# 2008 Update on Hawaii's Growing Dual-Use Industry

Informational Briefing for the
Senate Committee on Economic
Development and Taxation
April 3, 2008

# Agenda

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|---|---|
| ❖ **Introductions and Purpose.** | Ian |
| ❖ **Recap 2007 Briefing.** | Ian |
| ❖ **Ideas.** Dual Use Report. | Bill & Ian |
| ❖ **Capital.** Venture Capital Report. | Bill & John |
| ❖ **Companies.** The Support Network. | Keith & Tom |
| ❖ **People.** Experiential Education. | Lynn & Alan |
| ❖ **People.** Creative Media. | Chris |
| ❖ **Summary.** | Pat |
| ❖ **Question & Answer** | |

# Recap ’07 - Panelists

- Jennifer Goto-Sabas, Chief of Staff, Senator Daniel K. Inouye
- Jeanne Unemori-Skog, President & CEO, Maui Economic Development Board
- Tom Cooper, Chair, Kauai Economic Development Board
- Jan Sullivan, COO, Oceanit
- Keith Matsumoto, Technical Director, HTDV
- Ed Young, Program Manager HTDV, Enterprise Honolulu
- Dr. Pat Sullivan, Founder & CEO, Hoana Medical
- Larry Lieberman, Communications Director, Referentia Systems
- Monte Littlefield, Founder & CEO, Pipeline Communications
- Dr. Rob Yonover, Founder & CEO, See Rescue Technologies
- Tareq Hoque, Founder & CEO, Concentris Systems
- Ian Kitajima, Dual Use Network

# Recap ’07 - Why Should You Care?





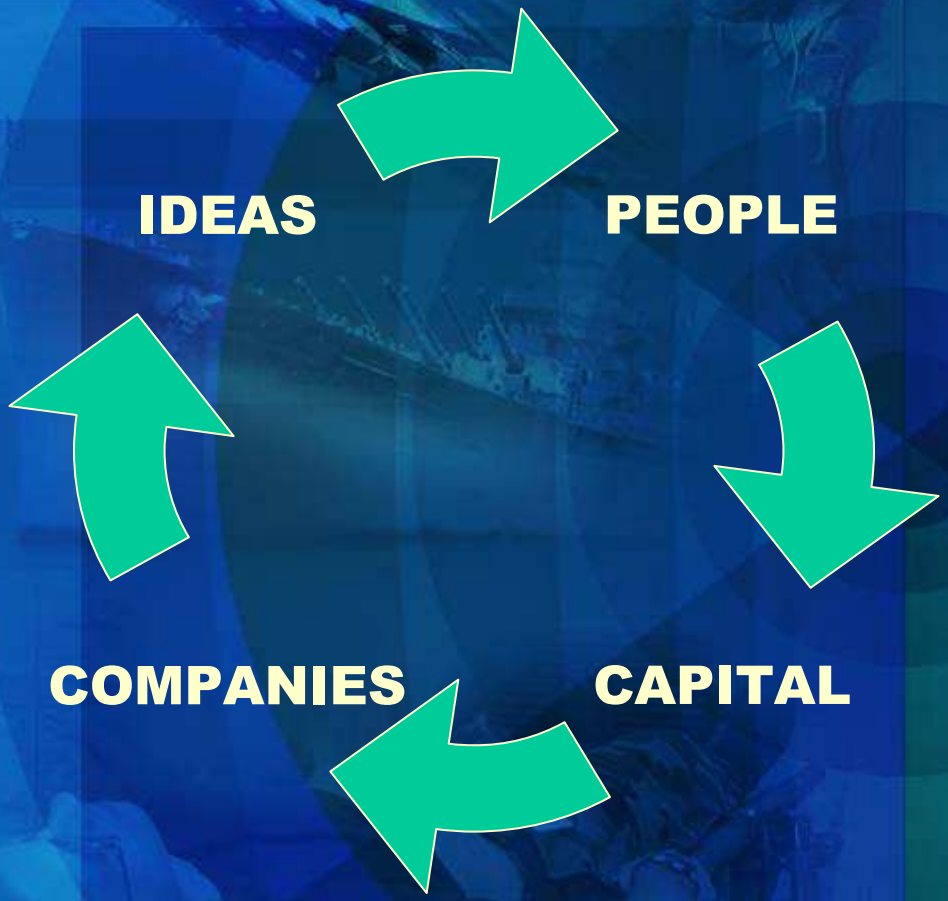

- $4B in the last 10 years in support to Hawaii’s economy
- Fast growing segment of tech
  - ➔ **739% growth in contracts**
  - ➔ **73% growth in grants**
- Rank 24th in SBIR grant funding, from last, with minimum State $s
- Over 100 companies and growing
- Average salary $68K vs. $35K in ’06 (Cyberstates Report ’08)

Sources: HIPA 2005 Policy Review; University of Hawaii OTTED, U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Commerce, Census Bureau; National Science Foundation/Science Resources Study Division; U.S. Bureau of Labor Statistics; Milken Institute; National Venture Capital Association; U.S. Patent & Trademark Of.ce; U.S. Of.ce of Management & Budget; U.S. Small Business Administration.

# Purpose & Panelists

- Purpose: Update to 2007 Dual use Briefing
  - Support for Act 267, SLH 2007: established to supplement federal grants awarded by CEROS and HTDV to Hawaii companies.
- Panelists:
  - Ian Kitajima, Dual Use Network
  - Bill Kaneko, Hawaii Institute for Public Affairs
  - John Chock, Hawaii Strategic Development Corp.
  - Pat Sullivan, Hoana Medical/Oceanit
  - Tom Cooper, Kauai Economic Development Board
  - Keith Matsumoto, HTDV
  - Chris Lee, Academy for Creative Media

# What's Dual Use?




- Dual Use – Refers to technology which has more than one use. Hawaii's dual use companies have used Federal grant funding to develop state-of-the-art technologies.
- Dual Use is **Hawaii's Innovation Industry**
- Innovation industries are driven by **ideas**, **people**, **Capital, & companies**

# World's Most Competitive Economies

1. **Finland**
2. United States
3. Sweden
4. Taiwan
5. Denmark
6. Norway
7. Singapore
8. Switzerland
9. Japan
10. Iceland

DEFINITION: The GCI, or the Growth competitiveness index, is composed of three pillars, all of which are widely accepted as being critical to economic growth: the **quality of the macroeconomic environment**, the state of **a country's public institutions**, and, given the increasing importance of technology in the development process, **a country's technological readiness**. The GCI aims specifically to gauge the ability of the world's economies to achieve sustained economic growth over the medium to long term.

SOURCE: World economic forum – Global Competitiveness Report 2004-2005 via NationMaster.com

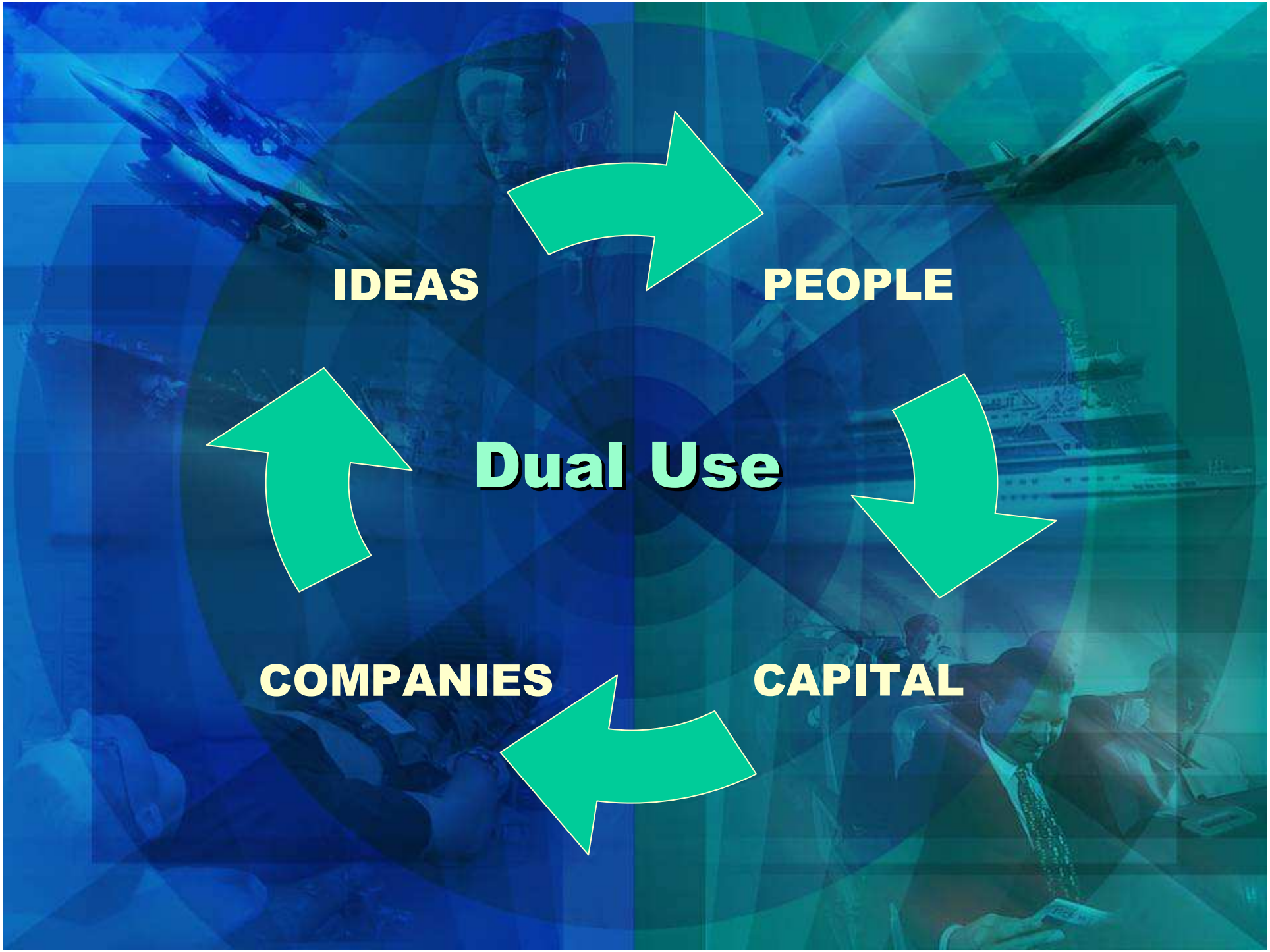
# Drivers of Competitive Economies

- **Growth Competitiveness**
  - ➔ & Innovation, 0.810
- **Innovation**
  - ➔ & Technological Achievement, 0.831
- **Technological Achievement**
  - ➔ & R&D Workforce, 0.816
- **R&D Workforce = <u>Dual Use</u>**

# Cyberstates Report 2008

- Top 5 states for technology job growth
  - ➔ during 2005-06 (6.3%)
- Top 5 states for technology wage growth
  - ➔ since 2001 (11.7%)
- HI's average tech wage in '06: **$68,363** vs. average HI private sector wage of $35,908
  - ➔ California Dreaming: $101K vs $48K
- Added 1,100 tech jobs from 2001-2006
  - ➔ most of the growth in the latter 3 years
- 14,902 tech jobs, 1,387 high tech companies, $1B in payroll in 2006
- **BUT**: Ranked 38 in R&D per capita and 45 in venture capital investment

Cyberstates Report: http://www.aeanet.org/publications/idjj_cyberstates2008_overview.asp


IDEAS
PEOPLE
Dual Use
COMPANIES
CAPITAL

# **Ideas** – Capital – Company - People

**Dual Use General Observations**

- More business assistance, brokering and mentoring needed
- Better coordination and strategic planning required
- Lack of consistent data and measurements
- Better marketing about dual use is essential

# **Ideas** – Capital – Company - People

**Dual Use Sector Plan**

1. Public sector agenda
2. Dual use sector agenda
3. Joint public / private agenda
4. Next steps – from planning to action

# **Ideas** – Capital – Company - People

## 1. Public Sector Agenda

- Infuse science and math into all levels of education
- Encourage private investment e.g., Act 221/215
- Improve Hawaii's image as a business destination and tech brand
- Workforce development and public education
- Other – affordable housing, public education, living wages, quality of life

# **Ideas** – Capital – Company - People

## 2. Dual Use Sector Agenda

- Strengthen the industry association
- Inventory companies, capacities, specialties and other information
- Create a collective business development strategy
- Provide business assistance, brokering and mentoring
- Interact with schools and communities
- Communicate with one voice about the value of dual use

# **Ideas** – Capital – Company - People

## 3. Joint Public / Private Agenda

- Create industry measurements and collect data
- Develop physical infrastructure
- Enhance technology transfer in universities
- Build university-industry training partnerships
- Attract high-skilled former Hawaii residents

# **Ideas** – Capital – Company - People

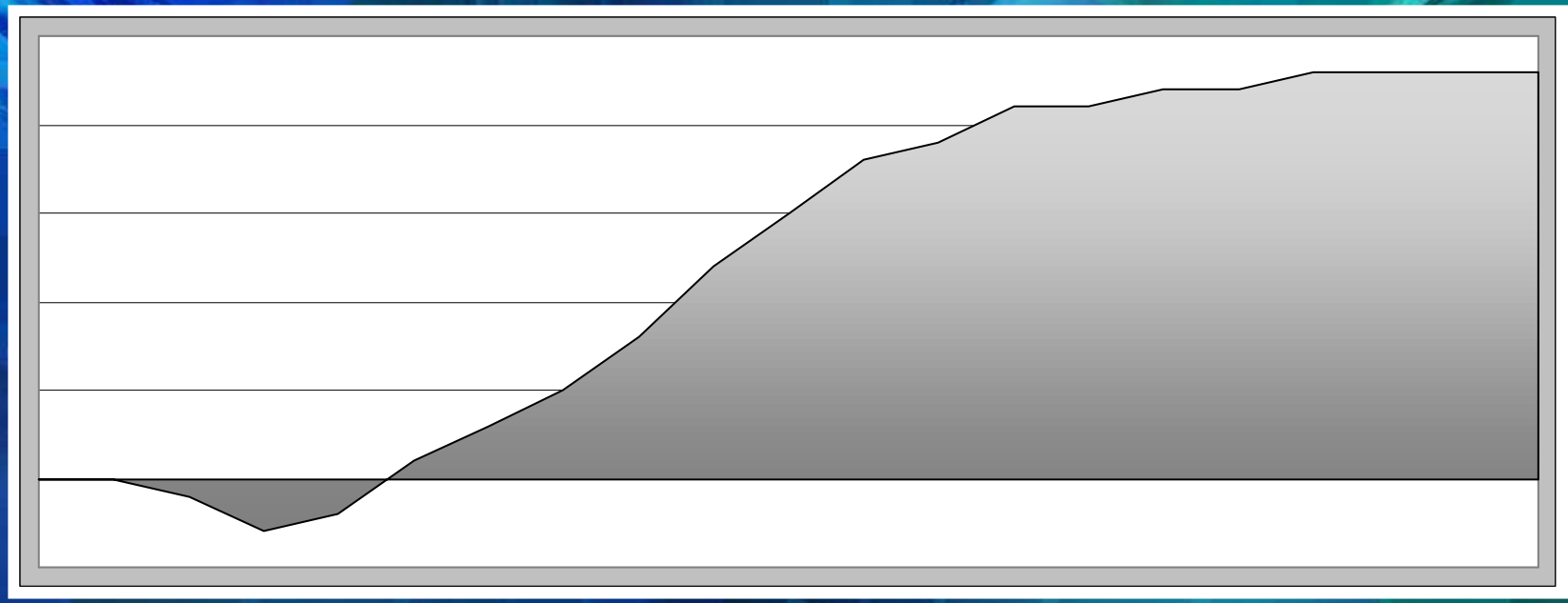
## 4. Next Steps

- Organize
- Develop a five year dual use strategic plan
- Set goals and benchmarks
- Evaluate and measure performance
- Assign roles and responsibilities – public, private and joint agenda
- Tell our story!

