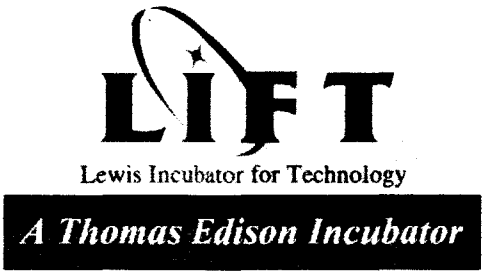

Closeout and Summary of Research Report
For the Period October 1, 2000-September 30, 2004

Lewis Incubator for Technology (LIFT)
NASA Cooperative Agreement NCC3-826

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November 4, 2004

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Background

This report summarizes the work done to manage and operate the Lewis Incubator for Technology (LIFT) under NASA Grant NCC3-826 for the period October 2000 through September 2004.

LIFT, which began accepting tenants in March 1997, is a business incubator designed to nurture new and emerging technology-based businesses. LIFT has strong links with the NASA Glenn Research Center (GRC) and this close affinity provides outstanding resources for technology and support from GRC. In addition to NASA GRC, LIFT is a cooperative effort of the Ohio Department of Development, the Great Lakes Industrial Technology Center (GLITeC), and is managed by Enterprise Development, Inc., (EDI), an organization with proven expertise in entrepreneurial assistance and development.

The LIFT program was initially started as a lab-based incubator in the former BP America Research Facility in Warrensville Heights, Ohio. That facility was filled within the first two years of operation and NASA requested that a second facility, with a focus on software, electronics, and communications (SEC) companies, be opened and that the new facility be closer to NASA GRC. The SEC site opened in Building 501 on the grounds of NASA GRC in 1999.

In 2000, BP America sold its Warrensville facility to Sherwin Williams and Sherwin Williams notified LIFT that it must move. During 2000, an extensive search for similar high-quality lab and office space was conducted. Space at the ICI Paint Research Center in Strongsville, approximately 10 minutes from the GRC, was identified, and a lease for approximately 14,000 sq. ft. of space was signed. This allowed LIFT to move its Warrensville tenants and program intact to ICI by March 1, 2001 and provided expansion space for additional tenants in the future. The SEC site remained at NASA GRC.

In January 2004, EDI merged with two other local economic development organizations to form JumpStart Inc. with the mission of providing intensive one-on-one business counseling for high-potential entrepreneurs, making seed capital investments and building entrepreneurship in Northeast Ohio. In conjunction with these primary objectives, JumpStart concluded that the real estate management responsibilities associated with incubator operation were not congruent with the stated mission, required substantial resources, and diverted funding away from high-potential entrepreneurs. The decision was made to close LIFT at the end of this Cooperative Agreement.

LIFT's primary objectives have been to increase the value and visibility of NASA knowledge, technology and expertise, and to create technology-oriented businesses and high-value jobs in the State of Ohio. LIFT was founded with the intent of providing significant benefits to NASA, including:

- New products based on NASA technology;
- New companies based on NASA technology;
- Increased number of NASA technologies that are commercialized;
- Increased community and industry leveraging of NASA resources; and
- Increased community understanding of the value of NASA.

Grant History and Leverage

EDI was originally awarded funding from NASA Lewis Research Center (now NASA Glenn Research Center) to start and operate LIFT under Cooperative Agreement NCC3-484 in the amount of $1,109,800 for the period July 1, 1996 through June 30, 1999. Through several modifications, this agreement was subsequently extended to September 30, 2000, and additional funding added to make the total amount $1,510,781, of which $1,411,507 was spent.

The original grant from NASA was predicated on the startup and operation of a lab-based incubator facility and program; however, based on a request from NASA GRC and the demand for additional non-lab space by area entrepreneurs, LIFT submitted a proposal to open a second incubator site focusing on the needs of software, electronics and communications (SEC) ventures. The proposal was accepted by NASA and LIFT was awarded an additional $200,000 (included in the funding total noted above) to implement this new program. That site, which opened in May 1999, is located in approximately 5,000 sq. ft. of space in the Development Engineering Annex Building 501 on the grounds of NASA GRC.

