a shorter commitment to the facility. They have access to all of sfComplex's facilities on a space available or short-term basis. Short-term members may be project managers with a limited-term project or practitioners who are available for project-based and consultant work for a limited time. They may also be testing the water before converting to a long-term membership.

5. Educational grants

sfComplex will solicit grants to develop a variety of educational programs with its educational partners. It intends to offer those programs for free or for a subsidized rate with local and national foundations as partners in this effort.

6. Third-party seminars, presentations and workshops

sfComplex provides a unique, centrally-located facility for businesses and institutions to host special events of varying durations. There are no facilities with comparable infrastructure and space, which makes sfComplex attractive as a hub or an overflow site for large gatherings. As with sfComplex's educational efforts, these facilities will be available at a reduced fee for nonprofit organizations.

Outreach/Communication/Advertising Strategy

sfComplex will use a full palette of outreach strategies to expand the community's awareness of its presence and complexity science. They will emphasize community involvement and interactive participation.

1. Public discussions and receptions

sfComplex will implement an active schedule of public gatherings to inform the community about its programs and participants. These will range from presentations and lectures to afterhours networking sessions. The audio-visual infrastructure at sfComplex will be central to these activities.

2. Newsletters and journals

sfComplex will actively publish the results of any activities carried out on its premises. It strongly supports the concept of open-source projects and will rely on this approach to convey the full flavor and import of its programs. While sfComplex understands that a project may have to protect some proprietary information in its product, all projects and members will agree that they will share the concepts and implementations used in their work as part of their membership in the complex.

3. Internet-based communications

sfComplex will rely heavily on its web presence to inform the community about its activities. The Internet is a complex system in itself and sfCOmplex looks forward to exploring the full gamut of options as this medium grows.

In particular, sfComplex foresees an environment of global communications with complexity practitioners and interested individuals. It will move towards real-time presentation of its events and interactive panels connected with video conferencing technologies.

4. Virtual workplaces

The complexity field is global in nature. sfComplex will create a center point in a global web of practitioners, researchers and enthusiasts. Some will come to Santa Fe to participate in or lead sfComplex programs; others will in the system through advanced Internet streaming protocols and regular listsery communications.

Finance

Strategy

sfComplex will grows in three stages that will allow it to balance its goals and its resources: start-up, expansion and full-scale operations. These can be summarized as follows:

Phase 1: Start-up. The facilities at 632 and 624 Agua Fria will initially develop as focal points for sfComplex activities with an incremental approach. Furniture, high-speed connections, audio-visual equipment, etc., will be selected and installed at a minimal level. The emphasis will be on fund-raising and public programs, such as courses and lectures to raise community awareness of the options available at the facilities.

Available space will be leased to complexity-related organizations. A public membership program will be launched. Potential donors will be identified and contacted. Collaborative activities with other Santa Fe organizations having complementary missions such as Warehouse 21 will be pursued. These efforts will be adjusted to provide the most effective service to the community based on public responses. sfComplex will rely heavily on volunteers to develop and implement the startup activities. The objective will be to create a financially stable organization providing a popular set of community services centered around a broad range of complexity applications. This will take approximately the first 6 to 18 months.

Phase 2: Expansion. This will expand the Phase 1 activities. Additional AV and computer equipment will be procured as necessary to implement public programs, educational activities and sfComplex's advanced web services. Courses, lectures, and other community activities will be expanded and integrated. Professionals will be hired (at least on a part time basis) to develop and implement programs and pursue funding opportunities. Major programs from funding sources such as the National Science Foundation will be pursued under sfComplex's umbrella. This will take approximately 24 months.

Phase 3: Full Scale Operations. When fully operational, sfComplex will have a small professional staff responsible for fund raising and for developing and implementing a comprehensive program of complexity-related activities for the Santa Fe community. It will provide state-of-the-art facilities, equipment, and training to its members and participating organizations to assist them and the overall economic development of Santa Fe.

Start-up and Capital Equipment Costs

sfComplex is seeking grants for its initial startup costs. Estimates for start-up and capital equipment costs are shown below for the minimum startup requirements and for what sfComplex would like when fully operational. Startup costs will be spread over the first 3 to 12 months of operation with full operations costs being phased in thereafter.

Item	Startup	Full Operations
Kitchen	\$1,000	\$50,000
Furniture & desks	\$20,000	\$100,000

Item	Startup	Full Operations
Audio-Visual & computing	\$15,000	\$100,000
Legal, accounting & marketing	\$5,000	\$50,000
Phone, office equipment	\$2,000	\$10,000
Initial lease	\$30,000	0
Total Startup Costs	\$63,000	\$310,000

We expect some of these costs (such as furniture, computer infrastructure and audio-visual equipment) may be contributed by donors or funded directly by projects. An additional expense may be incurred if we decide to become a node for the NM Supercomputing Applications Center. Connection costs will be in excess of \$200,000.

Operating Costs

These include personnel costs and recurring non-personnel costs. Non-personnel costs are shown in the following table, and cover both the 632 and 624 Agua Fria facilities. We do not expect significant variation between scenarios.

Personnel costs were developed assuming sfComplex would have an Executive Director, a Office Manager/Operations Director, a Receptionist, and a Technology Trainer/ Specialist. These would have different involvement depending on the stage of sfComplex's expansion strategy.

Revenue Sources

Revenue will come from Grants, Memberships, and Projects.