# Ideas – **Capital** – Company - People

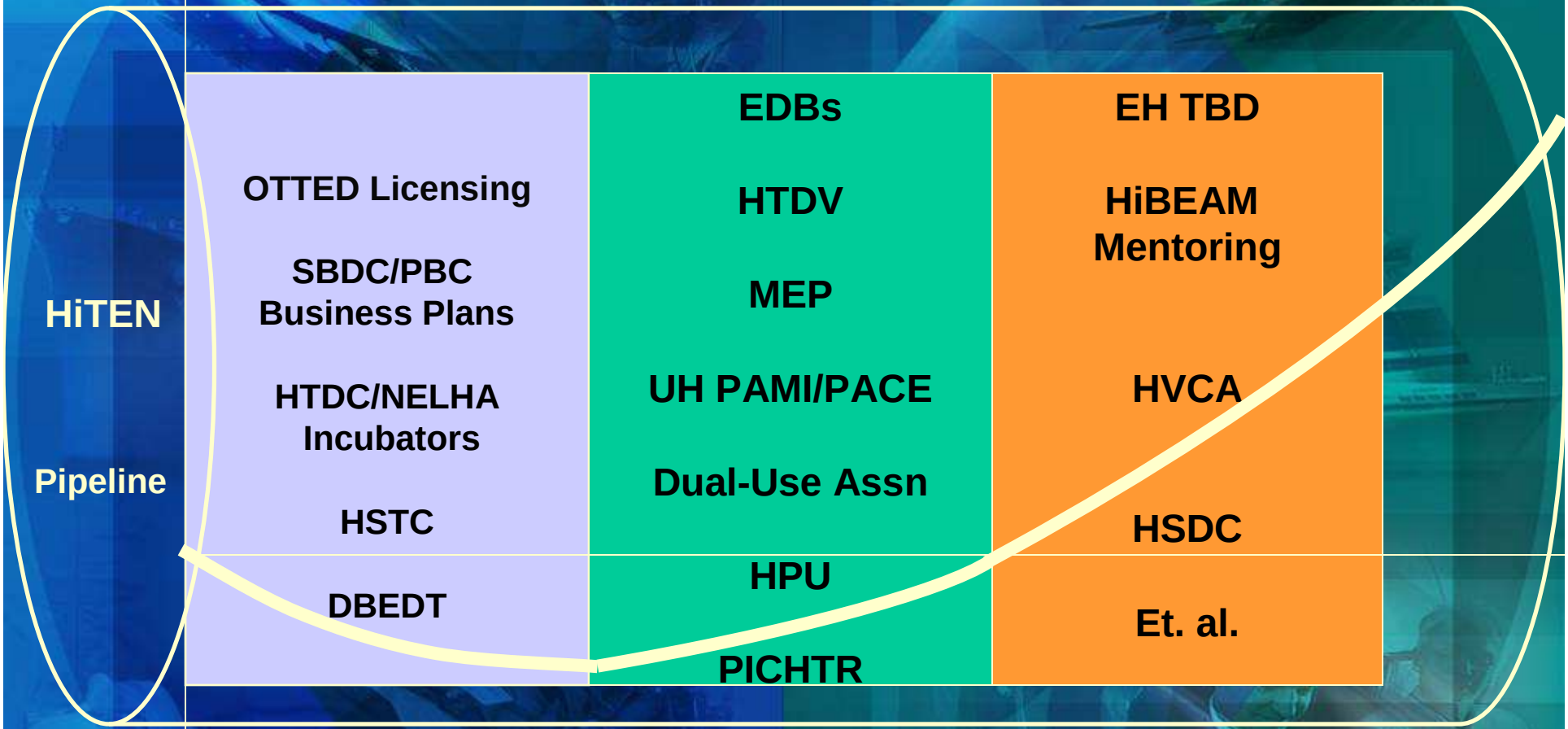
- Venture Capital Report ‘07 Highlights (Bill/John)
  - ➔Is there quality deal flow for institutional investors?
  - ➔Is the amount of capital in balance with the demand?
- Findings
  - ➔VC market developing; entrepreneurship strong
  - ➔High growth in angel investing; post-seed and early stage follow on funding lacking
  - ➔15-30 VC fund managers active, but capital constrained: raising $128 million
  - ➔63 qualified companies seek $147 million over next 3 years

# BUSINESS LIFE CYCLE FINANCING: The J Curve



| STAGE: | SEED | EARLY | GROWTH | LATER | MATURE |
|---|---|---|---|---|---|
| FUNDING SOURCES: | RESEARCH GRANTS<br>CREDIT CARDS<br>FRIENDS, FAMILY | ANGELS | VENTURE CAPITAL | MEZZANINE | IPO<br>BANK DEBT |

# Hawaii Technology Entrepreneurs Network




HSDC

# Ideas – Capital – **Company** - People





- Support Network
  - Mentoring
  - Workshops
  - Recruiting
  - Business Dev
  - Industry Days
- First Wed Gatherings
- Social Website
- Robotics in Hawaii

# Ideas – Capital – Company - **People**

- Changing our schools from the inside out
- Experiential Education (Lynn)
  - First Lego League (Middle School)
  - First (High School)
  - Botball, Rocketry
  - National Awards
- Invite companies to share
  - Tom Cooper of KEDB
  - Alan Hayashi of BAE Systems

# FIRST Robotics Regionals in Hawaii

Stan Sheriff Center. March 27 to 29, 2008

# Insights into Dual Use

- The types and availability of funding determines the outcome
  - ➔ Internal R&D = More Ideas
  - ➔ SBIR Funding = More Small Business R&D
  - ➔ University Funding = More Basic Research
  - ➔ Congressional Earmarks = More Jobs
  - ➔ Private Equity = More Business
- Commercialization requires non-Federal funding
  - ➔ Act 267, Act 215, Corporate R&D, Angels, FFF
- Incubation to commercialization takes years. Various forms of non-federal funding is required

# Insights into Dual Use

- Not all dual use companies can attract or want venture financing. Act 267 is critical for our dual use companies
- Seed funding by Feds and Congressional support ⇨ R&D workforce and innovative technologies ⇨ Competitive Economy
- Long-term supporters of STEM education

# Ideas – Capital – Company - **People**

- Academy for Creative Media - Chris

# Ideas – Capital – Company – People

- Summary - Pat
- Question & Answer

# A Strategic Plan for the Dual-Use Technology Sector in Hawai'i

HIPA
HAWAII INSTITUTE FOR PUBLIC AFFAIRS

**2008 Update**

# A Strategic Plan for the Dual-Use Technology Sector in Hawai'i

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HIPA
HAWAII INSTITUTE FOR PUBLIC AFFAIRS

## About this Report

This report is an update of the draft 2006 Dual Use report prepared by Enterprise Honolulu. The Hawaii Institute for Public Affairs (HIPA) was asked to conduct key stakeholder meetings on the draft Dual Use report, and to obtain feedback and impressions on the draft report findings and recommendations. Over seventy dual use, technology, economic development and business leaders statewide provided their insight and expertise. This report is a compilation of their views and observations on Hawai'i's dual use sector. The HIPA update is sponsored by a grant from High Technology Development Venture.

# Executive Summary

**Dual-use technologies have both military and civilian applications. Because dual-use technologies have military applications, dual-use companies can access the support of the federal government to finance the research and development (R&D) phase of their business ventures. This funding source is of utmost importance for developing a viable technology industry in Hawai'i.**

Dual-use companies deserve attention for two reasons. First, despite the fact that the term "dual-use" is arcane and unknown to many, the potential public benefits of the dual-use sector are in almost every person's vision for Hawai'i: higher paying jobs, diversification of Hawai'i's economy, reduced dependence on land development, successful Hawai'i-based companies, improved education and workforce development, and Hawai'i-generated technological products and services that can improve quality of life for Hawai'i's residents.

Second, the opportunity that dual-use presents for developing a thriving innovation economy in Hawai'i is a rare one-it brings elusive R&D funding from a source outside of Hawai'i. However, Hawai'i's window of opportunity for dual-use is a narrow one and it may be closing. R&D infusions into the local economy, which are primarily appropriations secured by Hawai'i's congressional delegation, will not pour into the State forever. Rather, these funds enable the first steps on the road toward commercially viable Hawai'i-based enterprises.

**For Hawai'i to fully benefit from this opportunity, the public and private sectors must work together toward the common goal of developing successful Hawai'i-based technology companies that provide good-paying jobs to local residents. In particular, the public sector should:**

1. Infuse science and math into all levels of education
2. Encourage private investment
3. Improve Hawai'i's business climate including building a tech brand

**The dual-use sector including intermediary organizations should:**

1. Continue strengthening the industry association and coordinate intermediaries
2. Inventory companies, capacities, specialties, and other information
3. Create a collaborative business development and capture strategy
4. Provide business assistance, brokering, and mentoring
5. Interact with schools and communities
6. Communicate with one voice about the value of dual-use

**Public and private sectors should work together to:**

1. Collect appropriate data
2. Develop physical infrastructure
3. Enhance technology transfer in universities
4. Build university-industry training partnerships
5. Attract high-skilled former Hawai'i residents

▲ Guided by appropriate indicators for success, public and private sectors can usher in a Hawai'i economy that puts greater emphasis human innovation and applied technology.

# Introduction

## Background

At Hawai'i's 2003 TechEnterprise Conference, industry stakeholders participated in a "Business Transformation" simulation to uncover key issues facing the dual-use sector in Hawai'i. This exercise revealed important features about Hawai'i's technology development efforts with regard to business development, business financing, and human resources. Building on this effort in 2005, Enterprise Honolulu, on behalf of the Office of Naval Research and the Hawai'i Technology Development Venture, produced a comprehensive ten-year strategic plan for the dual-use sector, with detailed goals and action steps.

**This report is another step forward in the advancement of this important economic development effort for Hawai'i. The following pages provide an update and refinements to the 2005 plan based primarily on feedback gathered from focus groups consisting of dual-use stakeholders. Specifically, this report tries to address:**

1. The need to better explain the important public benefits that can flow from a successful dual-use sector
2. The urgent need for Hawai'i companies to commercialize technologies and become less reliant on congressional appropriations
3. The need to identify key indicators that will provide outcome measures of success

This report should be of interest to anyone concerned about the future of Hawai'i-its system of education, environmental health, quality of life, and economic future. The dual-use sector is at a critical juncture in Hawai'i, yet it remains too misunderstood by too many people. It is hoped that this report will help accelerate much-needed progress in business development strategies, public policy advances, and public-private partnerships.

## What is Dual-Use Technology?

Dual-use technologies have both military and civilian applications. Dual-use technology companies ("dual-use companies," for short) are technology companies-the same prime movers of an "innovation economy" that has been promoted by Hawai'i policymakers in recent years.

The actual technologies developed by dual-use companies may not differ from those developed by non-dual-use companies. Both types of companies could work on medical devices, vehicles, software, renewable energy technologies, and the like.

The relevant and unique aspect of dual-use technology is its military application. Its primary purpose is to develop technologies that provide for the national security of our country, and to strengthen the capability and safety of the U.S. military. Because of this, dual-use companies can access the support of the federal government to finance the research and development (R&D) phase of the business venture. This funding source is of utmost importance in Hawai'i, which lacks the track record to attract and the capacity to invest significant dollars into R&D. In addition, dual-use companies that make it through the R&D phase have the opportunity to access the military as an ongoing customer.

Money for R&D is the essential initial fuel for converting abstract ideas into practical uses. Therefore, anyone truly interested in developing a technology industry in Hawai'i must appreciate the preciously rare opportunity that dual-use presents for homegrown, new technologies to spawn in Hawai'i.

# The Public Interest in Dual-Use

## Toward Achieving Social Goals

**In a free market system, private interest is sufficient incentive to strive to make an individual business successful. However, governments have always intervened when there is a public interest in the success of a particular business sector. In Hawai'i, government has done much to support agriculture, tourism, and land development. More recently, Hawai'i has begun taking an interest in developing an innovation economy that runs on knowledge, ideas, technology and creative activity. This current emphasis is well-placed.**

Throughout this report are stories of a just a few of the roughly 100 dual-use companies in Hawai'i. From these stories, one can grasp the diversity in the sector and the real ways that they are forging both private and public value. A commercially sustainable technology sector in Hawai'i can directly serve six important social goals:

### 1. Good Jobs

The people of Hawai'i are working hard. It has had the lowest unemployment rate in the country[1] and also has a high percentage of people with multiple jobs.[2] And yet, a recent study by the Aloha United Way and the University of Hawai'i (UH) Center on the Family found that one-third of households in Hawai'i make less than a self-sufficient income, meaning that one-third of Hawai'i families are dependent on government, charity, and others to make ends meet.[3] Part of the problem is an abundance of low-wage, low-skill jobs primarily in the service sector-23 of the 25 most common jobs in Hawai'i fail to pay a living wage for a family with two children.[4]

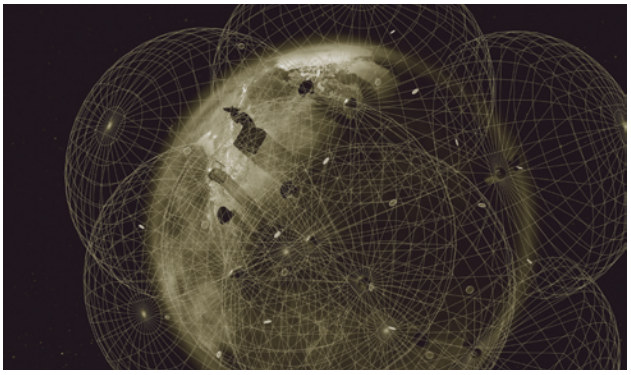
The solution is more high paying jobs. Jobs in Hawai'i's technology sector pay an average of $57,458 per year.[5] Currently, technology jobs account for 3.2% of all jobs in Hawai'i.[6] Public attention to developing this sector can increase the number of these good paying jobs and ensure that they will be around into the future. In 2005, the federal government invested $323 million to 63 research, development, test and evaluation (REDT) activities in Hawaii. Over the past decade, the over $10 billion in REDT projects were funded in the state.

### 2. Economic Diversification

Hawai'i has one of the least diversified economies in the country.[7] Concentration in a few industries leaves Hawai'i and its workers vulnerable to economic shocks and cyclical downturns in the visitor industry and construction.

Lack of diversification also limits the array of jobs available to the next generation in Hawai'i. This is of particular concern for the neighbor islands where job opportunities outside of the visitor industry are severely limited. For many high-skilled people in Hawai'i, leaving Hawai'i is often the only way one can find a job in her or his area of expertise and interest.

Tourism, construction, and service industries will likely always have an important place in Hawai'i. Hawai'i need not set its sights on becoming a tech-dominated economy. Rather, if Hawai'i can aggressively establish a sustainable and significant technology industry, it can change its mix of jobs to ensure that there are enough places for Hawai'i's own highly skilled students to work, and it can be more resilient against economic downturns.



# The Public Interest in Dual-Use (Continued)

### 3. Better Education

Today's economy in Hawai'i is laden with low-wage and low-skill jobs. While these jobs are honorable, they are increasingly insufficient to support the needs of Hawai'i's families. The system of education must aim to prepare people for the jobs desired in 10-15 years, when today's children will be working adults. This concept is easy to grasp but implementation can be elusive.

Improving education in Hawai'i is not just the province of the Department of Education and the University of Hawai'i. The creation of more local jobs that demand higher levels of knowledge and the willingness of industry to work collaboratively with educational institutions can positively shape the educational system. Perhaps more than any other industry in Hawai'i, technology companies have an enormous stake in improving educational results at all levels-particularly, though not exclusively, with regard to science and math. The system of education needs to aim for the jobs of tomorrow; the jobs of tomorrow need a strong system of education. This combination creates a powerful environment for school improvements on small and large scales, and it is why a public commitment to the technology sector is simultaneously a commitment to improving education.