NASA subsequently awarded EDI a new cooperative agreement grant, NCC3-826, for the continued operation of LIFT through September 30, 2003 in the amount of $1.295 million. NCC3-826 was modified to extend until September 30, 2004 and a total of $1,300,506 has been awarded under this agreement. The State of Ohio also continued to fund LIFT through June 2004.

Leverage of the NASA funding has been provided to the LIFT program from several sources. The Ohio Department of Development granted LIFT $731,500 for the period from mid-1996 through September 30, 2000 and continued financial support in the amount of $746,606 for the period October 1, 2000 to September 30, 2004. NASA funds were also leveraged by donation of office and laboratory space at less than market rates by BP Amoco (and subsequently by Sherwin-Williams), a cash donation by BP Amoco, and provision of internet wiring upgrades by NASA. Early in 2001, LIFT relocated the laboratory-based portion of the incubator program from the Sherwin Williams facility to the ICI Strongsville Research Center, located closer to GRC. ICI also provided space for the incubation program at below market rates through a partial rent donation that also contributed to continue the leverage of NASA funding. The total value of these donations has amounted to approximately $500,000 from July 1,1996 to September 30, 2000 (NCC3-384) and $302,651 for the period October 1, 2000 to September 30, 2004 (NCC3-826). In addition to donations, the LIFT program has historically charged its tenants for rents and services. The income from rents and services, which amounted to $375,000 under NCC3-384 and $456,513 under NCC3-826, have been "reinvested" in the LIFT program to provide additional tenant services. A summary of funding sources is provided in Table 1.

Table1. NASA Funding and Leverage 1996 through 2004

Period	July 1, 1996 to September 30, 2000	October 1, 2000 to September 30, 2004
NASA Cooperative Agreement	NCC3-484	NCC3-826
NASA Funding	$ 1,411,507	$ 1,300,506
State of Ohio Funding	$ 731,500	$ 746,606
In-Kind Corporate Donations	$ 500,000	$ 302,651
Tenant Rent and Services	$ 375,000	$ 456,513
Total Non-NASA Funding	$ 1,606,500	$ 1,505,770
NASA Funding Leverage	1.14:1	1.16:1

Performance

From its inception through the end of 2000, all critical performance measures for LIFT had been met or exceeded, on or ahead of schedule. At the beginning of NCC3-826, LIFT housed 11 technology-based tenants and had three tenant companies that "graduated" from the program. Through the end of FY '03, LIFT added six more tenant companies and "graduated" an additional 11 companies for a total of 20 tenant companies that have benefited from the LIFT program. Beginning in FY '04, following discussions with GRC program management, it was decided to transfer the laboratory-based operations and its three tenant companies from LIFT to the Edison Technology Incubator that is also managed by EDI. This change reduced the LIFT exposure to facilities expense, refocused the program towards an "incubator without walls" concept, and brought the LIFT operating budget in line with the available funding from NASA and the State of Ohio. This left the LIFT program with three tenant companies located at the SEC site. The complete tenant and graduate statistics are shown in the Client Profile Sheet on page 8. LIFT and its partners continued to work with numerous potential tenants still in the "pre-incubator" stage to help them advance their business concept to the point where they would be ready for incubator tenancy.

Both tenants and graduates of the LIFT program work in such diverse technology areas as environmentally-friendly polymers and coatings, computational fluid dynamics, wireless communications, advanced ceramics and composites, and medical diagnostics. The technology base of these businesses enabled the LIFT staff to link many of its tenant companies with NASA GRC researchers for assistance or collaboration. Of the 20 tenant companies in the LIFT program, 14 had varying levels of direct interaction with NASA researchers working in related fields of science, four entered into Space Act Agreements for collaborative technology development, and one company actively commercialized a family of NASA-developed technologies. The process of linking tenant companies with NASA researchers was greatly facilitated by the LIFT staff's participation in the Technology Assessment Group and other commercialization programs.

