



# **A Comprehensive Solution for Global In-Transit Asset Visibility**

**Presented to:**

**Aerospace Auto-ID Programme  
Founders EXPO**



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20 June, 2007**



# Agenda

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- Introduction
- SPC history in Auto-ID
- The GlobalTrak<sup>®</sup> Asset Monitoring Solution
- Commercial Market Drivers and Security Initiatives
- Questions?





# SPC – Over 37 Years Of Excellence

- **Corporate Overview**

- Advanced technology innovator
- Scientific, engineering, technical assistance
- Systems engineering and refining total business process
- Systems development, acquisition, test and evaluation
- World class radar development
- 300 employees, \$60 million annual sales



1000 Wilson



## **Selected areas of technical expertise**


- Radar Physics
- Homeland Security
- Communications & Information Solutions
- Intelligence Support & Analysis
- Security Design and Integration
- TriData: Fire & Emergency Services Consulting
- **Asset Visibility and Supply Chain Management/Security--GlobalTrak**



One Virginia Square



Advertisement appearing in the April, 2007 issue of Inbound Logistics



What will happen if you lose this load?  
Will you know proactively, or must you wait  
for shipment unloading?

**It's 10:00 in Shijiazhuang, China.  
Do you know where your containers are?**

Do you know the condition of it and of its contents? Has the container remained sealed?  
Is the temperature staying in the proper range? Have other conditions been  
meeting parameters? Have you been notified? Has action been taken?