### 4. Smaller Footprints

In her 2007 State of the State address, Governor Linda Lingle announced a policy shift away from dependence on land development as the basis for economic growth.[8] Many have viewed Hawai'i's land-focused economic activity as unsustainable due to increasingly adverse environmental and social consequences.

If a viable technology industry can emerge, Hawai'i will be able to generate jobs and wealth from activity that is primarily reliant on human intelligence and creativity. The products and services created in the technology sector generally will have smaller ecological impacts and land area needs than other economic activities. Technological activities do require adequate infrastructure — most notably, reliable energy sources and telecommunications networks — but they generally produce less additional strain on other traditional aspects of public infrastructure such as water, roads, and sewers.

**Dual Use Stories**

**Technology: Innovative hull forms for ocean vessels**

**Navatek**

Founded in 1979 by a Kaimuki High School graduate who returned to Hawai'i after graduating from a mainland university. Privately-owned subsidiary of Pacific Marine — a local company founded in 1944. Navatek was the largest initial private commercial user of the Maui Supercomputer. It has developed boats for touring, ferries, and at the request of the military. It is currently embarking on designing unmanned vessels and wave energy conversion devices to make electricity.

"It's possible, and local people can do it."
**Michael Schmicker, VP**

# The Public Interest in Dual-Use (Continued)

## 5. Locally-Generated Wealth

The median net worth of Hawai'i households is quite high among the states.[9] However, much of Hawai'i's wealth is due to exceedingly high home values, rather than high rates of savings, investments, and business ownership. As important as the creation of local jobs is the creation of local wealth. Wealth can catalyze new economic activity as well as fund charitable community investment.

Technology presents an opportunity for local entrepreneurs to build local wealth. Hawai'i-owned technology companies can access global markets, while still maintaining a local presence. Inevitably, some companies will be sold to non-Hawai'i entities, and some entrepreneurs will take their wealth outside of Hawai'i. However, early technology companies have thus far exhibited considerable loyalty to Hawai'i (indeed, outside of state tax incentives, few would choose Hawai'i as the place to start a technology company were it not for an affinity to the place and people, or the need for proximity to a unique Hawai'i asset). Furthermore, the emergence of the Entrepreneur's Foundation of Hawai'i is evidence that, even in its nascence, the technology sector has a propensity for reinvesting in Hawai'i and its communities.

## 6. Beneficial Products and Services

Because they have the financial support of the military, dual-use technologies are sometimes narrowly perceived to be products used only for offensive military purposes. To the contrary, many dual-use technologies have to do with saving lives, improving communications, and making operations more efficient.

As the name "dual-use" implies, these products and services also have peaceful uses, which not unlike other technologies, can improve the lives of regular civilians. Applied technologies can benefit individuals directly or indirectly through healthcare facilities, law enforcement, emergency responders, public utilities, and other service entities. Dual-use technologies can clean the environment, improve energy efficiency, cure diseases, improve transportation, and do many other things that improve quality of life. Hawai'i residents and institutions are often the first to benefit from locally generated technologies, both as the initial testing grounds and as a proximate and convenient marketplace.

**Dual Use Stories**

**Technology: RescueStreamer® to help find people who are lost or stranded**

**Rescue Technologies Corporation**
Founded by a University of Hawai'i graduate. Product sold to all branches of the military and licensed to companies in Hawai'i. So far, saved two military lives in Afghanistan and Iraq, and two civilian lives in Hawai'i.

"Our kids need to know that its possible for them to come up with ideas and that it's possible to go to the next level."
**Rob Yonover, CEO**

# The Public Interest in Dual-Use (Continued)

## Why Dual-Use? Opportunity and Urgency

**A strong case can be made to make public investments in the tech industry, but why should Hawai'i pay particular attention to the dual-use sector? There are three basic reasons:**

- First, dual-use is Hawai'i's unique opportunity to be innovative. While there are other ways technology companies can get started (and these are certainly worthy of attention), the prospects for utilizing large amounts of federal money to do the expensive and financially risky R&D work to create original technology is too good for the state to ignore. Dual-use may simply be the most practical, present business opportunity for innovation in Hawai'i.

- Second, dual-use is a unique process with particular needs. Moving from dual-use startup to a sustainable dual-use business is not the same as other business startups. Relationships with military institutions and dealing with different funding vehicles requires a different set of support structures to help businesses become successful.

- Third, the window of opportunity for dual use is closing. Prospects for a strong dual-use sector are good-Hawai'i has a significant number of promising dual-use ventures, it has military facilities in its borders, and there is much potential for future government contracts. However, this opportunity may be fleeting. About 80% of all Department of Defense (DoD) spending in Hawai'i is the result of congressional appropriations thanks to the substantial clout and hard work of Hawai'i's Congressional delegation. Should this momentum be interrupted, the supply of R&D dollars could dry up. If companies have not yet commercialized their technologies, the benefits of the initial investments may come to an end.

When Hawai'i's leaders speak of the creation of a sustainable innovation economy, they may knowingly or unknowingly be emphasizing the creation of a sustainable dual-use sector. One might even say that development of a tech industry in Hawai'i hinges on taking full advantage of the opportunity presented by dual-use.

Competition among the states to gain a foothold in the technology arena is particularly fierce, and for good reason. Most jurisdictions realize that a strong tech industry can secure good jobs and increase prosperity for future generations. The time for government and the dual-use sector to monitor, plan for, and invest in the long-term sustainability of dual-use companies is *now*. The plan outlined in this document is Hawai'i's plan to reap the public benefits of this rare and fleeting opportunity.

# The Status of Dual-Use

## The Need For Measurements

**The amount that something is valued should be reflected in how much it is measured. In the case of the dual-use sector, Hawai'i is falling far short in measuring the important indicators that can help shape policy, evaluate results, and direct public and private investments.**

Since the TechEnterprise simulation in 2003, it seems that the dual-use sector has taken many positive strides: Companies that remain are more experienced, contract revenues are up, grant revenues are up, and sector participants are more organized. One might assume that positive real outcomes are being produced. Yet we lack the consistent measures to know for sure.

This section contains a list of measures that could form the basis of future, regular reports on the status of the dual-use sector. Good indicators will tell the dual-use sector and its stakeholders something about important outcomes and essential inputs which can be used to set goals and benchmarks.

One will immediately notice that many of the indicators listed are not yet measured, or if they are, they are not measured with the frequency, consistency, or specificity needed to have an accurate and timely snapshot to inform actions. This overarching and critical need will be discussed later.

The indicators are divided into two categories-inputs and outputs. Understanding this simple model for how strong companies and good jobs can be created in Hawai'i allows for a more targeted approach to public policy and business activities.

In the case of dual-use companies, essential measurable inputs are primarily human and financial. That is, companies must have workers with the education and training needed to build good products and strong companies; and, they must have the financial resources required to invest in research, development, and growth. Key outputs for the dual-use sector include standard measures of sector growth like jobs, companies, and gross revenues. Because the dual-use sector strives to become commercially sustainable and to make a contribution to local economic development, measures like the number of living wage jobs and commercial revenue (versus revenue from grants, investments, or congressional earmarks), are also important.

**INPUTS (education, investment)**

- **Student proficiency in math**
- **Science and engineering students**
- **Scientists and engineers in the workforce**
- **Academic R&D**
- **Federal Dept. of Defense R&D**
- **Private investment in R&D**
- **Venture capital investment**

**OUTPUTS (companies, revenues, jobs)**

- **Number of dual-use companies**
- **Jobs in dual-use companies**
- **Living wage jobs in dual-use companies**
- **Total revenue of dual-use companies**
- **Commercial dual-use revenue**

Periodic examination of broader economic impacts such as the impact on physical infrastructure, fiscal impacts (such as tax revenues generated), business visitors attracted, and environmental impacts, might also be assessed, although these would likely require study beyond data that can be regularly and easily collected. Finally, anecdotal information is also important to tell the story of the dual-use sector and ensure the public accurately perceives the impact of dual-use companies and their technologies.

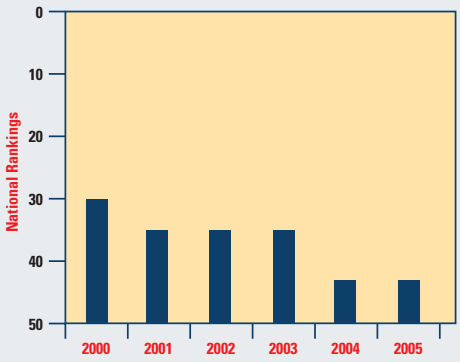
# The Status of Dual-Use (Continued)

## Student Proficiency in Math

### Trend and Ranking on NAEP 4th Grade Math Scores

**Source:** U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. National Assessment of Educational Progress (NAEP); CFED Development Report Card for the States, 2000-2007

The National Assessment of Educational Progress (NAEP) measures students' proficiency in vital skills such as reading and math. Like all standardized tests the NAEP is not a perfect measure of skills, but it is widely respected and is the only measure of student performance used uniformly across the country. Hawai'i continues to fare poorly with only 27% of 4th graders at or above the "Proficient" level. Hawai'i's national ranking remains at 43rd for the second consecutive year. 8th grade math scores were worse with only 18% at or above "Proficient" leaving Hawai'i near the bottom of all states.

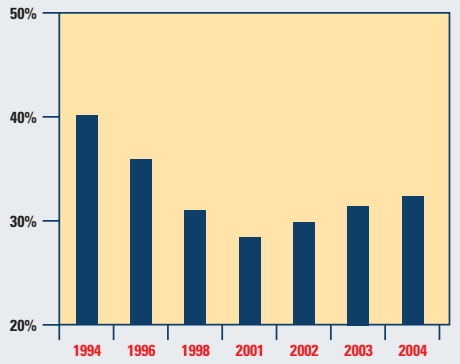



## Science and Engineering Students

### Trend and ranking, science and engineering graduate students as a percentage of all workers

**Source:** National Science Foundation, Science & Engineering Profiles

This measure does not tell us how many degreed recipients actually stay within the state or how many scientists and engineers are attracted from out-of-state. Still, it is a useful indicator of Hawai'i's science and engineering "pipeline." Hawai'i ranks in the middle of the states. The National Science Foundation began counting students in health fields along with science and engineering students in 2003 which may be the cause of the upward trend. In any case, Hawai'i has been maintaining a fairly constant level and has remained in the middle of the pack among states for many years.



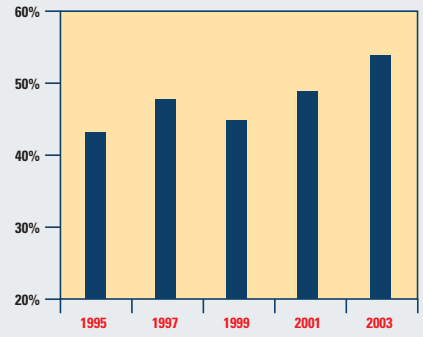
# The Status of Dual-Use (Continued)

## Scientists and Engineers in the Workforce

### Trend and ranking, doctoral scientists and engineers as a percentage of total workforce

**Source:** National Science Foundation, Science & Engineering Profiles

Scientists and engineers are a critical part of the human capital that enables dual-use companies to grow and thrive. They enhance the innovative capacity of firms, fostering the development of high-tech businesses and encouraging the proliferation of innovation across all industries. Hawai'i has steadily had a fairly high proportion of scientists and engineers in its workforce compared to other states and its trend line is moving in the right direction.

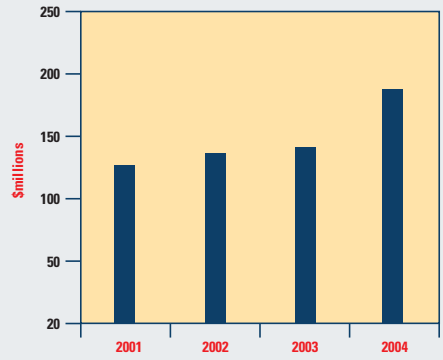



## Academic R&D

### Trend and ranking, research and development expenditures at universities and colleges, dollars per capita

**Source:** National Science Foundation, National Patterns of R&D Resources

This measure looks at research and development spending at state universities and colleges. It suggests the capacity for in-state universities to generate technology-related business development. Hawai'i has traditionally fared well compared to other states and continues to do so, ranking in the top quartile. However, Hawai'i has struggled at commercializing university research (Hawai'i is in the bottom third of states for licensing and royalty income from university research), but this indicator suggests a good potential for improvement.

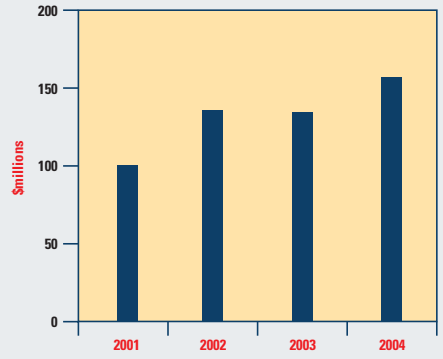



## Federal Department of Defense R&D

### Trend and ranking, federal obligations for research and development, dollars per capita

**Source:** National Science Foundation, National Patterns of R&D Resources

Federal research and development spending by the Department of Defense is the fuel for the dual-use sector and should lead to new business spin-offs. Hawai'i fares quite well in its ability to obtain these dollars, usually ranking in the top third among the states. For Hawai'i, this indicates a tremendous, present opportunity for the development of new products and services.



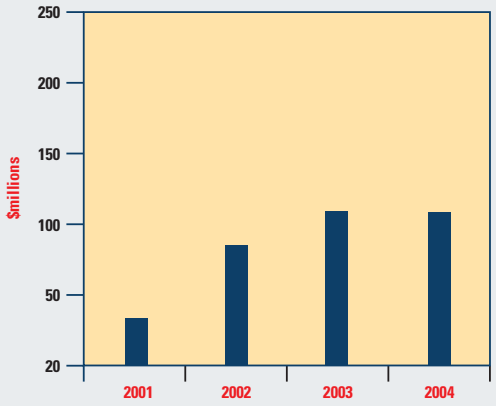
# The Status of Dual-Use (Continued)

## Private Investment in R&D

### Trend and ranking, private research and development per capita

**Source:** National Science Foundation, National Patterns of R&D Resources

Business investment in research and development generates product innovations and expands the knowledge base of industries. Industries differ widely in the extent to which they depend on R&D (e.g., pharmaceuticals is R&D intensive, tourism is not), and a state's ranking will depend largely upon its industry mix. This measure primarily reflects large corporate operations that regularly invest in R&D. Hawai'i consistently ranks poorly on this measure, gaining only incrementally between 1995 and 2000. Improvements in this measure would be a sign of increased confidence in Hawai'i's technology companies-a critical factor for the long-term sustainability of the innovation industry.



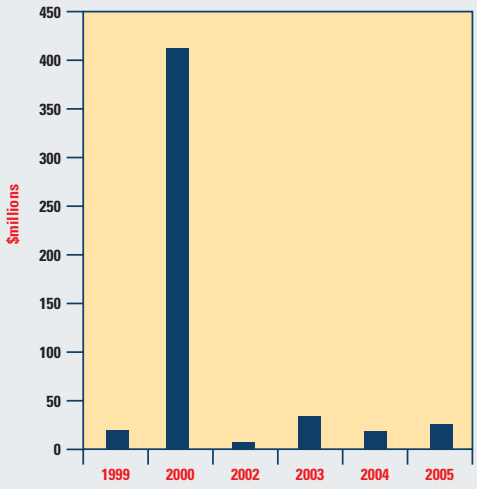

## Venture Capital Investment

### Trend and ranking, venture capital investment dollars per worker

**Source:** CFED Development Report Card for the States, 2000-2007

Access to startup or expansion financing fuels the growth of firms that drive the New Economy and indicates the extent to which venture capitalists view a state's entrepreneurs as worthy of investment. Venture capital deals vary wildly from year to year and it is sometimes difficult to see a trend line. Also, although the venture capital industry has grown sharply in recent years, it is still rather small and focused in only a handful of states.

