



# Technology Commercialization

## FLC Far West Conference

### August 31, 2011

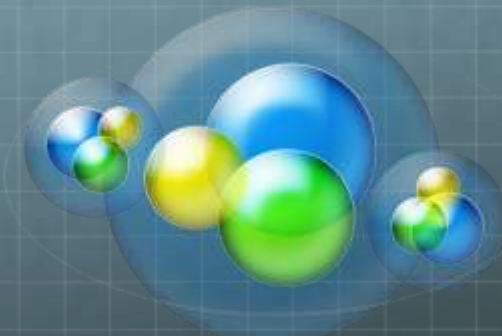
Critical Issues for Success

## My Background

- Cornell Engineering Physics, Stanford EE, Aeronautics Ph.D (almost)
- MBA, Pepperdine Presidential Key Exec, *cum laude*
- 25 Years in Aerospace Automatic Control
- Currently, CEO and co-Founder, ZanttZ, Inc.
- Started Six Companies
  - Integrated Systems, IPO '90, Merged with WindRiver, Acquired by Intel
  - Closely Involved in 8 Gov't Lab Spinouts
    - Safeview, Sold to L3 Communications, 2006
- VC's:
  - GP and Co-Founder, Zilkha Ventures
    - Cambridge, Top 5 percentile for '99 Funds
  - Venture Partner, ePlanet Ventures (\$800M)
  - Venture Partner, Paladin Capital Group (\$1B)
  - Venture Partner, Vanguard Ventures
- Consulting Assoc. Prof.
  - Stanford School of Engineering since 1988
    - Co-Founder, Stanford Technology Ventures Program
  - UBC Sauder School of Business since 2006
  - Stanford Lille Entrepreneurship Program/Founding Professor
  - Aalto University, Helsinki, Entrepreneurship Program

# Outline of Topics

- Realities on the Value of IP: The Safeview-L3 Case Study
  - What the Lab Had
  - What Was Needed to Capture Commercial Opportunities
    - Team/Opportunity/Financial Resources
  - What It Cost/Terms of the License/How Long
- Major Issues in Lab Commercialization
  - Business Impacts vs. Licensing Terms (Not a Zero Sum Game)
    - Time to Market/Cost/Ability to Finance
  - Managing Laboratory Immune Systems
- Ways to Improve the System
  - Imbedding Commercialization Groups In the Entrepreneurial Process
  - Case Studies to Improve Situational Awareness
  - Tips and Tricks to Attract Entrepreneurial Talent
  - Building Trust Between Operational and Commercialization Groups



April 2002  
CONFIDENTIAL

**SafeView Technologies, Inc.**

# SafeView Mission Statement

Provide Advanced Technology Solutions to Problems of  
Personnel Screening, Surveillance, and Biometrics

## The Problem

- Personnel Screening
  - Access to Airports and Transportation Centers
  - High-Security Government Installations
    - DoD Facilities
    - Federal Buildings
    - Correctional Facilities
    - Government Labs
    - Private/Public Facilities
- Biometrics
  - Personnel ID and Tracking via Body Measurement
- Surveillance
  - In-Wall Imaging
  - Portable surveillance systems

## SafeView Team

### Management Team

#### Rick Rowe, President and CEO

- Member of National Research Council Committee on Transportation Security
- Former CEO of \$550M Electronics Contract Manufacturer
- Retired from Honeywell (VP-GM Sensing & Control and Home & Building)
- West Point engineering grad with assignment to National Security Agency

#### • Tom Grudkowski, VP of Engineering

- Stanford PhD with 35+ patents
- 20+ year commercial career in product development

#### • Doug McMakin, CTO

- PNNL Team Lead on Millimeter Wave Holography
- 15 years experience as RF designer

#### • Karen Meyer, VP of Operations

- 20+ years in Electronics Contract Manufacturing
- Experience as buyer, program manager, business development

### Board of Directors and Advisors

- **Mike Lyons**, Chairman & founder, Stanford faculty and early stage investor
- **Mir Imran**, Director & founder, Investor with 250+ patents
- **Rick Rowe**, CEO Director
- **John Campagna**, Director, VP Intelligence & Operations Group, CTSC
- **Greg Kovacs**, Advisor, Stanford PhD and MD, DARPA Advisor, RF expert

Slide 7

Presentation Date: 9/5/2011

## Current State-of-the-Art

Application	Technique	Characteristics
Personnel Screening	Metal Detection	Metal Only
	Backscatter x-ray	Ionizing/In Eval
	Full-Body x-ray	Ionizing/In Eval
	Passive mm-wave	Poor Image/High-Cost
Biometrics (Body Dimensions)	Backscatter x-ray	Ionizing/High Cost
Surveillance	Visible Optics	Blocked by Clothing
	Infrared	Blocked by Clothing
	X-Ray	Not Portable