In addition to meeting its Key Performance Measures and opening the SEC site, some of the other major accomplishments of LIFT during NCC3-826 have been:

- An "Entrepreneurial Perspectives Course," twice offered by EDI for Case Western Reserve University faculty and staff, was modified and offered for the first time to NASA research scientists and engineers in 2002. Former NASA employees, who have successfully started high tech companies using GRC technologies, kicked off the series of five weekly lunchtime seminars. Over 50 Glenn researchers attended these sessions. Follow-up sessions, providing intensive one-on-one business counseling for interested participants, continued into 2003.

- Joe King and Wayne Zeman of LIFT took leadership roles in NASA Inc., an affiliation of the directors of nine NASA-funded incubators across the U.S. The group met in 2000 to establish best practices, a common vision, set goals, establish working teams to enhance the overall effectiveness of the NASA business incubation program, and define metrics to better measure the overall impact of the incubation program. This effort continued into 2003. Wayne Zeman presented an overview of NASA Inc. to the NASA Commercial Technology Management Team (NCTMT) meeting in January 2001. For FY '01, the nine NASA incubators supported 150 tenant companies employing 772 individuals. Those companies had sales revenue of [redacted], raised [redacted] in capital,

and were awarded almost [redacted] in grant funding. With the shift in NASA focus toward "spin-in" collaborations, incubation was deemphasized and NASA Inc. was disbanded.

- Wayne Zeman led the development of OhioTechNet, an internet resource enabling companies and researchers to locate technology, know-how, and specialized facilities available at all major research institutions in northeast Ohio. The consortium members of OhioTechNet include the NASA GRC along with eight area universities and technology development centers.

- LIFT and tenant companies were recipients of numerous awards and recognitions. ChanTest, Inc. and graduate Analiza, Inc. both received BioOhio 2000 Awards; e-merging technologies group (ETG) received two nominations for the E&Y Entrepreneur of the Year Award for 2002; The Edgington Company was honored with the 2003 Emerging Technology Award presented by the Ohio Department of Development; AP Solutions gained a subcontract through participation in the NASA Mentor-Protégé Program with QSS; and a Department of Commerce report entitled "Partners on a Mission: Federal Laboratory Practices Contributing to Economic Development" highlighted NASA GRC and its LIFT program for fostering economic development through a comprehensive program of business incubation, technology and business assistance, education outreach, and workforce development.

- To support our tenants' efforts in securing funding, LIFT sponsored several events to educate and prepare entrepreneurs in making presentations to potential investors and writing proposals for federal grants. Some examples would include:

  A one-day conference on SBIR programs with presenters from LIFT, NASA, and the State of Ohio, providing insights on agency programs, locating suitable solicitations, preparing winning proposals, and understanding the review process.

  LIFT and EDI staff conducted one-on-one coaching sessions to prepare tenants, and potential tenants, for presentations to the Ohio Venture Association, angel investors, and venture capitalists.

  The LIFT/EDI staff created the TechVesting Forum for early-stage companies, a two-session seminar that provided entrepreneurs with information and coaching on effectively presenting their business opportunity. Selected participants then had the opportunity to present their business concepts to angels and venture capitalist investors from seed and early-stage funds in the second session. Over 90 entrepreneurs participated in this program over three offerings.

Since program inception, LIFT has also developed (and strengthened relationships already in place through the EDI network) links with a wide variety of organizations such as the state-wide Edison Centers, other NASA-funded incubators, other Edison Incubators (especially through the Edison Technology Incubators Directors Council), universities (especially Case), the Northeast Ohio Software Association, Cleveland Tomorrow, and the Northeast Ohio Technology Coalition (NorTech).