Hawai'i traditionally fared poorly in this area when looking at VC deals as a function of gross state product. CFED chooses to compare states by workforce which may be a more appropriate measure. Looking at venture capital in this way, Hawai'i fares reasonably well compared to other states, although there is room for improvement.



# The Status of Dual-Use (Continued)

## Sector Outcome Measures

**Because the data on the dual-use sector span several industries (as officially classified by the North American Industry Classification System), it is difficult to use federal data sets to track things like job counts, wages, revenues, or firms.**

**Instead, an investment must be made in the collection of local data that is sufficiently detailed to allow for categorization of company-specific data into new industry and cluster groupings, including grouping according to dual-use definitions.**

### Number of Dual-Use Companies

**Trend, number of dual-use companies in Hawai'i**

**Source:** Not currently available

The raw number of dual-use companies and its trend line would reveal the degree to which people are venturing into the arena of government R&D and government contracting. As support for the sector increases and its profile is raised, one would expect this indicator to rise.

***In 2005, Enterprise Honolulu reported that there were 82 private companies in the defense and dual use sector. With a consistent way of identifying a dual-use company and dedicated resources for regular counting, this trend line should be fairly easy to capture.***

### Total Jobs in Dual-Use Companies

**Trend, number of jobs in dual use companies in Hawai'i**

**Source:** Not currently available

Job count is an excellent measure of growth in an economic sector. It signifies the level of business activity, prospects for future growth, and the public impact of a sector.

***In 2005, Enterprise Honolulu reported that there were 3,800 workers in defense and dual use sector private companies.***

# The Status of Dual-Use (Continued)

## Living Wage Jobs in Dual-Use Companies

**Trend, comparison to statewide figure, percentage of living wage jobs in dual-use companies**

**Source:** Not currently available

To make the case for public investment in the dual-use sector, the sector must be able to show that they are creating good jobs and many of them. One way to define a "good job" is that it pays more than it takes to minimally survive in Hawai'i-this is often called a living wage.

***The average wage in Hawai'i's technology sector in 2005 was $57,458 according to DBEDT. This is more than the living wage for a family with two children, estimated at about $54,000 by the UH Center on the Family.***

***To track this indicator, three things must happen:***

1. *Hawai'i must consistently track a meaningful living wage (UH CoF used the "self-sufficiency standard");*
2. *Dual-Use companies must be identified;*
3. *Dual-Use companies must report on job counts and wage levels.*

## Total Revenue of Dual-Use Companies

**Trend, total revenue of dual-use companies in Hawai'i**

**Source:** Not currently available

Total revenues measured and tracked on an annual basis, like job counts, suggest the degree to which dual-use companies are growing.

***There is no measure of annual revenues of dual-use companies. Enterprise Honolulu did report, in 2005, that DoD funding for research and development in Hawai'i was about $557M in 2004, and $4B combined over the ten-year span from 1995 to 2004.***

## Commercial Dual-Use Revenue

**Trend, commercial revenue as % of total**

**Source:** Not currently available

This indicator is critical for assessing the degree to which the sector as a whole is moving away from congressional appropriations and grants and toward commercial income-signs of a maturing and more viable sector.

***There is no measure of annual revenue mix for dual-use companies. Dual-use companies must first be identified and then surveyed. This should be done on a regular basis.***

# A Dual-Use Sector Plan for Hawai'i

## Plan Overview

**The dual-use strategic plan developed in 2005 provides a detailed list of action steps, with suggestions for lead agencies, and a rough timeline. Since then, progress has been made toward many of the strategic goals, and much of the detailed analysis and ideas contained in that plan are still useful today.**

This document reemphasizes the priorities of 2005 and attempts to more clearly delineate the important role of the public sector in pursuing its ultimate economic development goals.

If Hawai'i is to establish a viable technology industry, it must address a number of key challenges including improving education, developing private investment, improving Hawai'i's business climate, providing adequate business development assistance for new and developing companies, and working with the public to better understand economic development issues. Any one of these challenges can undermine the development of a publicly beneficial tech industry in Hawai'i. Dealing with these challenges is not just the province of government nor is it solely up to the private sector. Rather, there are unique roles for both, including opportunities for public and private sectors to work in tandem.

## Public Sector Agenda

**Government's ability to take broad public actions, its regulatory and taxation powers, and its access to public resources give it the most power to improve public education, create incentives for private investment, and improve Hawai'i's business climate. While government needs the private sector to participate, advise, and assist along the way, ultimate accountability for these tasks rests with government and its ability to effectively craft and execute appropriate policies and initiatives.**

### 1. Infuse science and math into all levels of education

If Hawai'i is to move toward an economy based on human knowledge and innovation, then schools, colleges and universities must increase the degree to which it nurtures its innovation talent.

Recent passage of so-called STEM (science, technology, engineering and math) legislation is a good beginning. Over $4 million was appropriated for 2008 and 2009 for a number of STEM related initiatives and projects including efforts to train middle school teachers and the development of STEM academies in conjunction with the University of Hawai'i's College of Engineering. Still, this size of investment is hardly enough to alter the trajectory of the school and university systems. Proof of the effectiveness of this and future measures should eventually show up in math proficiency scores and the number of students who choose STEM pathways in college and beyond.

# A Dual-Use Sector Plan for Hawai'i (Continued)

## 2. Encourage private investment

Public incentives and activities to boost private investment have met up with some resistance. The high-tech investment tax credits which have come to be known as Act 221-215 (Act 215 being the number of the current law) have generated controversy. Hawai'i's State Private Investment Fund (SPIF), which would be a tool to stimulate local venture capital, was established but never funded. And an effort in 2007 to devote up to $100 million from the Hawai'i Employee's Retirement System for local venture capital investment was stopped.

**Dual Use Stories**

**Technology: Hoana's PSA™ technology accurately measures basic physiology (e.g. heart rate, respiration) passively, without the use of electrodes, leads, cuffs or canula**

**Hoana Medical**

Hoana was founded in late 2001 as a spin-off of Oceanit Laboratories. Hoana's technology sprang from early development work at Oceanit, funded by grants from the US military to develop a Medevac ambulatory monitoring platform. Since 2001, Hoana has raised $40 million in private equity. They currently have 50 employees.

"Hawai'i is an incredible environment for innovation. The missing piece is execution. With people and capital it's going to change."
**Pat Sullivan, President and CEO**

**Some believe that these efforts are unnecessary because the free market should provide adequate investment if business ideas are sound. However, these critics may fail to grasp two key issues:**

1) Investment in high tech companies, particularly in the early development stages, requires a certain kind of capacity, risk comfort, and experience. If Hawai'i cannot gain the attention and eventually the confidence of these investors, very little local innovation activity can take place. Building this unique capital market for technology is a pre-requisite, just as airports are for a viable visitor industry.

2) There is a fiercely competitive battle between jurisdictions to attract investors in high-tech sectors because others' know how important tech is to future economic prosperity. The playing field for attracting tech investment is not a level one. Each jurisdiction must determine its best strategy to find a competitive advantage.

Furthermore, in the case of dual-use companies, adequate private investment is essential to building the right incentives for companies to be commercially viable. As one dual-use stakeholder put it, private investors have the right incentives to help companies become profitable, unlike the federal government which really only cares about getting the end product.

Despite its imperfections, which most agree should be fixed, Act 215 has led to the emergence of a local capital market for technology. It has provided local and external investors with an option other than real estate or other traditional kinds of Hawai'i investments. And Act 215 investments have been critical to the survival of many smaller Hawai'i companies. This government support need not last forever. Once goals for private investment and sustainable companies in Hawai'i are met (goals must first be set), government incentives can fade away.

# A Dual-Use Sector Plan for Hawai'i (Continued)

### 3. Improve Hawai'i's business climate including building a tech brand

Whether based in fact or myth, Hawai'i's reputation for business has been a poor one. This general notion of "business climate" is a function of many factors including taxes, regulatory environment, business resources, quality of life measures, and other elements. Another important factor is how the place is branded and how it is consequently perceived.

Hawai'i has spent considerable public resources branding itself as a vacation destination. This has helped sustain a strong visitor industry for decades. However, it has often been counter-productive for other local industries to gain sufficient traction. Hawai'i will never be branded like Silicon Valley or Research Triangle Park; it would be foolish to try. However, Hawai'i can do more to broaden its image and better coordinate the collective messages that emanate from its activities. There are ways to think of Hawai'i's traditional industries-tourism, military, construction, agriculture-as complementing rather than competing with a new tech industry. However, leadership in this arena has not yet emerged. While private resources and advice can help, only government has the coordinating power to change the image of its entire jurisdiction.

## Dual-Use Sector Agenda

**As one stakeholder put it, dual-use companies know you can't get rich on DoD contracts to do R&D. The dual-use sector has all the incentives it needs to improve its prospects for long-term commercial success. The following is a list of items over which the private sector must assume leadership. Many of these activities could certainly benefit from appropriate public funding, but the expertise and ultimate control over these efforts are with the companies themselves and the intermediary organizations that support them. In brief, the dual-use sector needs to be efficient and coordinated, it needs to get good at the dual-use business development game, produce measurable results, and justify public investments it gets from the people of Hawai'i.**

### 1. Continue strengthening the industry association and coordinate intermediaries

By all accounts, the emergence of the Dual-Use Council — with its regular breakfast meetings, information sharing, problem solving, and joint advocacy — has provided a tremendous lift to the dual-use sector. Its role should continue to develop and grow.

A number of local organizations might be deemed "intermediaries" with an interest in the development of a technology. Among them are the Hawai'i Technology Development Venture (HTDV), the Hawai'i Science & Technology Council (HSTC), the Hawai'i Technology Development Corporation (HTDC), the Economic Development Alliance of Hawai'i (EDAH), the county-level economic development boards (MEDB, KEDB, HIEDB, and Enterprise Honolulu), Hawai'i business and Entrepreneur Acceleration Mentors (HiBEAM), and the Hawai'i Venture Capital Association (HVCA). Each may have a unique niche or approach, but there is also overlap in efforts. Duplication of effort and even competition is not a problem per se, but in an industry at such a critical stage, the more coordination of efforts the better. Unlike the companies themselves, intermediaries have the time, expertise, networks, and capacity to take on key roles in the development of the tech industry. Activities might include: data collection; brokering relationships between companies, government agencies and investors; bringing experts to Hawai'i; advocating for public policy changes; conducting research; and providing other support services for companies in various stages of development.

# A Dual-Use Sector Plan for Hawai'i (Continued)

### 2. Inventory companies, capacities, specialties, other information

No current, continuously updated catalog of the capacity, location and people in charge of the dual-use companies in Hawai'i exists. Such an inventory would have obvious benefits for data collection, but there are also financial benefits.

Recently, the DoD started categorizing their technology problems more clearly, and they are presenting these sector-by-sector, service branch-by-service branch, and technology category-by-technology category. In other words, searching for opportunities has become more refined and direct. Knowing more about Hawai'i's own players could help coordinate activities and improve success as accessing funds. A catalog will also help large companies find small companies that can help them.

### 3. Create a collaborative business development and capture strategy

One of the biggest issues for smaller dual-use companies is the lack of access to key government agencies, investors, and other players. Keeping abreast of opportunities, developing relationships, and gaining name recognition takes significant time and money that many small companies do not have. But lack of a consistent presence severely limits the ability of Hawai'i companies to leverage R&D funds.

A collaborative business development and capture strategy that makes efficient use of people's time and marketing efforts, avoids duplicative efforts, and ensures systematic and consistent exposure to the right stakeholders could increase the ability for local firms to obtain government contracts and subcontracts. A joint business development office in the Washington, D.C. area, where key federal agencies are situated, could increase the ability of local firms to obtain government contacts and subcontracts. It could form important relationships with contracting agencies, and help introduce Hawai'i companies to key contacts.

### 4. Provide business assistance, brokering, mentoring

Perhaps the most important and involved role for the private sector-a role particularly though not exclusively suited to intermediaries-is to help companies move from one development stage to the next until they become sustainable. For some, this process requires hands-on, almost daily interaction between companies and experts. In technology, where Hawai'i has little reputation and is in many ways just getting started, this task is critical.

**Dual Use Stories**

**Technology: Animated training products**

**Referentia**

Headquartered in Honolulu, Referentia is an award-winning provider of C4I (Command, Control, Communications, Computers, and Intelligence) Systems, Advanced Technology Solutions, and Information Technology & Services. Referentia maintains staff across the country and overseas, providing world-class technology, science and engineering expertise to help government and corporate customers solve complex and critical problems. In 2001, it had 7 employees. Today there are over 80 employees, 75% of which are in engineering or technical positions. It has internship programs, workforce development initiatives, and opportunities for Hawai'i residents to return home.

*Lockheed Martin recently signed a three-year mentor-protégé agreement with Referentia to advance its business development.

"The mentor-protégé program is a tremendous opportunity for our company and the state of Hawai'i."
**Nelson Kanemoto, President & CEO**

# A Dual-Use Sector Plan for Hawai'i (Continued)

**Some of the primary areas where new companies need help include:**

- Fulfilling the expectations associated with DoD funding
- Moving from R&D activities to downstream production, prototyping, and management (where the bigger DoD contracts are)
- Moving from congressional appropriations and earmarks to accessing other sources of funding including grants, government contracts, different forms of investment, and eventually, commercial revenue
- Learning to get into Programs of Record or accessing SBIR II or III programs
- Overcoming fears and learning how to contact and partner with the large military contractors (the "primes").
- Learning how to sell "potential" to venture capitalists
- Taking commercial products and services into global markets
- Finding talented workers

One result of this business support and mentoring is a stronger sense of solidarity within the industry. Already, there is evidence of a strong alliance of companies and intermediaries, many of which share a common vision for and loyalty to Hawai'i.

## 5. Interact with schools and communities

Many dual-use companies have invested time and money in educational and community activities. Many companies hire local interns at the high school, college, or graduate levels. Some go into schools to talk about careers in technology or to participate in STEM projects and activities. These activities should continue to grow.

Besides the benefits to the students touched by the interactions, an interaction with schools and the community foster deeper understanding of the dual-use sector and helps get the community vested in the sector's ultimate success. Technology companies have a uniquely large stake in educational reform. The more learning experiences it can provide, the more the industry can pull the educational system towards itself and help pave the way for the system to better prepare students for technology jobs.

## 6. Communicate with one voice about the value of dual-use

Dual-use suffers from a cryptic name that is largely inaccessible to the general public. Once associated with the military, dual-use can meet further resistance even from those who are only slightly uncomfortable with the heavy military presence in Hawai'i.

There is certainly a case to be made that dual-use companies deserve continued attention and development and that the public benefits derived from their development outweigh any associated public costs. However, it us up to the dual-use sector to make credible arguments to the general public and to gain the support of political champions and grassroots leaders who may not yet fully understand the sector. Balanced, rational, and reasonable messages about dual-use need to be debated, refined, and repeated by the sector's stakeholders.

# A Dual-Use Sector Plan for Hawai'i (Continued)

## Joint Public / Private Agenda

**The final part of the plan includes items that require the joint participation and leadership of the public and private sectors. These are areas where authority and information is split between the two.**

### 1. Collect appropriate data

As seen above, there are large gaps in Hawai'i's current ability to measure important dual-use indicators, particularly with regard to measuring sector outputs.

Several efforts have been undertaken to collect such data with mixed results. The Hawai'i Science & Technology Council (HSTC) aims to create a comprehensive database of science and technology companies, including those in the dual-use space. HSTC's database, once complete, should capture the data needed to track the progress of dual-use companies and the health of the sector. The Hawai'i Technology Development Corporation has also been collecting data on high technology companies in Hawai'i as well.