1. Grants

Grants will be solicited from major donors including major corporations and government agencies. Initially, we hope to get 6 donors to each provide \$50,000 per year, for a total of \$300,000/year. This will allow us to transition to the expansion scenario. There are however significant issues to be addressed. These include the time frame required to market a donor (typically, 6 – 12 months), identification of sufficient donors (preferably in New Mexico) willing to help at these levels, and obtaining the 501 (c) (3) designation.

We have identified a number of organizations to approach for support and funding, which are given the table below. At this point, all have indicated interest in sfComplex and in assisting us, although none have committed. We have also started the application process for gaining our 501 (c)(3) designation. Potential donors include:

- Santa Fe Institute
- Intel Corporation
- City of Santa Fe
- National Science Foundation
- · Los Alamos National Bank
- Los Alamos National Labs

- · McCune Foundation
- · Sandia National Lab
- NMCAC

2. Memberships

A significant portion of sfComplex's financing requirements will come from selling memberships to its supporters. There will be two broad categories of members: individuals and organizations who directly use the facilities and those who support the sfComplex' work and contribute to sustain its efforts. The second group is referred to as Friends. They will receive invitations to Complex events (courses, lectures, etc.) at discounted rates, "drop-in" use of facilities, and so forth. These annual memberships will be offered at a variety of price levels.

The first group is divided between long-term and short-term occupants. Long term occupants will be provided with a range of services including fixed desk and storage space, use of common space, priority use of AV and computer equipment, technical assistance, etc. These members will pay approximately \$400 per month with a minimum three-month commitment. Short-term memberships will include floating desk space, non-priority use of AV and computer equipment and of common space, etc. These will go for \$100/month.

3. Projects

Project revenue will come from renting facility space and equipment for activities such as classes and lectures. sfComplex will charge administrative overheads (typically 10%). This revenue is estimated at \$2,000/month.

Cash Flow Projections

Phase 1: Startup pro forma cash flow projections for the for the years 2008-2013 show sfComplex is financially viable. We should note that some of the expenses (equipment expenses, in particular) can be delayed if revenues and grants don't meet expectations. sfComplex will move into Phase 2 and Phase 3 during this pro forma's time frame. The exact timing of those steps depends on market conditions and technological advances.

Personnel

Board of Directors

The board of directors unites the major local organizations from the industry, education, and government sectors to help with fund raising and operations, and to ensure sfComplex is a major asset to the community. The current members include:

- · Stephen Guerin, Chairman Redfish Group
- Frank Wimberly, Vice President Carnegie Mellon University / Redfish Group
- Don Begley, Secretary Santa Fe Complex, President
- · Ed Angel UNM ARTSLab
- Irene Lee Santa Fe Institute Education
- John Miner Intel
- Steve Smith LAVA / Los Alamos Lab visualization scientist (retired)
- David Stout College of Santa Fe computational artist
- Chris Wood Santa Fe Institute
- Cathie Zacher Santa Fe Economic Development

The treasurer's position will be filled at the board's regular meeting in March. Don Begley, the sfComplex president, is operating in that capacity for the present. In addition, sfComplex will identify a student from Santa Fe schools to serve on the board.

Staff

Don Begley is the president of Santa Fe Complex. He comes to sfComplex from enchantment Magazine, the second-largest publication in New Mexico, where he served for 14 years as its editor. Before that, Don was an executive at Public Service Company of New Mexico. He served in various capacities during his 11 years there, ranging from the financial and investor-relations areas to heading the electric unit's communications programs. Don received his MBA in management science is from the University of New Mexico. His BA in Spanish and linguistics is also from UNM.

Additional staff will be employed as appropriate.

Advisory Board

The Board of Directors will be assisted by an Advisory Board consisting of local complexity practitioners, businessmen and artists who have been instrumental in developing the concept for sfComplex and bringing it to its current point. They are all committed to making it a success and will be volunteering their services to assist in day-to-day operations. This board consists of:

Shawn Barr's background in evolutionary psychology and is interested in agent behavior. He is currently working with Redfish Group on developing agent-based models.

Dede Densmore

Owen Densmore is a Principal in Redfish Group, working on several modeling and visualization projects. He has 30 year's experience in the computer industry at Xerox PARC, Apple and Sun.

Tom Johnson

Michael Kauffman is internationally recognized as a facilitator, consultant, and experiential educator, focusing on strategy formation, complex problem solving, innovative product and service design, and organizational transformation. He combines twenty years of experience with a rich background in the practice of innovation and collective creativity.

Orlando Leibovitz

Cory Metcalf

Paul Paryski, a former U.S. diplomat, UNDP Chief Technical Advisor and creator of two Haitian National Parks, is on the Governor's Blue Ribbon Water Task Force and the Rivernetwork Board of Trustees.

Jack Stafurik has been working with scientists and entrepreneurs in the Santa Fe and Los Alamos area to help them set up technology-based start-ups. He has a BS and MS in engineering, and an MBA.

Nick Thompson joins us in Santa Fe after nearly 40 years as a professor of psychology at Clark University in Massachusetts and as a free-lance writer.

Dave West heads the complexity science effort at the College of Santa Fe. He is an educator, software designer, author, anthropologist working hard to radically redefine the realm of software development and how that subject is taught.

Roy Wroth is an urbanist concerned with sustainable community and the built environment. He is in private practice in Santa Fe and serves on the board of the Santa Fe Alliance.