# SafeView, Inc. Intellectual Property

## ▶ Current Patents

- Real-Time Holographic Surveillance System, Awarded 10.3.95
- Real-Time Wideband Holographic Surveillance System Awarded 9.17.96
- Real-Time Wideband Cylindrical Holographic Surveillance System Awarded 1.12.99

## ▶ 4 Additional Invention Disclosures Being Filed

## The Solution

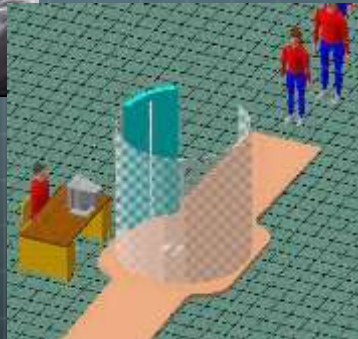
- 🌐 **MM-Wave Imaging Provides Numerous Benefits**
  - 🌐 Images Body Through Clothing
  - 🌐 Imaging of All Metallic and Non-Metallic Objects on or about the Body
  - 🌐 3-D (Coherent) Real-Time Imaging
  - 🌐 Non-Ionizing Illumination (Meets FCC Class B)
  - 🌐 Software Driven
    - 🌐 UI and Feature Set Allow Adaptation to Screening, Biometrics, and Surveillance with the Same Hardware Platform
    - 🌐 Privacy Algorithms Demonstrated
    - 🌐 Tech Support/Training Remotely Delivered
  - 🌐 Low cost of goods (\$10K-\$20K Depending on Configuration)
  - 🌐 Low-Power Consumption Permits Portable Devices



## Next Product Iteration: Cylindrical Holographic Imaging System



Present



Future



Combined Cylindrical  
Holographic Algorithm

## Alternative Concept: Semi-Cylindrical "Clamshell" High Throughput Scanner



## Battelle Technology Deal Points

- 🌐 Exclusive Rights to IP and Follow-Ons in Field of Use: Detection of Security Threats
- 🌐 2.5% Royalty on Net Non-Government Sales
- 🌐 \$200K/Yr. Funding for Battelle Support
- 🌐 37% of Founders' Equity (Prior to Funding)
- 🌐 \$200K In License Fees
- 🌐 We'll Discuss The Issues Around Terms Later

## The Market-(US)

Application	Venue	Installations
Personnel Screening	Airports/Travel Ctrs	15,000
	DoD	5000
	DoJ/Federal Bldgs	5000
	Customs	500
	Corrections	3000
	Others/Public Evnts	2000
Biometrics	Customs	500
	Secure Facilities	500
Surveillance	Classified Customers	500

## The Market-(ROW)

Application	Venue	Installations
Personnel Screening	Airports/Travel Ctrs	5000
	Govt. Security	1000
	Customs	500
	Corrections	1000
	Others	500
Biometrics	Customs	200
Surveillance	Foreign Govts	500

US: Number of Units 32,000

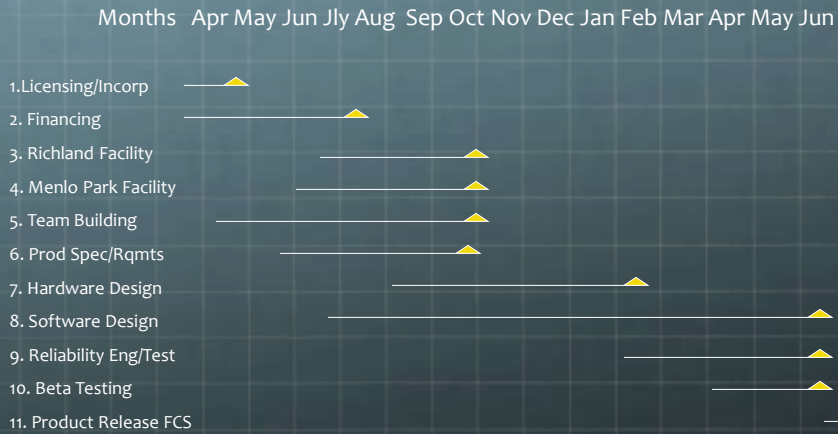
ROW: Number of Units 8700

@ASP of \$200K, TAM is:> \$8B

## Competition

Devices	Company	Price	Installed	Issues
Metal Detectors	Ceia OSI/Metor	<\$10K	99.9% of Entire Base	Not Effective False Alarms
Backscatter x-ray	OSI/Rapiscan AS&E	\$125K	<50	Ionizing/High Cost
Full-Body x-ray	ConnPass Heimann	>\$300K	<5	Ionizing/High Cost
Passive mm-Wave	QinetiQ MilliVision	>\$100K	<5	Poor Image Quality/Bulky