HVCA has embarked on an effort to collect regular, "real time" data from local companies through an online survey.

And in 2007, the Department of Business, Economic Development and Tourism received a legislative appropriation to regularly measure indicators of an innovation economy.

Each effort might produce important information. Hopefully, efforts are coordinated well enough such that a legitimate, consistent, regular, and timely set of useful measures emerge for ongoing reference.

### 2. Develop physical infrastructure

The 2005 dual-use plan contained an action item for creating a world-class defense and dual-use technology park on O'ahu. The project would put various types and sizes of related industries in close proximity with each other to encourage cross-over knowledge and greater collaboration. Plans for that kind of effort are still endorsed by many in the dual-use community.

In addition, stakeholders made clear that physical infrastructure and planning is not only an O'ahu issue. Plans to better coordinate and consolidate infrastructure needs as well as forecasting future needs, are needed in all counties. Because of the complex and costly nature of these efforts, government and private entities will need to collaborate and exert shared leadership to ensure that goals get accomplished.

### 3. Enhance technology transfer in universities

Dual-use stakeholder stress the importance of the University of Hawai'i's ability to expedite patenting, technology transfer and licensing processes. The current system has inadequate capacity and processes for the increased amounts of innovation activity happening in Hawai'i.

The private sector can assist greatly in these efforts, but government must also recognize the important role of the University and its ability to commercialize its technologies. If the processes can become more streamlined and effective, companies will have more opportunities to work with faculty in projects that have both academic and commercial value.

# A Dual-Use Sector Plan for Hawai'i (Continued)

### 4. Build university-industry training partnerships

The prospects of college programs and industry needs matching up cannot be left to chance. Local colleges and universities must work closely with industry to design appropriate programs that meet the needs of both entities. Better alignment will increase a student's desire to attend Hawai'i colleges and universities in order to gain greater access to good Hawai'i-based technology jobs. Partnerships can also help recruit excellent educators and researchers to local colleges and universities.

The new Dean of the UH School of Engineering is looking to industry for input to understand business needs in terms of students and faculty. Salvos such as these are welcome gestures that will lead to improvements on both sides.

**Dual Use Stories**

**Technology: WaveCloak™ antenna technology which sends a narrow wireless beam along with a jamming signal**

**Pipeline Communications and Technology**

Formed in late 2004 by a University of Hawai'i MBA graduate who also had two tours of military duty in Hawai'i. He saw the technology on the OTTED website and earned a grant from HTDV to develop a prototype. Additional technology was developed which can simultaneously jam roadside bombs. PCAT raised its first round of funding with the help of Act 215.

So far, it has created nine high paying jobs and subcontracted work back to UH. It has seven local college interns, and two local high school interns. Two engineers help on student engineering projects at Roosevelt High School.

"Four of our employees bought homes in Hawai'i in last two years and we plan to stay for a long time."
**Monte Littlefield, Chairman**

### 5. Attract high-skilled former Hawai'i residents

The Dual Use Council believes that there are 100 technology jobs open at any given time in Hawai'i, but companies and interested individuals cannot find each other. Many of the people who can fill these spots are former Hawai'i residents who relocated to the mainland to work. One dual-use company mentioned that they receive an email at least once every two weeks from former residents asking about job openings.

Former Hawai'i residents often have the social networks and cultural competencies to make the transition to Hawai'i an easier one. The "Kama'aina Come Home" effort is working to some extent but it has not been pulled together on a broad level. Government agencies may be in the best position to pull these resources together. On the other hand, private companies must be involved to ensure the system is designed well. Efforts to expand "Kama'aina Come Home" through legislation were not entirely successful in 2007. Stakeholders should continue to stress the economic and social importance of this program.

# Conclusion

**Hawai'i's ultimate goals-a relevant and high-caliber system of education, good living wage jobs, industries that are environmentally sustainable, an improved quality of life-could be enhanced by a strong and vibrant dual-use technology sector. It is in Hawai'i's best interest to make maximum use of the economic development opportunities available today and to help the sector develop into something that is not only in tune with the best visions of Hawai'i, but is actively and purposefully striving to bring those things about.**

Achieving the goals in this plan require a team effort between the public and private sectors. For its part, government and the public sector should acknowledge that the prospects for dual-use companies to become thriving, local commercial enterprises and employers, lie in a window of opportunity that will not stay open forever. Unique opportunities to diversify Hawai'i's economy and create good jobs should be seen as precious. As such, an adequate amount of attention and resources should be devoted to the goals described in this report. In most cases, these public investments will enhance more than just the dual-use technology sector.

For their part, dual-use technology companies need to continue to coalesce. There is already a strong and healthy sense among most that collaboration is essential to improving the chances of individual long-term success. Continued shared information and investments can counter some of Hawai'i's inherent competitive disadvantages while enhancing its unique advantages. The dual-use sector must also continually strive to connect with the broader community to listen to and address concerns, clarify misconceptions, and publicize whatever successes they have that benefit the greater good.

Over the next few years, some individual companies will succeed and many will fail. Ideas, technologies and entrepreneurs will come and go. Such is the nature of business-creativity, initiative, perseverance, and learning through experience. This plan cannot determine which businesses will win or lose.

But this plan can, hopefully, help make sure that Hawai'i will win. This plan is Hawai'i's plan. Successful implementation will increase the likelihood that, in the end, the families and communities of Hawai'i will discover long-lasting net benefits from this unique opportunity.

# ABOUT THE SPONSORS

## Hawaii Institute for Public Affairs

The Hawaii Institute for Public Affairs is Hawai'i's first independent, nonpartisan, nonprofit public policy institute devoted to fact-based research, issues education and community collaboration.

The institute's goal is to improve the quality of life and business in Hawa'ii by improving public policy.

By encouraging informed discussion of immediate and long-term issues facing Hawai'i's communities, the institute brings together scholars, policymakers and the community. This collaborative approach of all major stakeholders creates a fact-based forum in which new knowledge, new ideas and new opportunities are created to solve Hawai'i's most important issues.

## Hawai'i Technology Development Venture

The Hawai'i Technology Development Venture (HTDV) is a project of the Pacific International Center for High Technology Research (PICHTR) and funded by the Office of Naval Research (ONR) that utilizes the capabilities of Hawai'i-based small businesses in performing high technology efforts related to current and future Department of Navy and Department of Defense programs. HTDV will create a Pacific regional center for commercialization of defense and homeland security technologies that would benefit small companies in Hawai'i. The results of the effort will be a stronger technology base in Hawai'i to meet technology requirements of the Department of Navy and Department of Defense.

## Notes

1 **U.S. Department of Labor, Bureau of Labor Statistics, 2006. See** www.bls.gov/opub/ted/2006/feb/wk4/art04.htm

2 **State of Hawai'i Department of Labor and Industrial Relations, News Release, January 24, 2006. See** www.hawaii.gov/labor/pr/mr_2006_01_uipr_dec06.pdf

3 **Honolulu Advertiser, 33% in Isles Not Self-Sufficient, February 3, 2007. See** http://the.honoluluadvertiser.com/article/2007/Feb/03/ln/FP702030350.html

4 **He, S.J., Yuan, S., Illukpitiya, P., & Yuen, S., Economic well-being in Hawai'i: Family and individual self sufficiency-AUW report, University of Hawai'i at Manoa, Center on the Family, 2007.**

5 **State of Hawai'i Department of Business, Economic Development and Tourism, 2005. See** www.hawaii.gov/dbedt/info/economic/data_reports/technology_report/Hltech2005.pdf

6 **CFED, Development Report Card for the States, 2007. See** www.cfed.org/focus.m?parentid=34&siteid=2346&id=2366&year=2007&measureid=3696

7 **CFED, Development Report Card for the States, 2007. See** www.cfed.org/focus.m?parentid=34&siteid=2346&id=2366&year=2007&measureid=3692

8 **Governor Linda Lingle, 2007 State of the State Address, 2007. See** www.hawaii.gov/gov/news/speeches/STATE%20OF%20THE%20STATE%20ADDRESS%202007.pdf

9 **CFED, Assets and Opportunity Scorecard, 2007. See** www.cfed.org/focus.m?parentid=31&siteid=504&id=509&measureid=2840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# Venture Capital in Hawai`i

## An Assessment of Market Opportunities

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Hawaii Institute for Public Affairs

January 2008

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# Executive Summary

This report presents the findings of a study of venture capital (VC) in Hawai`i, that examined data on VC supply and demand, with particular attention to whether the Hawai`i market offers opportunities for institutional investors. The study gathered data on 27 venture capital funds active in the Hawai`i market and 63 companies, most of which were backed by angel investors or venture capital funds.

## MARKET OVERVIEW

■ Secondary data suggests that Hawai`i is broadly undercapitalized when it comes to venture capital and other forms of business capital. Hawai`i consistently ranks among the bottom 10 states in VC and small business loans per $1,000 of GSP, yet ranks respectably on measures of entrepreneurial activity and health: 15th for "surviving start-ups" and "young growing firms" and 7th in portion of population starting new businesses.

■ Mainland fund managers we surveyed, report that Hawai`i offers opportunities at greater scale and of better quality than other states where the supply of VC investment is greater. Tax incentives and other supports have encouraged angel investment and entrepreneurship, increasing the number of companies and entrepreneurs, and seeding new deal flow for VC funds.

■ The track record and experience of local VC funds is mixed, but improving, and VC funds outside of Hawai`i are taking serious interest (and making serious investments) in Hawai`i, particularly in promising areas like cleantech and life sciences.

■ Taking angel investment as a "leading indicator" predicting future demand for VC funds, we would anticipate a rise in VC activity in the next few years. From 2003 to 2007, investing by the Hawai`i Angels rose from $1.6 to $19.6 million (1,152% increase) compared to an increase in VC fund activity from $16 to $20 million (24% increase).

Projected Fundraising by Last/Next Fundraising Round

| Past Fundraising/ Future Fundraising | No. of Firms | Fundraising Next 3 years | Assumed Success | "Qualified" Demand |
|---|---|---|---|---|
| No Past Equity Raised | 22 | $ 61,350,000 | 0% | $0 |
| Closed Angel Round/Seeking Series A | 18 | $ 55,250,000 | 35% | $ 19,337,500 |
| Closed Series A/Seeking Series B | 16 | $ 104,350,000 | 60% | $ 62,610,000 |
| Closed Series B/Seeking Series C | 7 | $ 100,000,000 | 65% | $ 65,000,000 |
| **Totals** | **63** | **$ 320,950,000** | | **$146,947,500** |

## DEMAND FORECAST

The survey data points to a substantial increase in demand for venture capital in the coming years. From a non-random sample of 63 companies (oversampling venture- and angel-backed firms), we anticipate qualified demand of approximately $49 million per year over the next 3 years. The increase will be driven largely by maturing companies in need of larger rounds of capital (companies seeking series B and C financing).

The forecast was generated by taking self-reported fundraising plans from 63 companies, completely discounting those that had not raised equity in the past, and assuming "success rates" (based on national data) for companies moving from one round of fundraising to the next.

In addition to VC demand, Hawai`i fund managers also see an opportunity in Hawai`i for buyouts driven by the retirement of baby boomer business owners. Fund managers that have examined the local market place the buyout market for equity at approximately $80 to $100 million per year.

## SUPPLY FORECAST

VC fund managers have begun the process of raising capital to fill this demand. The study found 10 fund managers with a track record of investing in Hawai`i with plans to raise a combined $128 million in the next 24 months. Most fund managers aimed to raise larger funds than they had managed in the past to fill a perceived need for larger sums of capital among companies in the Hawai`i market.

This data suggests that an adequate number of funds of sufficient scale are positioning themselves to serve rising demand for VC in Hawai`i. It also suggests that there is currently low probability of saturating (over-supplying) the market with capital, since fundraising goals still fall somewhat short of the forecast of qualified demand.

# 1 Study Background & Methods

This report presents the findings of a study of venture capital (VC) in Hawai`i, conducted during the Fall of 2007.

## 1.1 STUDY BACKGROUND

For purposes of this report, the term "venture capital" refers to private equity investments by professional firms into young, high growth companies. It does not include venture investments by individuals (angel investments), private equity for acquisition of mature companies (buyout investments), or short term debt or equity for specialized purposes (e.g. mezzanine or bridge financing).

The study was designed to gather evidence that might inform public and private efforts to support capital formation in Hawai`i. It examined data on VC supply and demand, with particular attention to whether the Hawai`i market offers opportunities for institutional investors.[1] To a limited degree, the study also examined investment opportunities in other areas like buyout financing.

[1] Entities with large amounts to invest, such as mutual funds, insurance companies, pension funds, and endowments.

# the study

Specifically, the study sought to answer the following questions:

1. Does the scale and quality of demand for venture capital among Hawai`i companies present an opportunity for institutional investors?

2. Are the number and size of venture capital funds active in the Hawai`i market sufficient to serve this demand?

3. Are there too many venture capital funds with too much capital in the market, creating a risk of oversupply of capital?

The study was conducted by Hawaii Institute for Public Affairs (HIPA) with technical assistance from 3Point Consulting and PriceWaterhouseCoopers, and with financial and in-kind support from Pension Consulting Alliance, Inc., Hawai`i Science & Technology Council and High Technology Development Corporation.

## 1.2 DATA SOURCES & METHODS

The study began with a review of the available literature on local venture capital and private equity, as well as a review of media coverage of transactions during the past 3 years. Secondary data from a variety of sources including the U.S. Small Business Administration, PriceWaterhouseCoopers/National Venture Capital Association (PWC/NVCA) MoneyTree Survey of venture capital, and other sources was also analyzed. The centerpiece of the study was primary data of supply and demand collected via interviews and surveys. VC supply data came from interviews with current or former venture fund managers and other private equity experts. VC demand data was gathered via surveys, press clippings, and annual report information for a sample of 63 companies, focusing on firms that had successfully raised at least one round of equity from external sources (i.e. venture- and angel-backed companies).

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NovaSol personnel conduct preflight testing of the MicroHSI From the roof of their Headquarters building, overlooking Honolulu Harbor.

(right) The first Hyperspectral image acquired from NovaSol's MicroHSITM includes Honolulu Harbor and the Reef Runway

## 1.3 DATA LIMITATIONS

Attempts to assess current and future conditions in a local VC market (especially future opportunities for VC investment) face several challenges. Data is limited because much of the information on transactions, funds, and fundraising is confidential. Assessing demand based on the self-reported needs of companies is also problematic because it is difficult to distinguish between "qualified" and "unqualified" demand. That is, while many firms seek venture capital, only a small fraction (perhaps 1 out of 100) actually receive it, and the criteria used to screen companies is too complex to replicate in a survey of venture-seeking firms. Though this study attempts to address such issues, the findings and conclusions should still be viewed in light of data limitations.

## 1.4 REPORT CAVEATS

The study captured data on market conditions at a particular point in time. Events subsequent to the study may affect market conditions and the conclusions of this report. This report is not intended as investment advice, and the study's authors are not liable for actions taken based upon its findings. Neither HIPA's fees nor payment of those fees was contingent upon the results of the study.

# 2 Primer on Venture Capital

Venture capital (VC) is a type of private equity capital typically provided by professional investors to young, privately-held businesses with perceived potential for dramatic growth.

Venture capitalists provide cash to young growing companies in exchange for an ownership interest in the enterprise, then actively work to help grow the company's value. Eventually, venture capitalists hope to sell their ownership stake in a company at a much higher price than they bought it for.

Venture capital is a high risk investment: companies are often young and unproven, may have few tangible assets, and issue stock that cannot be sold on a public exchange. However, the rewards of venture capital are commensurate with the risk: venture capitalists have profited by financing the start-up and early growth of some of the most successful companies in history – Apple, Federal Express, Starbucks, Yahoo, eBay, Staples, and Microsoft to name just a few.