[redacted]

Final Observations

The LIFT program was quite successful in that it facilitated the startup and growth of 20 high technology companies of which 16 are on-going businesses. Three companies have shown very strong growth and one formed a joint venture with a larger company. Only four companies encountered financial difficulties, with three going out of business and one going dormant. The impact of the LIFT program on the tenant companies is best exemplified in their own words:

> "An unparalleled set of resources that you can't get alone anywhere without expending much time, money and effort. An excellent staff, with a low-key approach; get as deep or as shallow as you want in your business." - Dr. Arnon Chait, President of Analiza
>
> "At the time of our startup, LIFT provided an excellent facility that was a tremendous help financially and great support. The location was accessible to our major customer at a cost a startup could afford." – Dr. Lonnie Reid, President, AP Solutions
>
> "ETG's future success will be forever linked to the supportive LIFT Staff."- Don Heestand, President, e-merging technologies group
>
> "LIFT gave us exposure to a variety of companies to approach with our technology. The name recognition of NASA also helped to open doors and provided a level of credibility for our new company. We benefited greatly from the educational programs in learning how to operate an entrepreneurial business. The LIFT staff was extremely valuable in preparing our company to go out and do business with other companies. Unfortunately, at the time we were in the incubator, there were few funding opportunities available to us but through InnoVest we did receive funding from a major company." - Ralph Edgington, President, The Edgington Company

While the LIFT program had significant impact on the early stage development of its companies from the standpoint of business support and technology infusion, the program fell short on one of its original goals of commercializing NASA-developed technologies. Two companies began operations using NASA-developed software as a basis for their business. One of those companies successfully commercialized the technology and is a growing business. The other company was under-funded and was not able to make progress. Several other companies acquired access to NASA-developed technologies, either through Space Act Agreements or Software Use Agreements, and have experienced limited or no success in their efforts to develop commercially acceptable products.

Metrics

KEY PERFORMANCE MEASUREMENTS
Lewis Incubator for Technology (Warrensville/Strongsville and SEC Sites)
October 1, 2000 through September 30, 2004

TABLE 2.

Client Data Statistics—Warrensville/Strongsville Sites	NCC3-384 9/30/00	NCC3-682 9/30/04
Number of tenants (as of the end of the reporting period)	8	0
Number of graduates	1	11
Total number of jobs created by current tenants	24	--
Total number of jobs created by graduate companies	5	57
New tenant - jobs in existence upon entry to LIFT	3	33
Average months of residency of tenants	22	33.5

Client Data Statistics—NASA SEC Site	NCC3-384 9/30/00	NCC3-682 9/30/04
Number of tenants (as of the end of the reporting period)	3	0
Number of graduates	2	9
Total number of jobs created by current tenants	15	--
Total number of jobs created by graduate companies	0	30
New tenant - jobs in existence upon entry to LIFT	19	24
Average months of residency of tenants	9	25.8

TABLE 3

Business Assistance—Both Sites*	NCC3-384 9/30/00	NCC3-682 9/30/04
Number of incubator educational services*	64	70
Number of attendees (tenants & others)	1,183	1,771
Number of potential tenants assisted	128	172

*Some programs held in conjunction with the Edison Technology Incubator, BioEnterprise and CAMP incubators.