## Milestones



## Advisory Board

- ▶ Dr. Greg Kovacs, Prof. Stanford/RF Systems, Medical Issues, DARPA Advisor
- ▶ Gary Morgan, IP Director, Battelle PNNL
- ▶ John Campagna, VP Intelligence & Operations Group, CTSC/Customer Liaison
- ▶ John Avolio, Director, Government and Aviation Affairs, PE Detection Systems

# VC Financing

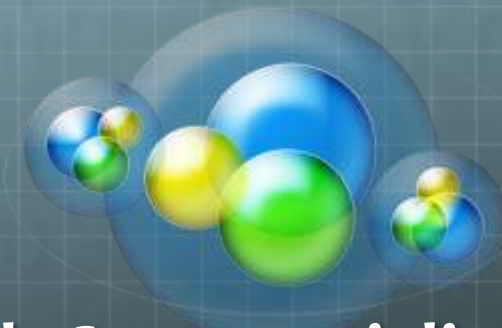
- Two Rounds of \$7M A Round and \$15M B Round
  - Draper Fisher Jurvetson, Paladin Capital Group, Novak Biddle
- Since Both Rounds Needed to Build a Very Complex Product, No Sales Traction Existed at B Round
- Financings Were Very Dilutive

# Outcome

- SafeView Was Sold to L3 Communications in Mid-2006 for \$110M. About 40% of That Was Earn-out Which L3 Refused to Pay
- Battelle and VC's Made Significant Returns
- Founders Were Crushed Out; Management Team Carve Out Provided Some Dilution Protection
- Product Has Made Significant Impacts in Physical Security Markets (mostly air transport)
  - Standard for Performance in Personnel Scanning

# Process Assessment










- License Negotiations Took 6 Months and Cost SafeView \$100K in Legal Fees from Cooley Godward
- Negotiations Nearly Cratered at Least 5 Different Times
- Final Terms Were Extremely Onerous on Equity and Fees
  - Battelle Ownership Crushed Founders from the Outset
  - Fees Used Valuable Seed Round Cash; BMI Refused to Convert to Equity
- We Were Very Lucky to Achieve What We Did
  - Funding Environment Was Very Difficult
- I Would Never Do This Again














## Tech Commercialization from Government Labs


Questions You Must Answer. A Difficult But Potentially  
Rewarding Process

# Why We Should Care About Innovation

-  The U.S. cannot remain a debtor nation forever
  -  No real National Investment Strategy/ Management by Hope
  -  No energy policy for decades
  -  No Control of Entitlements
  -  No "U.S. Inc." Kind of Approach
-  Strength Comes from Producing Leading-Edge Technology and Subsequent Products/Services That People Around the World Want
-  Outsourcing is Not the Answer When The Total Carbon Footprint is Included in the COGS
  -  We Have Badly Damaged Our Ability to Manufacture
-  The Vast majority of the GDP Does Not Come from the F-500.

## Innovation: We Need Warp Drive

-  Contrary to the Popular Press\*, Entrepreneurial Immune Systems Are Alive and Well
  -  Within Companies
  -  Within Government Labs
  -  Within Social Systems
-  Big R is needed to create more areas like Silicon Valley
-  Big R no longer available from Corporations (e.g. MSFT) as a real driver of growth: Immune Systems Are Too Powerful
-  This must come from Gov't. funding thru Univ. and Gov't. Labs
-  This is public investment in supercharging innovation
-  Playing this as a zero sum game to "protect careers" or optimize internal compensation schemes is against our own interest as investors
-  We Need to Move Faster with Less Bureaucracy and Aggressively Align Interests
-  The AIG model of let's tank the company and get big bonuses is not the answer

 \* The Economist, March 14, 2009

# Need for Commercialization

- Commercializing Stanford's IP Output Was/Is the Primary Driver of Silicon Valley
  - Started by Gov't Funding
- The U.S. Spends More Than Any Country on R&D at University and Gov't.Labs
- This Can Be the Engine That Drives Innovation-If It Is Used Effectively
- The Effectiveness of *Implied* Public/Private Technology Partnerships Is Critical to Improving U.S. International Competitiveness
- Creating More "Silicon Valleys" Provides Huge Economic and Societal Value
- Innovation Is Critical To Resolving Global Warming, International Competitiveness, and Our Ultimate Standard of Living