## 2.1 HOW VENTURE CAPITAL FUNDS WORK

A venture capital fund (VC fund) is a pooled investment vehicle, usually a limited partnership, that invests the capital of third-parties in young, growing companies. The limited partners in a fund – large institutions like trusts, pension funds, insurance companies, and endowments (see sidebar) – provide the capital and participate in oversight of the fund, but do not take an active role in making or managing investments. The general partners in a VC fund, also called fund managers, raise capital from limited partners, find qualified companies, negotiate investments with entrepreneurs, and actively manage the portfolio of companies in which they've invested.

A VC fund may spend up to 1 year fundraising and 3 years placing its capital into qualified companies. A fund may screen 100 or more companies for each one ultimately invested in. Once an investment is made, fund managers take an active role in growing a portfolio of companies, sitting on the company's board of directors, offering their expertise and connections, and making follow-on investments with the fund's

capital. The goal of the intensive screening, negotiation, investment and management process is to grow the value of portfolio companies and then position the company for a "liquidity event" – typically sale of the company's shares via acquisition or initial public offering (IPO). This liquidity event allow investors, including the VC fund and its partners, to "exit" the investment. Only at the point of exit can the fund and its limited partners realize the increased value of the stock they purchased with their initial investment.

Many VC funds strive to exit investments within 5 to 7 years, and aim to achieve an annualized rate of return of 25% or more on their portfolio. Not every company in a fund's portfolio will produce spectacular returns. In a typical fund, 10 portfolio companies may produce 1 "home run" sold at a value 20 or more times the initial investment; 2 or 3 "base hits" sold at 5 to 10 times the value of the initial investment; and a majority of portfolio companies offering little to no returns. To account for this uncertainty, funds "swing for the fences" in each company they invest in. If a fund is successful, its limited partners will be pleased, and the fund manager will work to raise another fund. A single VC firm may therefore raise and manage multiple funds.

Institutional investors maintain investment portfolios which allocate their money in various "asset classes." One asset class is called "alternative investments" and includes venture capital. An institutional investor may allocate anywhere from 2% to 10% of its portfolio to the alternative investments asset class. According to the National Venture Capital Association, over 50% of investments in venture capital comes from institutional public and private pension funds.

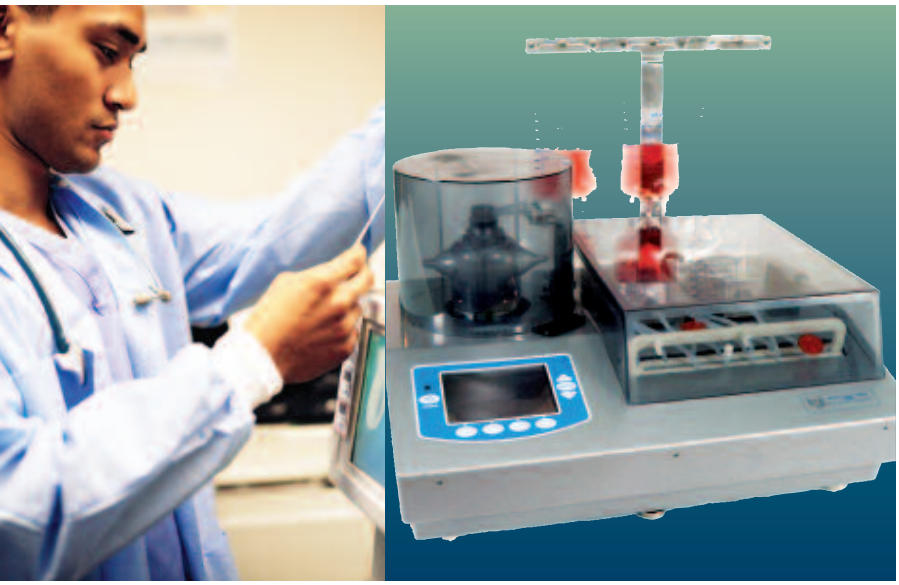
## 2.2 HOW COMPANIES RAISE VENTURE CAPITAL

Companies raise money from venture capital funds in several successive "rounds" of fundraising. These rounds are defined by the company's capital needs at different stages of growth. Though experience differs from company to company, a common path includes the following rounds:

- **Angel or Seed Round.** Company financing typically begins with "angel" or "seed round" of up to $1 million, very early in the company's development. At this stage, the entrepreneur may have an idea or an untested technology, but still lack an actual company or even a business plan. Capital from the angel round funds product research and development. The round is typically funded by individuals – family, friends, and individual investors (hence the term "angels") – without participation from VC funds.

- **Series A Financing.** Assuming the product works, and initial market research is positive, the entrepreneur will need additional capital to build a company that can begin to market the product and test the profitability of the business model. This "company building" and "initial selling" stage can require $2 to $5 million. Series A financing will often be led by a VC fund and may also include individual investors.

- **Series B Financing.** After a successful company and product launch, funds will be needed to further develop the marketing plan, hire more staff and management, and establish strategic alliances. Because the company is expanding into larger markets, capital needs increase. Series B financing may amount to $10 million or more, and will be led by a larger VC fund with specialized industry expertise and/or experience taking a product to regional or national scale.



The Tissue Genesis TGI 1000™ Cell Separation System extracts adult stem cells, and other therapeutic cells, from a small amount of the patient's own fat, for use in treating the patient's injury or disease.

■ **Series C Financing.** If a product finds acceptance in a large market, demand may quickly outstrip production capacity. At this point, internal funds (profits) and lines of credit are insufficient to support the rapid development needed for stronger sales growth. Another round of financing in the $15 to $25 million range is needed to substantially ramp up existing operations, move the company into a significant position in the industry, and set the company up for acquisition or IPO.

The financing path differs between companies and industries. For example, a web-technology company may follow the path above, but a biotech firm testing a new drug may require several successive rounds of $10 to $20 million to get through drug testing, FDA approvals, and into marketing. Some companies go from series B straight to their acquisition or IPO, while others may require several rounds beyond series C. Still, the path described above captures the experience of a majority of venture-backed firms.

## 2.3 THE ROLE OF VENTURE CAPITAL IN LOCAL ECONOMIES

As the description above illustrates, start-ups and young firms need venture capital to develop new products, reach new markets, expand their team and acquire essential assets enabling growth. Other forms of capital, like bank loans, are ill-suited for such high risk, high growth situations. Venture capital is therefore a critical element supporting emerging companies and industries in a local economy.

The institutional investors that supply VC funds with capital tend to prefer funds located in geographic areas with a reputation for producing many high-growth companies – well known centers of technology and entrepreneurship like Silicon Valley in California or Route 128 in Massachusetts. VC funds in such areas have access to a greater number of companies to invest in, can develop solid track records of success, raise ever greater amounts of capital from investors based on this record, and seed more and more companies, thus creating a self-perpetuating cycle of capital and company formation.

Smaller markets face an opposite type of cycle. VC funds in areas without a reputation for active entrepreneurship have difficulty raising capital, and therefore cannot seed entrepreneurs with good ideas. Without high levels of entrepreneurship, VC funds struggle to build a track record of success, struggle to raise sufficient capital from their investors, and struggle to meet the needs of investment-worthy companies. In such a market, even companies that have solid growth potential and generate competitive returns may find it difficult to raise capital. A company may be driven to out-of-state sources of investment, which in turn, often leads to relocation of the company closer to its capital supply. In such cases, local investors are left out of local companies' success and financial returns.

In many instances, state and local governments have created public-private partnerships to jumpstart investment in undercapitalized regions. States have created tax and other incentives to help encourage investment while managing risk and complying with fiduciary duties. Public pension funds in 29 states have established programs that invest a small portion of their fund dollars in their local market as part of an economically targeted investment program.[2]

[2] U.S. General Accounting Office, Public Pension Plans: Evaluation of Economically Targeted Investment Programs, March 17, 1995

# 3 Secondary & Qualitative Data on the VC Market

Past studies have characterized Hawai`i as an example of the "capital starvation" spiral – trapped in a vicious cycle of undercapitalized VC funds leading to stunted entrepreneurship leading to less capital for VCfunds, and so on. The available data paints a more nuanced portrait of Hawai`i's capital market, though the general view of Hawai`i as undercapitalized appears to be well supported.

## 3.1 EVIDENCE OF UNDERCAPITALIZATION

A review of published secondary data suggests that Hawai`i's young, growing businesses may indeed be capital-constrained. Hawai`i is consistently among the bottom 10 states in venture capital investment with only $0.36 of venture capital invested for every $1,000 of GSP. Ten states with economies of comparable size have about 1½ times the venture capital invested in Hawai`i, and the national average is about $1.73 for every $1,000 GSP.[3]

Another sign that Hawai`i may lack sufficient capital for business development is found in small business lending data. Hawaii consistently ranks among the bottom 10 states in loans guaranteed under the U.S. Small Business Administration's 7a Loan Guarantee program. SBA guarantees are designed to serve higher-risk businesses without the track-record or collateral to qualify for conventional

Sopogy: Solar Power Technology
Sopogy has pioneered the technology bringing the proven concepts of Concentrated Solar Power (CSP) to the distributed generation market.

bank financing. In 2005 (the latest year for which data is available) Hawai`i ranked 47th among the 50 states in SBA lending per $1,000 of Gross State Product (GSP), just behind West Virginia and Alabama.

These statistics on capital supply would not be of concern if demand were similarly limited – that is, if Hawai`i lacked the entrepreneurial activity to justify greater investment. However, that does not appear to be the case. Data compiled by the National Policy Research Council measures the percentage of companies in each state that are "surviving start-ups" (more than 4 years old) and "young fast-growers" (less than 10 years old and experiencing more than 20% growth). Based on these metrics, Hawai`i's state ranking jumped from 45th in 2003 to 15th in 2006.[4] Additionally, a recent Kaufmann Foundation analysis found that Hawai`i had the 7th highest portion of its population starting businesses in 2006, and experienced the 2nd largest increase in entrepreneurial activity from 1996 to 2006.[5]

Reports by VC fund managers confirm that capital supply is constrained. Several fund managers reported passing on deals because they had insufficient capital to invest in a company. In aggregate, local fund managers reported 17 instances where they passed on deals primarily because their fund's capital was either exhausted or insufficient to fund the request. These deals were otherwise quality investments. Because the names of companies were not revealed, it is impossible to know whether this figure double-counts deals (i.e. whether different fund managers passed on the same deal). However, one fund manager reported passing on 8 deals during 2006 and 2007 because the fund's capital was insufficient.

[3] These states include Mississippi, Nebraska, New Mexico, New Hampshire, West Virginia, Maine, Idaho, Alaska, South Dakota and Montana. They were selected because they their GSPs were comparable to Hawai`i's and because they were not located in a cluster of highly urbanized states (like Rhode Island, which was excluded from comparison for this reason).
[4] National Policy Research Council, Entrepreneurial Hot Spots: The Best Places for Starting and Growing a Business, 2007.
[5] Kaufmann Foundation, Kaufmann Entrepreneurial Index, 2007

## 3.2 PROFILE OF LOCAL VC SUPPLY

In any given year, there are between 15 and 30 active VC funds in the Hawai`i market.[6] These VC funds are divided into three groups with 5 to 10 funds each: Hawai`i-focused funds, (based in Hawai`i and investing 90% of their capital locally), funds with a significant Hawai`i presence (at least 2 portfolio companies and a quarterly presence in the islands) and funds that made one-time or occasional investments in Hawai`i. Though the specific players have changed over time, the total number of active funds and distribution among categories has remained roughly the same for several years. The table below lists funds in each category participating in the Hawai`i market since 2002. The list excludes funds that are primarily real estate focused and also excludes angel investor groups.

Data from the PWC/NVCA MoneyTree indicates that, in the aggregate, VC funds made roughly $68 million in Hawai`i investments, excluding real estate and buyout transactions between 2002 and 2006.[7] In the past four years, PWC/NVCA reports $15 to $20 million in annual venture investment. These figures understate total VC fund investment: A review of press clippings and annual reports of VC funds identified several transactions not included in the PWC/NVCA data. Though incomplete, the data still provides a useful sense of trends in venture capital investment and the mix of deals over time in Hawai`i.

Table 3.1.
Venture Capital Funds Active in Hawai`i Since 2002

| Hawai`i Focused | Hawai`i Presence | Occasional Investment |
|---|---|---|
| Hawai`i Venture Group | Advantage Capital Partners | American Pacific Ventures |
| HEAVEN Fund* | Finistere Partners | Arcadia Holdings |
| HMS Capital Management | Garage Ventures | Avalon Ventures |
| Kolohala Ventures | Global Venture Capital | Cornerstone Holdings |
| Lava Ventures | Integra Ventures | M/C Venture Partners |
| PacifiCap Group | Invencor | Menlo Ventures |
| Palm Cove Capital | Startup Capital Ventures | Palo Alto Partners |
| Tradewind Capital | Technology Partners | Stockton Ventures |
| UPSIDE Fund* | | Sulfur Creek Ventures |

*Managed by other firms already in the list, but with a separate/distinct investment focus.
Source: PWC/NVCA data, press clippings, company annual reports, interviews.

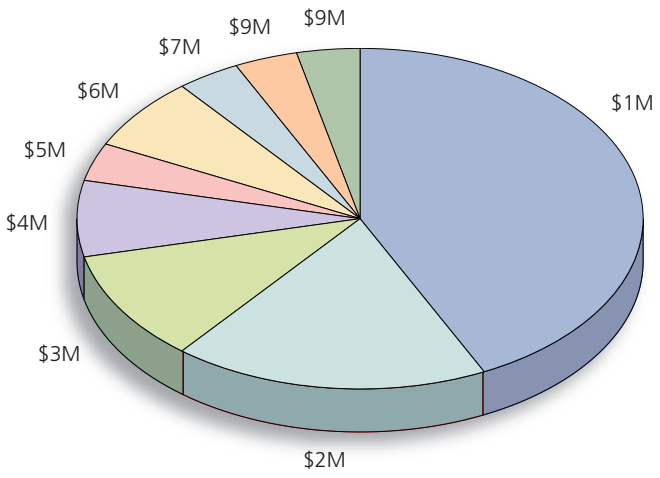
Hawai`i's local VC industry is relatively small, comprised of 5 to 10 Hawai`i-based, Hawai`i-focused funds with mixed experience levels and track records. Investments by local funds have, to date, been concentrated in seed and early stage deals. A majority of funding rounds closed between 2002 and 2006 were under $2 million (see Figure3.1). Investments have been concentrated in four industry areas: information technology, cleantech, defense-funded research (dual use technologies), and life sciences. The portfolio of a typical Hawai`i-focused VC fund has companies from a mix of industries. Hawai`i's small market prevents funds from specializing by industry, as many mainland and international funds do.

Only a few Hawai`i fund managers have raised capital, invested it, and produced competitive returns in multiple funds. Because most have focused on seed and early stage companies, few local fund managers have a strong track record in later-stage investing. In the past, there have been no buyout-focused funds in Hawai`i, although interviews revealed plans for two new funds that would include a buyout component in the future (see below). At the time of this study, there was only one Hawai`i-based fund with an investment focus outside of the islands.

Larger and later rounds of financing for Hawai`i companies have been supplied almost exclusively by out-of-state VC funds. This points to a well documented and much commented on "gap" in financing for local companies requiring expansion capital. When Hawai`i companies reach a point in their growth requiring larger sums of capital, they must seek such capital from non-Hawai`i funds. Because non-Hawai`i funds may lack experience or familiarity with the Hawai`i market, these investments are often difficult to secure. When capital is forthcoming from non-Hawai`i VC funds, companies have often been forced to relocate in order to satisfy investors who wish to have portfolio companies close at hand.

The local VC industry has therefore reached a difficult point. It has succeeded in cultivating companies that have grown beyond their need for seed financing and now require larger sums for growth and expansion. Yet, the same funds that seeded these companies lack sufficient capital to service the demand they've helped to create. Furthermore, there is a perception that local fund managers lack the track record of 'big wins' in multiple funds required to raise larger sums needed. Finally, the Hawai`i-focus of Hawai`i-based funds may also impede their growth, as concerns about diversification may prevent these funds from raising larger pools from institutional investors.