Client Data Sheet

NAME OF THE INCUBATOR LIFT

Lewis Incubator for Technology
Client Profile in Order of Entry Date

9/30/2003

Company Name	Business Type* L / S	Market Stage** pre / post	Technology Oriented Y / N	Female/ Minority	Current Status***	Entry Date	Exit Date	Employment Figures At Entry	Employment Figures Current	Average # of months as tenant	LIFT Location	Technology Description
Graduates												
ECM International Group	S	Pre	Y	Y	0	Dec-02	Jul-03	1	1	9	SEC	Internet software to address regional airport mgmt issues
Zinc Air Power Corporation	S	Pre	Y	N	1	Mar-01	Feb-03	9	0	24	ICI	Develops and markets high performance batteries
CyStorm, Inc.	S	Pre	Y	Y	0	Feb-00	Oct-02	2	2	33	SEC	Internet online brainstorming center
e-Bio-Tech, LLC	S	Pre	Y	N	4	Aug-01	Sep-02	2	1	14	SEC	Manufacture and markets bio-medical products
Rosetta & Cornerstones, LLC	S	Pre	Y	N	1	Oct-01	Apr-02	1	0	6	SEC	Software development for communication/utility industries
Bi-K Corporation	S	Pre	Y	Y	0	Aug-99	Mar-02	1	1	31	ICI/BP	Non-chromate conversion coatings
NovaTek Engineering, Inc.	S	Pre	Y	N	0	Mar-00	Aug-00	3	0	5	SEC	Software simulation development
Arboles Technology, Inc.	S	Pre	Y	N	2	Feb-00	Aug-00	3	3	6	SEC	Designs and develops e-commerce web sites, databases & applications
ChanTest, Inc.	S	Post	Y	Y	0	Jun-99	Mar-01	4	27	21	BP	Drug discovery and drug testing
Kamlee, Inc.	S	Pre	Y	Y	0	Oct-98	Feb-01	2	1	28	BP	Advanced hair care products
Prevention Research Lab (PRL)	S	Pre	Y	N	0	May-98	Nov-00	1	2	30	BP	Medial diagnostics
Cerone, Inc.	S	Pre	Y	Y	0	Apr-98	Jan-01	2	3	33	BP	Advanced ceramics
The Edgington Co. (TEC)	S	Pre	Y	N	0	Aug-97	Mar-01	4	4	43	BP	High performance coatings and polymers
aVanzo Specialty Products(1)	S	Pre	Y	N	0	Jan-03	Sep-04	2	4	21	ICI	Develops specialty materials
Cast Metal Composites(1)	S	Pre	Y	N	0	Mar-01	Sep-04	2	3	43	ICI	Develops high-strength metal composites
SPECMAT*(1)	S	Pre	Y	Y	0	Feb-00	Sep-04	2	3	56	ICI	SIO-based dielectric thin film development
Wave Shield (Rivas Technologies)	S	Pre	Y	Y	0	Oct-00	Jun-04	1	2	45	SEC	Electrically conductive degradable plastics
e-merging technology group	S	Pre	Y	N	0	Jun-00	Sep-04	10	6	49	SEC	Wiresless techology and network security infrastructure
AP Solutions, Inc.	S	Pre	Y	Y	0	May-99	Sep-04	1	15	65	SEC	Computational fluid dynamics solutions
Analiza, Inc.	S	Post	Y	N	0	Apr-97	Jul-00	4	9	39	BP	Biotechnology and medical diagnostics analytical techniques
Totals:								**57**	**87**	**30.0**		

* SPECMAT was a tenant from Feb '00 through Nov '02 and resumed tenancy Jun '03.
(1) Tenants at ICI Location transferred to Edison Technology Incubator in Oct '03

***Business Type Code**

L = Lifestyle business type
S = Scalable business type

NA = Not Applicable

NOTE: If company is non-tech then use NA for Business Type category.

****Market Stage Code**

Pre = Pre-Market stage
Post = Post-Market stage

NA = Not Applicable

NOTE: If company is non-tech then use NA for Market Stage category.

*****Current Status Code**

0 = Operating
1 = FAILED (Zero Numbers)
2 = Merged (Freeze Numbers)
3 = Bought (Freeze Numbers)
4 = Unknown (Zero Numbers after three years)

LIFT Incubator Locations

BP = Original Lab-based Facility 3/97 -3/01
ICI = Lab-based facility after 3/2001
SEC = Software communications and Electronics site at NASA GRC

REPORT DOCUMENTATION PAGE

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1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
11/05/2004	Final	Oct. 2000 - September 2004

4. TITLE AND SUBTITLE

Summary of Research Report
Lewis Incubator for Technology

5a. CONTRACT NUMBER

5b. GRANT NUMBER

NCC3-826

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Zeman, Wayne P.
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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

NASA Glenn Research Center
21000 Brookpark Road
Cleveland, OH 44135

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Publicly available

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This report summarizes the work done to operate the Lewis Incubator for Technology for the period October 2000 through September 2004. The Lewis Incubator helped the startup and growth of technology based businesses with the potential to incorporate technology from the NASA Glenn Research Center.

15. SUBJECT TERMS

Business Incubator, Technology Commercialization, Technology Transfer, Business Startups

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Richard E. Jankura, Jr.
U	U	U	UU	11	19b. TELEPHONE NUMBER *(Include area code)* 216 363-3418