Why IP Management Is Important

**"I Can Make A Whole Lot  
More Money Skillfully  
Managing Intangible  
Assets Than Managing  
Tangible Assets"**

-Warren Buffet, CEO Berkshire Hathaway

# Elements Needed to Make This Work

- Know What You Want and What It Is Worth
- Know Why You Want It
  - Company Roadmap
- Get Enough Understanding of the Licensing Process to Assess Feasibility of Getting the IP on Reasonable Terms
  - May Not Be Possible
- Understand Lab Echo System and What You Need from It
  - Will the Immune System Kill You?
  - Do You Need to Take People Out of the Lab?
  - What IP Transfer Help Do You Need?

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# Know What You Want

- Lab Technology Can Be:
  - More Mature Than Stuff from Universities
  - May Have Support of Lab Commercialization \$
  - May Already Have Had Some Business Cases Built
- Is The Technology Key to Your Business Selling Proposition or Just Nice to Have?
- Do You Need Exclusive License or Just Freedom to Operate?
- What Role, If Any, Would Lab Personnel Play?
- Value of IP: Whatever It Costs To Develop, Multiply by 10-20 To Get Commercialization Cost

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# Know Why You Want It

-  **Do A Full Opportunity Assessment**
  -  Customer Problem Being Solved & Proof!
  -  How Many Have This Problem?: Market Size & Adoption Risk
  -  What Technology and Team Resources/Time Gets You A Viable Product? What Is Tech Risk?
  -  What Is Your Team Now and How Do You Create a Credible Team?
  -  What Is The Financing Risk? Capital Required and When
-  **Build a Business Plan**
  -  Needed to Get Any Kind of License Out of A Lab
  -  Shows You How Much IP You Can Afford

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# Licensing Process

-  **Without Reasonable Business Terms, License Could Make the Company Un-Financeable**
  -  Less Than 5% Equity
  -  Single Digit Royalty
  -  Reasonable Fees
  -  Fast Negotiation
  -  Look at Stanford OTL Website: <http://otl.stanford.edu/>
-  **Many Labs/Universities Are Clueless**
  -  E.g., Run by Litigators
  -  Don't Know How to Support Entrepreneurs
-  **Commercialization Group Is a Key Player**
-  **Never Let Your Lawyers Negotiate a License!!**

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# Understanding Lab Echo System

- 🌐 Critical to Extracting IP from a Lab
- 🌐 What Is Business Model of a Lab?
- 🌐 Are You Perceived as Interfering with It?
- 🌐 Is There a Political Battle Between Commercialization and R&D Programs?
- 🌐 Will Technical Groups Help You or Attack You?
  - 🌐 Recall Why Researchers Are There in the First Place
- 🌐 What If You Want Lab Personnel to Come Out?

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# Final Thoughts

- 🌐 You Must Be Incredibly Persistent
- 🌐 This Can Take a Long Time
- 🌐 You Must Really Understand What You Want and How to Get It
- 🌐 You Must Do An Assessment of Lab's Ability to Get This Done
- 🌐 This Does Not Happen Much; There Is a Reason
- 🌐 Build Relationships with Key Commercialization Managers-This Will Pay Off and Is Absolutely Necessary to Create Trust

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# Onerous Terms Sheets & Licenses

*Remember, technology is rarely unique: generally multiple ways to solve a commercial problem.*













*Onerous Terms in a Technology License Can Pre-determine an Enterprise's Failure.*

*Greed and Ignorance of a Startup's Investor Needs Is Always A Bad Combination In Any Negotiation*










## What Startup Companies Need In Tech Licensing

- 🌐 A Technology Partner, Not An Adversary
- 🌐 A Win-Win Relationship, Not A Zero Sum Game
- 🌐 A Keen Respect for Cash; Startup Capital Is VERY Expensive
- 🌐 Agreements That Align Interests
- 🌐 Fair Valuations of Technology
- 🌐 Honest and Diligent Representations of Technology
- 🌐 No Hidden Agendas

# Financing Red Flags (1)

-  **Large Up Front Fee**
  -  Significant problem due to startup's limited cash reserves
  -  Poor Use of Resources
  -  Sends Message to Company:
    -  You won't succeed
    -  We're going to "get it while we can"
  -  Recommendation: Large enough fee to show serious, but focus on milestones and take equity.
-  **Excessive Royalties**
  -  Adversely Affect the Income Statement
  -  Places Unrealistic Value on Initial Technology
  -  May Prevent Business Model Changes (very common in startups)
  -  May Prevent Exit or Require Substantial Renegotiation