Figure 3.1.
Hawaii Deals by Size, 2002 - 2006




Source: PWC/NVCA data, 2002-2006.

[6] "Active" funds are those investing, screening, or managing portfolio companies.
[7] This figure also excludes $30 million dollar investment in the Hawai`i Superferry, HSF Holdings in 2005.

## 3.3 PROFILE OF LOCAL DEMAND

### 3.3.1 Factors Affecting Demand

Trend data from PWC/NVCA MoneyTree suggests that local demand for VC has recovered since the technology "bubble" of 2001, with steady growth in investment by VC funds during the past 5 years (See Figure 3.3 below). Fund managers consistently pointed to the following factors as contributing to recent growth:

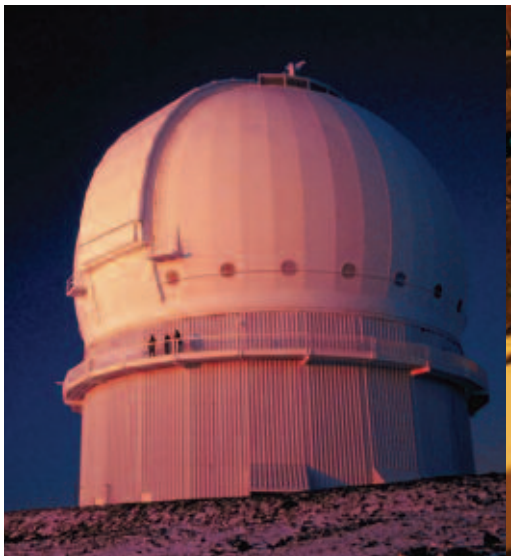
■ ***Strong companies in key industry areas.*** Hawai`i has strong companies that are moving beyond the seed stage in life sciences, cleantech, and information technology. Cleantech is particularly attractive – even to VC funds outside of Hawai`i - because the islands offer access to multiple forms of renewable energy: technologies related to wind, wave, solar, geothermal, biofuels and other energy sources can be designed and tested in Hawai`i. Rising energy costs, growing concerns over climate change, and a commitment to reduce U.S. dependence on foreign oil will drive continued investment into cleantech. Several mainland-based venture funds report that Hawai`i is perceived as a potential "Silicon Valley of Cleantech," as no region has yet claimed dominance in this area.

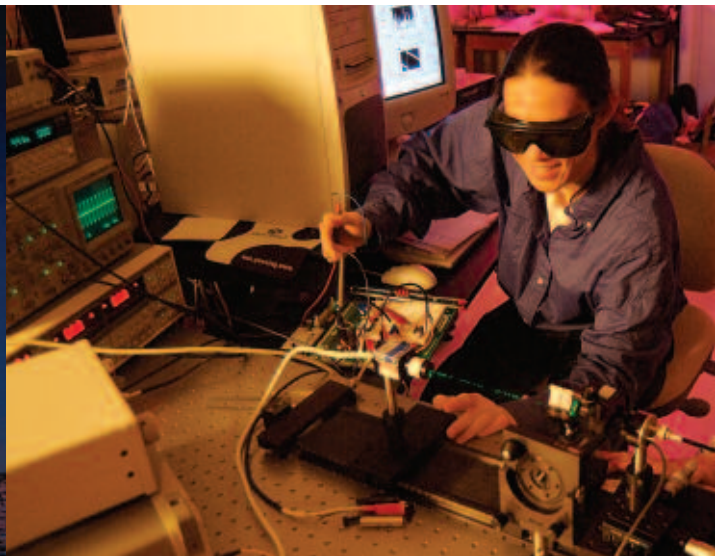
■ ***Angel investment spurred, in part, by tax incentives.*** Hawai`i's R&D and high technology tax credits have spurred new investment by individuals and corporations. This has seeded scores of new companies, creating new deal flow for VC funds with an interest in Hawai`i. Fund managers felt that the presence of the credits and consequent availability of angel capital, had improved the number and quality of venture-seeking companies in Hawai`i. However, some also noted that the incentives had led to overvalued companies, difficulties in due diligence, and complicated negotiations for later stage investors.

■ ***Rising visibility of entrepreneurs and their companies.*** Media coverage of successful companies like Hoku Scientific, Hoana Medical and others has lent high technology and entrepreneurship an air of credibility that it lacked 5 to 7 years ago. These successes are also drawing new talent away from traditional sectors and into entrepreneurship.

■ ***Key infrastructure.*** Entrepreneurs are making use of infrastructure like the Maui Research and Technology Park, the John A. Burns School of Medicine, the Natural Energy Lab of Hawai`i, and incubators/accelerators like HiBEAM and the Manoa Innovation Center. Though these supports have existed for some time, a growing number of companies are relying upon them.

Fund managers who invested in multiple states including Hawai`i rated the scale and quality of deal flow in Hawai`i favorably compared to other markets. One fund manager operating in multiple states called Hawai`i's current market as the "best in 5 years" and "better than states like New Mexico, Oregon, Utah and Louisiana" which receive more venture investment. Mainland fund managers described Hawai`i as an "emerging domestic market" – an undercapitalized state where competition between VC funds was still limited, and where good investments were increasingly common, but still "under the radar." Asia-domiciled funds made similar observations, and also found Hawai`i attractive as a location for future funds. Recent changes in tax and regulatory policy affecting VC funds in Asia have prompted fund managers to begin looking for new places to domicile.



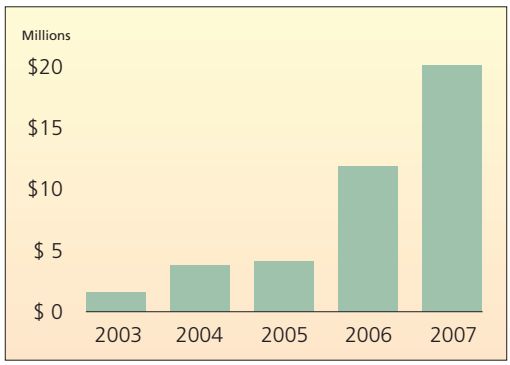


### 3.3.3 Angel Investment as a Leading Indicator

Angel investment activity is often used as a "leading indicator" to forecast future demand for venture funds. Because angels "seed" the companies that venture funds later invest in, it follows that growth and decline in venture fund investments should ensue the general trend in angel activity. Organized angel groups offer a better "leading indicator" than data from individual angels because angel groups have formalized processes for vetting companies, and rely on the combined experience of the group, whereas individual angels vary widely in their process and expertise.

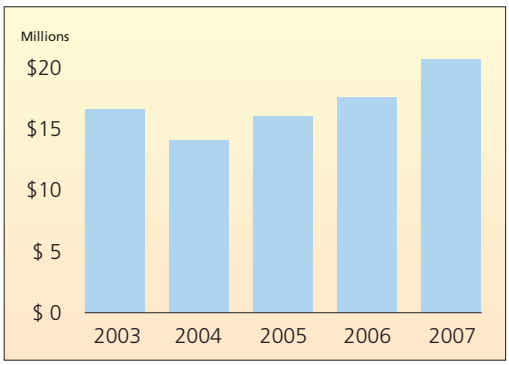
Hawai`i's leading angel investing group – the Hawai`i angels – reports a dramatic rise in investment activity during the past 2 years. As Figure 3.2 indicates, from 2003 to 2007 investing by the Hawai`i Angels rose from $1.6 million in 5 companies to $19.6 million in 16 companies – an increase of 1,152% by dollar volume. During the same period, Figure 3.3 shows that investing by VC funds rose from $16 million in 4 companies to $20 million in 11 companies, an increase of only 24%. If investing by organized angel groups is indeed a leading indicator of investment by VC funds, the data would lead us to expect a significant rise in demand for VC funds in the coming years.

Figure 3.2.
Sharp Rise in Angel Investments




Source: Hawaii Angels

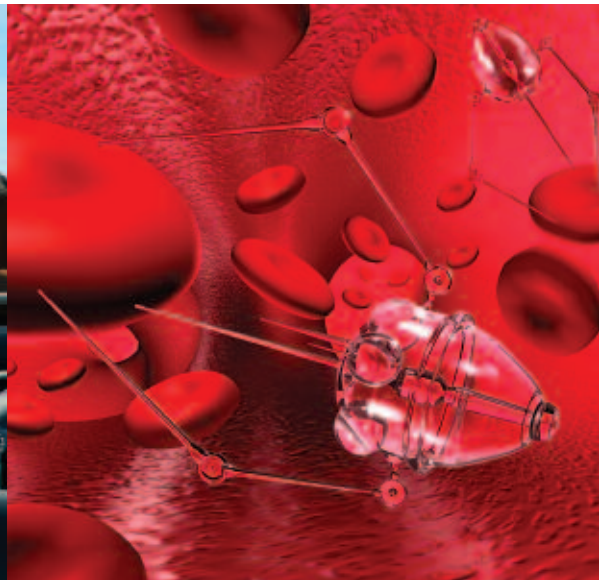
Figure 3.3.
Gradual Rise in VC Fund Investments



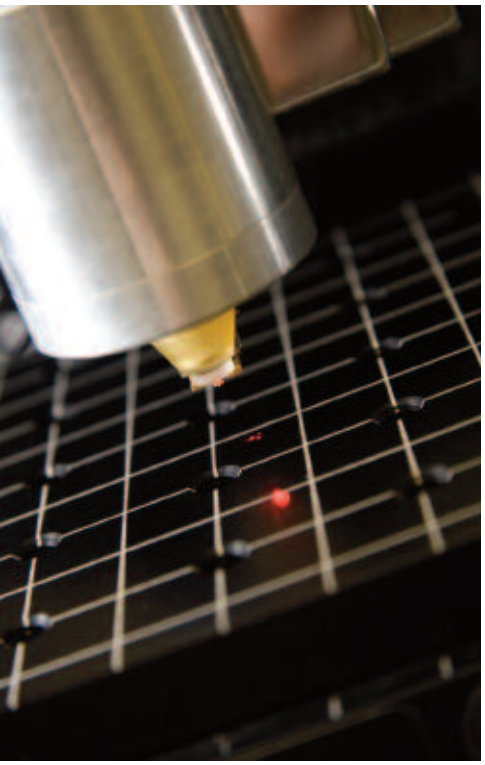

Source: PWC/NVCA data

## 3.4 SUMMARY CONCLUSIONS FROM SECONDARY DATA

The available secondary data, existing literature, and interviews with fund managers suggest that Hawai`i's VC market does offer opportunities for investors. Indeed, Hawaii appears to offer opportunities at greater scale and of better quality than other states where the supply of VC investment is greater. Tax incentives and other supports have encouraged angel investment and entrepreneurship, increasing the number of companies and entrepreneurs, and seeding new deal flow for VC funds. The track record and experience of local VC funds is mixed, but improving, and VC funds outside of Hawai`i are taking serious interest (and making serious investments) in Hawai`i, particularly in promising areas like cleantech and lifesciences. Importantly, there appears to be room left in the market for additional capital (particularly in the later-stage and expansion periods), as many funds report exhausting their capital supply, and competition over deals remains limited.



# 4 Primary Data & VC Market Forecasts



Estimating the scale of investment opportunities required going beyond secondary data and anecdotal reports, and gathering primary data on supply and demand.

We gathered data on 27 VC funds (nearly the entire universe of VC funds active in the Hawai`i market) and data on a sample of 63 companies. From this collection of supply and demand data, we attempted to estimate the scale of qualified demand for investment by VC funds over the next few years.

## 4.1 QUALIFIED DEMAND FOR VENTURE CAPITAL

Estimating qualified demand required a focus on companies that were good candidates for equity investment through VC funds. Therefore, the survey sample was a non-random sample, constructed to capture

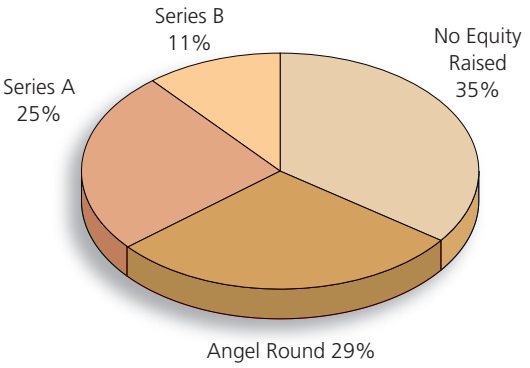



Figure 4.1
Sample Companies by
Last Round Closed

| Last Equity Raised | Companies | % |
|---|---|---|
| No Equity Raised | 22 | 35% |
| Angel Round | 18 | 29% |
| Series A | 16 | 25% |
| Series B | 7 | 11% |
| **Total** | **63** | **100%** |

companies in industries, at stages of development, and with fundraising track records that might make them good candidates for investment from a VC fund. A survey was distributed with the assistance of industry associations including the Hawai`i Science & Technology Council and the Hawai`i Venture Capital Alliance. A total of 63 companies responded, including 41 that had raised equity from outside sources (other than friends and family) in a previous funding round, suggesting that they had been validated to some degree by investors. The remaining 22 companies were self-funded or financed through small business loans. In addition to survey responses, we gathered additional data on the 63 companies through interviews and a review of all publicly available information about the firms and their financing. Figures 4.1 and 4.2 show how the sample was apportioned among companies at different stages and with different fundraising experience.

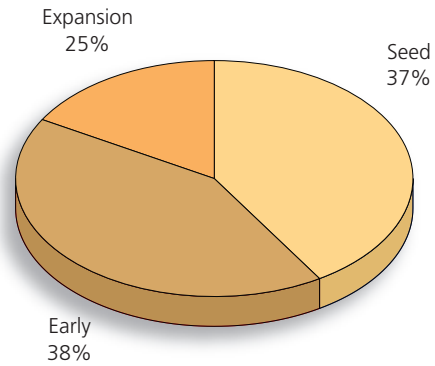



Figure 4.2
Sample Companies by
Stage of Development

| Stage of Development | Companies | % |
|---|---|---|
| Seed | 23 | 37% |
| Early | 24 | 38% |
| Expansion | 16 | 25% |
| **Total** | **63** | **100%** |



We examined past and projected fundraising experience of these 63 companies within a 3 year historical and 3 year projected period. During the past 3 years, the 63 companies in the sample raised an aggregate of $76.3 million. Of this total amount, $69.8 million was raised in the form of equity or equity-like capital (e.g. debt that could be converted to equity) from external sources. On average, series A financings were 4.6 times larger than angel rounds, and series B financings were 3.2 times larger than series A funding. The table below illustrates the amounts raised by companies divided into categories based on their most recent fundraising round.

Table 4.1
Past Fundraising by Last Round Closed

| Last Round | Companies | Past 3 Years | $ per Company |
|---|---|---|---|
| Debt, Licensing, or Self-Funded | 22 | $ 6,475,000 | $ 294,318 |
| Closed Angel Round | 18 | $ 6,460,000 | $ 358,889 |
| Closed Series A Financing | 16 | $ 26,320,000 | $ 1,645,000 |
| Closed Series B Financing | 7 | $ 37,000,050 | $ 5,285,721 |
| **Totals** | **63** | **$ 76,255,050** | **$ 1,210,398** |

We asked companies if they expected to close another round of financing within the next 24 months and if so, to describe the amount and purpose of the funding sought. Though the question was worded to focus companies on anticipated fundraising in the next 24 months, spreading projections out over 3 years provides a more conservative estimate of future fundraising and the timeframe in which it might be accomplished. As the table below illustrates, the 63 companies in the sample anticipated seeking nearly $321 million in aggregate funding spread over 3 years.

Table 4.2
Projected Fundraising by Next Round Sought

| Next Round | Companies | Next 3 Years | $ per Company |
|---|---|---|---|
| Debt, Licensing, or Self-Funded | 22 | $ 61,350,000 | $ 2,788,636 |
| Closed Angel Round/Seeking Series A | 18 | $ 55,250,000 | $ 3,069,444 |
| Closed Series A/Seeking Series B | 16 | $ 104,350,000 | $ 6,521,875 |
| Closed Series B/Seeking Series C | 7 | $ 100,000,000 | $14,285,714 |
| **Totals** | **63** | **$ 320,950,000** | **$ 5,094,444** |

In one way, the $321 million figure understates demand because it reflects a sample of companies and not the entire universe. However, in another way, the $321 million is overstated, since not all sample companies will succeed in raising their next round of funding. The company forecasts can be refined by (a) discounting those companies that have not raised equity in the past[8], and (b) applying "success rates" based on existing research, for companies moving from one round to the next.

Based on national data, about 35% of angel-backed companies succeed in raising a subsequent round of capital from a venture capital fund or funds[9]; 60% of companies that raise series A successfully raise series B; and, 65% of series B companies raise a series C.[10] Applying these ratios to the companies in the sample, yields the figures in the "Qualified 3 Year Demand" and "Annualized Investment" columns in the table below. Sample companies are conservatively estimated to attract $146.9 million in VC investment over the next three years, or roughly $49 million per year.

Table 4.3
Estimated Future "Qualified" Demand

| Next Round | Company Projections | Funding Success | Qualified 3 Year Demand | Annualized Investment |
|---|---|---|---|---|
| Closed Angel Round/Seeking Series A | $ 55,250,000 | 35% | $ 19,337,500 | $ 6,445,833 |
| Closed Series A/Seeking Series B | $104,350,000 | 60% | $ 62,610,000 | $20,870,000 |
| Closed Series B/Seeking Series C | $100,000,000 | 65% | $ 65,000,000 | $21,666,667 |
| **Totals** | **$320,950,000** | | **$146,947,500** | **$48,982,500** |

[8] It is unfair to assume that all start-ups, self-funded, or debt-financed companies are less likely to raise VC than angel- or venture-backed companies. Many of these companies are highly qualified – some even more qualified for VC investment than companies with an equity-raising track record. However, at the risk of overgeneralization, they are excluded from the analysis to yield a more conservative estimate of qualified demand for VC.

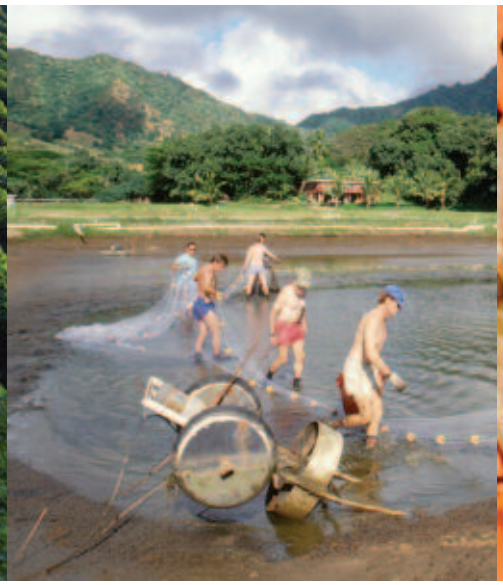
[9] Boeker and Wiltbank, Angel Investor Performance Project, forthcoming. Studied data from 86 angel groups with 539 angel investors 3,097 investments found 35% subsequently raised capital from VC funds. A different Kaufmann Foundation study places the figure at 50%+, but the lower figure was used to yield more conservative estimates.

[10] Hochberg, Ljungqvist and Lu, Whom You Know Matters: Venture Capital Networks and Investment Performance, 2006. analyzed data on 47,705 rounds in 16,315 portfolio companies managed by 1,974 VC firms from 1980 to 2000.

## 4.2 A NOTE ON THE LOCAL BUYOUT MARKET

The $49 million in projected annual demand excludes an important segment of demand for private equity investment: equity capital for acquisitions of mature companies. Buyout equity funds acquisitions that enhance company value when new owners streamline operations restructure financing (e.g. reduce debt), merge firms to achieve economies of scale, or reorganize a business. Acquisitions can create wealth for previous owners and can also allow good companies facing closure to remain viable.

Historically, no Hawai`i-based funds have specialized in buyouts. However, interviews identified two funds that intend to participate in buyout financing in the coming years. Both firms see an opportunity in Hawai`i buyouts driven by the retirement of baby boomer business owners. As they approach retirement age, many local business owners are looking to liquidate their ownership stakes. Many of these companies are either closing or being bought by out-of-state companies or investment firms. Both venture firms see an opportunity to enhance good companies and create a locally-financed alternative to closure or mainland acquisition with a Hawai`i-based buyout fund. Both estimate the market opportunity at around $80 to $100 million per year.


## 4.3 ASSESSING SUPPLY–SIDE RISKS

Even with robust demand, two kinds of supply-side risk could undermine good investment opportunities: (1) there could be too few VC funds active in the local market for institutional investors to invest through, resulting in good deals that are never discovered, (2) there could be too many VC funds with too much capital focused on Hawai`i, leading to fierce competition over deals, inflated valuations, investment in sub-standard deals, or idle capital – all of which all would depress investor returns. In order to assess these risks, we examined data on the supply side of the VC market.

We examined VC supply using historical, secondary data from PWC/NVCA, VC fund reports, and interviews with fund managers. Data from these sources was available for 27 funds – nearly the entire universe of VC funds active in the Hawai`i market. The investment activity for these funds for the past 3 years is summarized in the table below.

Several fund managers reported that they were in the process of, or would soon begin raising a new fund. Five new Hawai`i-focused funds are planned within the next 1 to 2 years, and 5 mainland/international funds with a track record of significant investment[11] in Hawai`i are also raising new funds. Together, these 10 funds aim to raise roughly $128 million for investments in Hawai`i.[12] Assuming 100% of their fundraising goals are met, $128 million will be invested in Hawai`i companies over the next 3 to 5 years.

Every fund manager but one will seek to raise a fund larger than the last fund they managed. New funds will be 50% to 300% larger than a manager's previous fund. Fund managers report that they plan to raise larger funds for one of three reasons: 1) because they had to pass on larger deals in the past due to insufficient capital, 2) because they expect to make investments in Hawai`i companies that have emerged from the seed/early stage and therefore require larger amounts of capital, 3) because emerging industries in Hawai`i are more capital intensive by their nature, particularly cleantech and life sciences.

Although planned fundraising reflects an ambitious increase over past years, the combined $128 million fundraising goal of these 10 funds still falls short of the demand predicted by the 63 sample companies examined above. Assuming the capital raised by VC funds today is invested in companies over the next 3 years, VC funds need to raise $147 million today to serve annual qualified demand of $49 million.

This data suggests that an adequate number of funds of sufficient scale are positioning themselves to serve anticipated demand for VC in Hawai`i. It also suggests that there is currently low probability of saturating (over-supplying) the market with capital, since fundraising goals still fall somewhat short of the forecast of qualified demand.

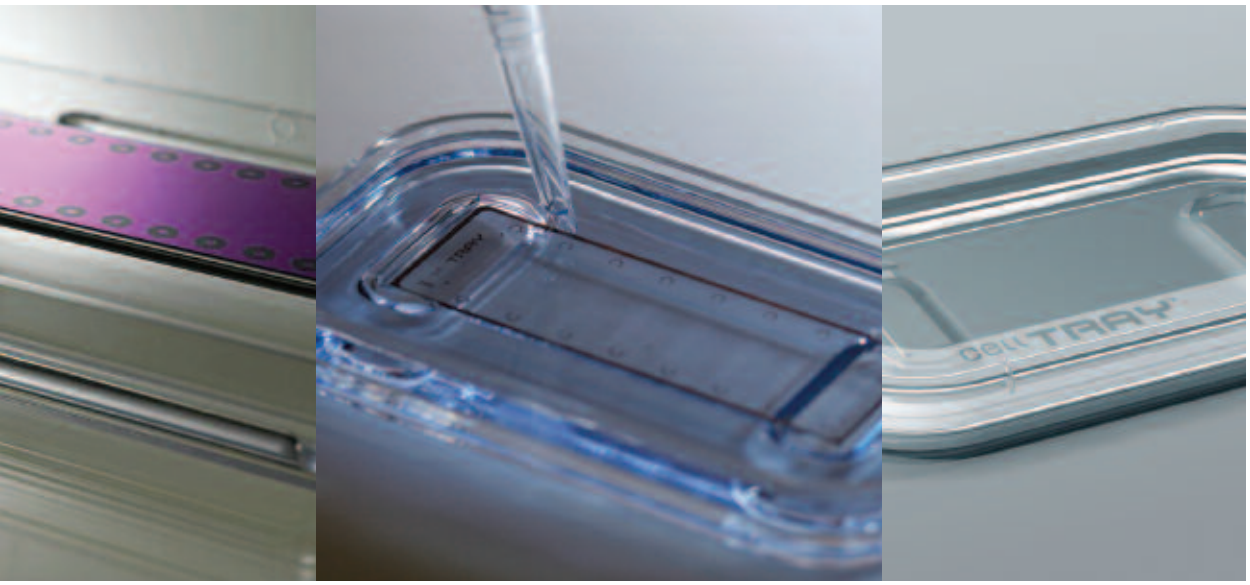
Table 4.4
Historical Supply of Venture Capital by Fund Type

| Fund Type | Funds | Deals | Past 3 Years | Avg. Invest. |
|---|---|---|---|---|
| Hawai`i Focused Funds | 9 | 69 | $ 50,800,000 | $ 736,232 |
| Funds with Hawai`i Presence | 9 | 36 | $ 36,375,000 | $1,010,417 |
| Funds Occasionally Investing | 8 | 8 | $ 32,000,000 | $4,000,000 |
| **Totals** | **27** | **113** | **$ 119,175,000** | **$1,054,646** |

[11] Using the same definition from section 2: funds with at least 2 investments and a quarterly presence in Hawai`i.
[12] We took the fundraising targets of Hawai`i-focused funds and assumed that 90% would be invested in Hawai`i, consistent with historical investment. For mainland/international funds, we applied assumptions ranging from 10% to 25% of capital invested in Hawai`i based on fund-specific track records.

## 4.4 SUMMARY CONCLUSIONS FROM PRIMARY DATA

The primary data points to a substantial increase in demand for venture capital over historical levels in the coming years. From a non-random sample of 63 companies, we can anticipate qualified demand of $49 million per year over the next 3 years. The increase will be driven largely by maturing companies in need of larger rounds of capital (companies seeking series B and C financing). Since capital raised by a VC fund today will be deployed over the next 3 years, VC funds will need to raise $147 million in the near term, in order to serve qualified annual demand of $49 million. VC fund managers have begun the process of raising capital to fill this demand. At the time of the study 10 fund managers with a track record of investing in Hawai`i were raising a combined $128 million likely to be invested in Hawai`i (based on those funds' track records of Hawai`i investment). Most fund managers aimed to raise larger funds than they had managed in the past to fill a perceived need for larger sums of capital among companies in the Hawai`i market. Though this combined fundraising goal is ambitious, it still falls short of the $147 million in near-term demand from sample companies, suggesting that the probability of over-supply is limited.




Nanopoint's innovative cellTRAY® slide – won a gold IDSA design award in 2007. The cellTRAY is shipped in the cellTRAY dish which is a fully reusable Petri dish replacement.

## APPENDIX A

Company Questionnaire

*Introduction*

Hawaii Institute for Public Affairs is conducting a study of the supply of and demand for venture capital in Hawai`i. The goal of the study is to define the current and anticipated demand for venture capital in Hawai`i, including an examination of the scale and character of that demand. We recognize that some of the questions we are asking may be sensitive in nature, as they relate to your company's track record and financial performance. No company-specific data will be reported. Your candor will be critical if the study is to generate information that is useful to the institutional investors with an interest in making Hawai`i-based investments.

*Questions*

1. Company name

2. Industry

3. Year founded

4. Office locations

5. What stage of development is your company in?

    Seed
    Early
    Expansion
    Later/Buyout

6. Please check the one that best describes your MOST RECENTLY closed fundraising round:

    Angel
    Series A
    Series B
    Mezzanine
    Other, please specify

7. Year you closed your MOST RECENT fundraising round?

8. Amount raised in MOST RECENT fundraising round:

9. Did some portion of this funding come from external sources of equity (besides friends and family)?

10. Do you anticipate another fundraising round in the next 24 months (2 years)?

11. If yes, what is the approximate amount you hope to raise?

12. If yes, briefly describe the purpose of the new round:

13. How would you rate the availability of venture capital for Hawaii companies?

    1 Very Poor
    2 Poor
    3 Adequate
    4 Good
    5 Very Good

14. What are the major barriers to raising venture capital for Hawaii companies?

15. Comments on this study, survey, or other:

## APPENDIX B

Investor Questionnaire

*Introduction*

Hawaii Institute for Public Affairs is conducting a study of the supply of and demand for venture capital in Hawai`i. The goal of the study is to define the current and anticipated demand for venture capital in Hawai`i, including an examination of the scale and character of that demand. We recognize that some of the questions we are asking may be sensitive in nature, as they relate to your fund's track record and financial performance. No fund-specific data will be reported. Only aggregate figures will be reported for at least the last 3 years from the 20+ funds that have made investments in Hawai`i. Your candor will be critical if the study is to generate information that is useful to the institutional investors with an interest in making Hawai`i-based investments.

*Questions*

1. Current or most recent fund size?

2. Can you describe your investment strategy (e.g. industry focus, company stage)?

3. If currently fundraising, amount raised to date?

4. Any difficulties fundraising from limited partners in Hawai`i?

5. Portion of total capital raised from outside Hawai`i?

6. Was there a reason to deliberately seek out-of-state limited partners?

7. Year/Month first investment made?

8. Number of portfolio companies to date?

9. Total capital invested/committed?

10. Number of portfolio companies in Hawai`i?

11. Total capital invested/committed in Hawai`i companies?

12. Ratio of deals reviewed (conducted some due diligence) to investments closed?

13. Common reasons for passing on Hawai`i deals?

14. Did you pass on any deals because you had insufficient capital to fully fund them?

15. If yes, number and size of deals passed on?

16. How has your fund performed to date (IRR or other performance measure)?

17. Number of liquidity events to date?

18. Number of liquidity events anticipated within the next year?

19. Do you plan to raise a new fund(s) in the future?

20. If not, why not?

21. If so, when do you think fundraising will commence?

22. What is the anticipated size of the new fund (i.e. your fundraising goal)?

23. Will you raise all of it from Hawai`i limited partners?

24. How much of the total capital do you expect to invest in Hawai`i companies?

25. Will industry focus, company stage, or investment strategy be the same or different from current fund? If different, why?

26. Compared to today, do you expect that qualified demand for VC in Hawai`i will be

1 Much less
2 Less
3 Same
4 Greater
5 Much greater

27. Compared to today, do you expect the supply of VC in Hawai`i will be

1 Much less
2 Less
3 Same
4 Greater
5 Much greater

29. How much VC can the Hawai`i market absorb on an annual basis? Does this figure include later stage and buyout private equity?

30. If institutional investors like the ERS or Kamehameha Schools were to participate in venture capital investing in Hawai`i, how would you recommend they do so (e.g. invest directly in local funds, invest in a fund of funds, what criteria should they apply in selecting funds)?

## Hawaii Institute for Public Affairs

Hawaii Institute for Public Affairs is Hawai`i's first independent, nonpartisan, nonprofit public policy institute devoted to fact-based research, issues, education and community collaboration. The institute's goal is to improve the overall quality of life in Hawai`i by improving public policy.

By encouraging informed discussion of immediate and long-term issues facing Hawai`i's communities, the institute brings together scholars, policymakers and the community.

This collaborative approach of all major stakeholders creates a fact-based forum in which new knowledge, new ideas and new opportunities are created to solve Hawai`i's most important issues.

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