# Financing Red Flags(2)

-  **Lack of true exclusivity: Internal Lab Groups cannot be allowed to compete with the Startup**
  -  Destructive Politics Between Commercialization Groups and Operating Divisions
-  **Co-Exclusive Licenses: Illusion of competition**
  -  Result: no one will invest
-  **Lack of Clear Title: Licensed Technology has been licensed to third parties (e.g. software)**
-  **Lack of Essential Commercial Information**
  -  Lab Doesn't Know What It Has or Where It Is (e.g. No BOM)
  -  Deliberate Withholding of Market or Technical Information
  -  Hyping the Technology to Increase It's "Value"

## Financing Red Flags (3) The Cap Table

- Equity Ownership Stakes Which Adversely Impact the Cap Table
- Total Ownership Above 5% Post-A Unless Purchased
  - E.g. 5%+ 5% purchased is OK
- Total Ownership Above 10% Post-A Regardless
  - Makes Company Un-financeable (most of the time)
- Liquidation Preferences Outside of Purchased Preferred Stock Which Impute the Exit Value






## The Classic Startup Cap Table

- Shown in Next Slide
- “A” Round VC’s Each Want Close to 20%
- Founding Team Needs Around 25%
- It Is Essential to Have Around 30% in the Option Pool to Attract New Employees and Build the Team
- These Constraints Dramatically Affect Remaining Equity for License Provisions, i.e. There is no room for outrageous 20% Equity Stakes Frequently Demanded by Naïve IP Owners

# Classic Startup Cap Table

Shareholder	Shares	\$ Invested	Shares Purchased	Total Owned Shares	% Ownership
Investor 1		\$2,000,000	444,444	444,444	22.5%
Investor 2		1,500,000	333,333	333,333	16.9%
Founder 1	250,000		-	250,000	12.6%
Founder 2	250,000		-	250,000	12.6%
			-	-	0.0%
Others	100,000		-	100,000	5.1%
Employee Pool			-	600,000	30.3%
<b>Total</b>	<b>1,200,000</b>	<b>\$3,500,000</b>	<b>777,778</b>	<b>1,977,778</b>	<b>100.0%</b>
Price per share		\$4.10			
Pre-money value		\$5,400,000			
Post-money value		\$8,900,000			

## Stanford's OTL: What Do They Do?

-  Do what's "best for the technology"
-  Foster good industrial relations
-  Be reasonable
-  Be flexible
-  Be action/results oriented

**My Quickest Result: License Terms Agreed in 4 Hrs.**

# The OTL Philosophy

“Since It Is Impossible to Predict Which of Our Early-Stage Technologies Will Someday Become Significant, We Do As Many License Agreements As Possible, thereby Planting Seeds for the Future”

# History

- Started in 1970
- over 5,300 cumulative disclosures
- 2100 Active disclosures
- Executed over 2400 licenses
- Approx. 1350 active licenses

## The upside...

- OTL has generated ~\$600M in cumulative gross royalties
- “Non-DNA” was \$345M
- Over \$460 M stayed at Stanford/inventors
- OTL has given \$33M to the Research Incentive Fund

## Sobering Statistics

- 1/5300 is a BIG WINNER
- 13 cases generated \$5M or more
- 43 cases generated \$1M or more in cumulative royalties
- The University cannot count on royalties for university operating expenses

# Royalties

- 🌐 \$50,000 in 1970
- 🌐 \$61.2 M in 1998 (highest to date)
  - 🌐 \$45.4 M in 2003
- 🌐 442 inventions generating income in FY 2003
  - 🌐 Only 44 brought in royalties of \$100,000 or more
  - 🌐 7 cases brought in \$1M or more

# OTL's Success is a numbers game

- 🌐 Early stage inventions
- 🌐 Royalties reflect early stage
- 🌐 We are looking for broad patents
  - 🌐 revolutionary v. evolutionary products
- 🌐 **5-10 years patience**

## Ways to Improve the System: Some Ideas

- Imbedding Commercialization Groups In the Entrepreneurial Process
  - Create EIR Like Positions
- Case Studies to Improve Situational Awareness
  - Entrepreneurs Do Case Seminars for Commercialization Groups
- Attracting Entrepreneurial Talent
  - Create an “Easy Button” to Make Commercialization Processes Look Attractive
- Building Trust Between Operational and Commercialization Groups
  - Achieve Buy-In at High Level
  - Must be Done from Top Down
  - Entrepreneurs Now Viewed as Evil

“We Had the Experience  
But Missed the  
Meaning”

TS Eliot