# GlobalTrak: A Historical Perspective

## SPC Initiatives in Container Monitoring and Security

Events of  
September 11<sup>th</sup> 2001



GlobalTrak  
is Conceived as  
Global Container  
Security  
System (GCSS),



First V1 Hardware  
Alpha Test

V2 Container  
Automated  
Sensor Kit  
Development



Operation  
Safe  
Commerce  
Trials



V3  
Development  
And Field Trials



V3  
GlobalTrak  
Worldwide  
Deployment



9/11/01

9/13/01

2003

2004

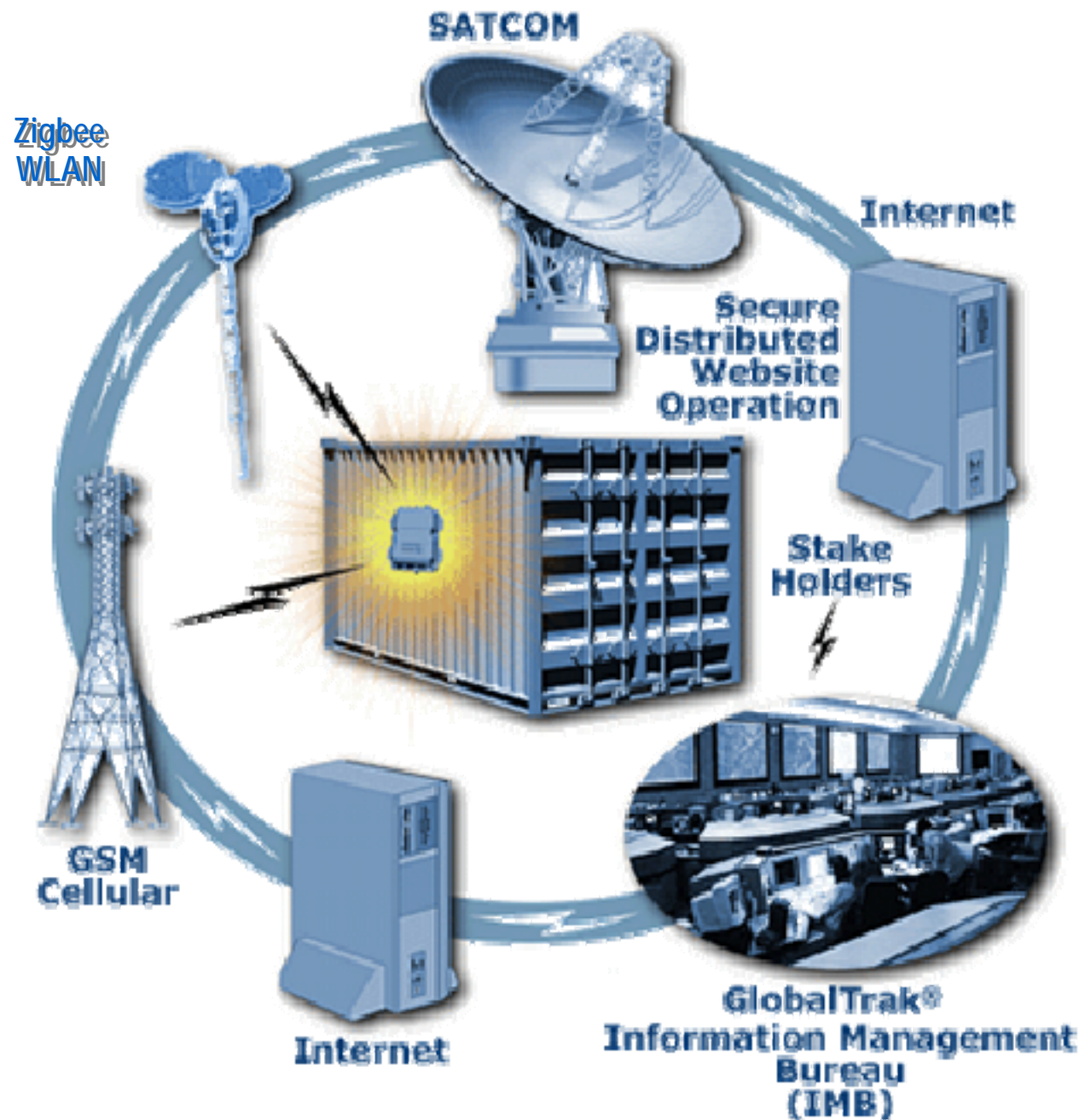
2005

2006

2007

SPC was among the first working towards container security and monitoring

# GlobalTrak<sup>®</sup> System Architecture





# Asset Monitoring Unit (AMU)

Highest communications availability in the industry



- 3 modes of 2-way communication
  - Satellite - Integrated Orbcomm Modem
    - Real-time & global coverage
  - Cellular - Quad-band GSM
    - Global SMS and GPRS
  - WLAN – Ad-Hoc ZigBee Wireless
    - 1500 ft range, peer connectivity
    - Remote sensors
- No additional infrastructure required
- Total weight 5 lbs including batteries
- Environmentally sealed for operation from – 40C to + 85C
- Configurable messaging levels for up to 4 year battery life
- Ultra low power/computation powerhouse
- Freescale u-Proc (885 MIPS) and Blackfin DSP (1200 MIPS)
- Multiple mounting options

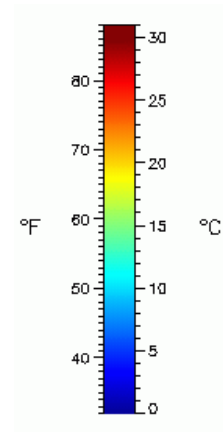
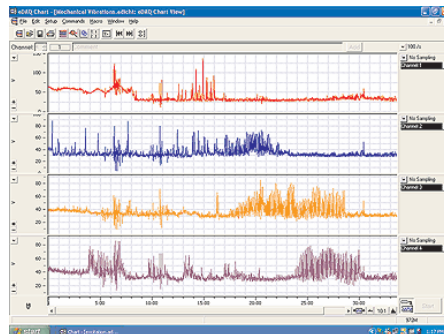


# Asset Monitoring Unit (AMU)

## Open Sensor Architecture

- **Built-in Sensors**

- Global positioning  
(location, speed, direction)
- Door position
- Temperature
- Acoustics
- Light source
- Tampering



### Optional Sensors:

- RFID
- Shock and Impact
- Infrared
- Vibration
- Chem/Bio
- Radiation
- EJ Brooks Wireless Door Seal
- Wireless Barcode Reader
- Customer Specific



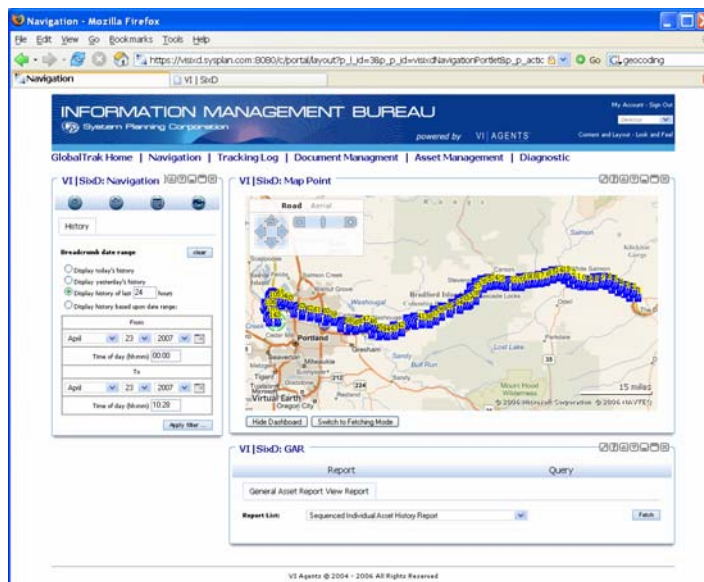


# GlobalTrak Information Management Bureau (IMB)

STAKEHOLDERS



- Web Based
- Java Based
- Asset Management
- Mapping and Geozoning
- Document centric
- Complex Business Rules
- Open and scalable architecture
- Event driven
- Flexible and adaptable interfaces to legacy systems (XML, SMS, SAP, Excel)





# GlobalTrak

## Information Management Bureau (IMB)

- XML, CSV, SAP,  
Excel

-Examples:

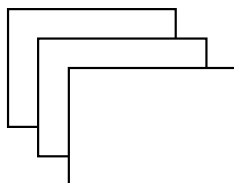
-PO

-BOL

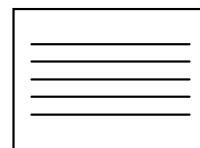
-ASN

-Manifest

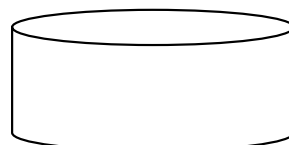
Documents



Rules



Events



-Alarms

-Associations

-Data Privacy

-Publication

- Location

- Timestamp

- Sensor Data

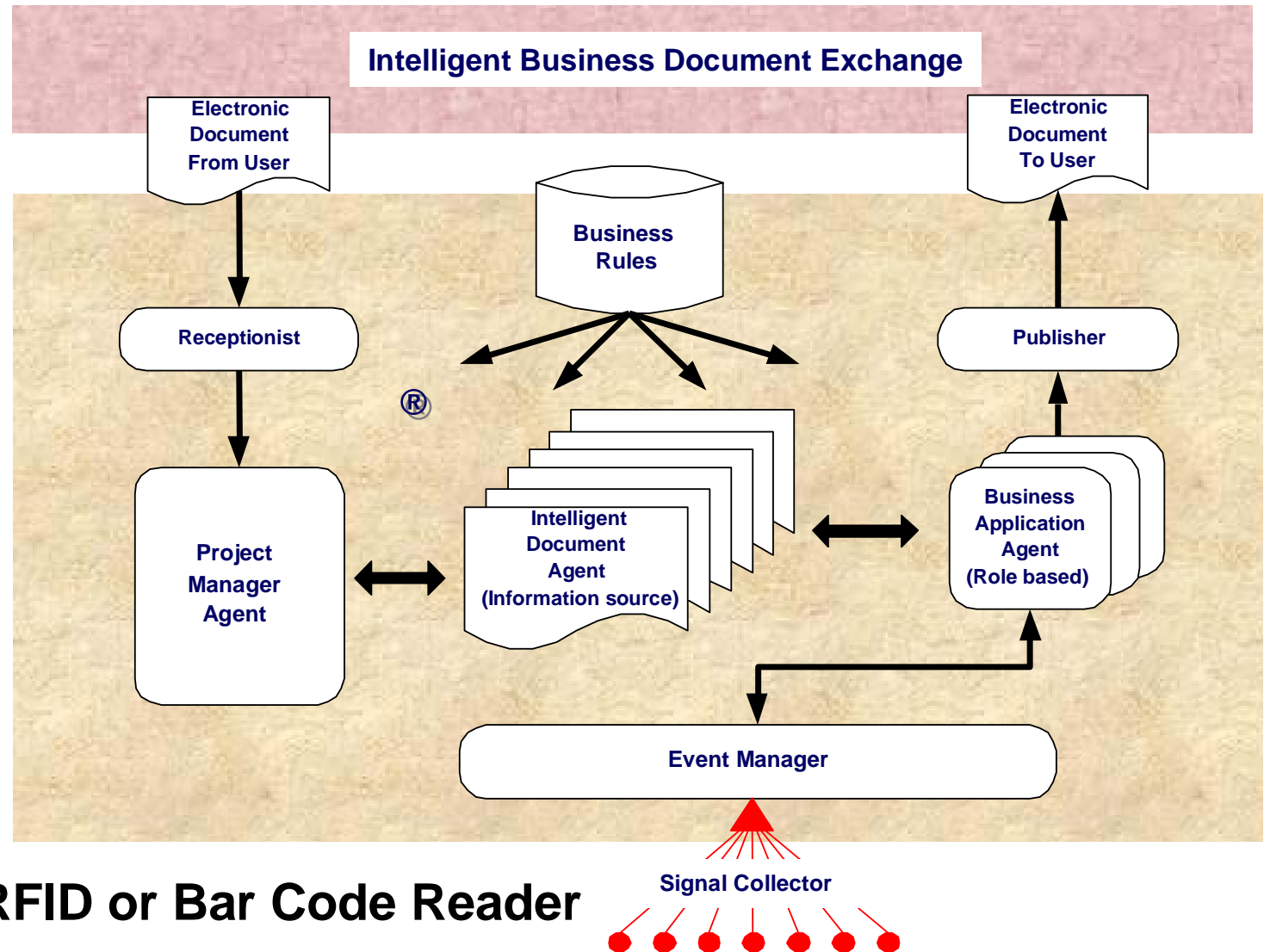
- Door State



# GlobalTrak® is an Integrated “Sense and Respond” Solution

Legacy or  
Other

The IMB



The AMU or RFID or Bar Code Reader

GlobalTrak® is powered by VI 6D® from VI Agents



# Visibility to the Item Level via Integrated Auto-ID

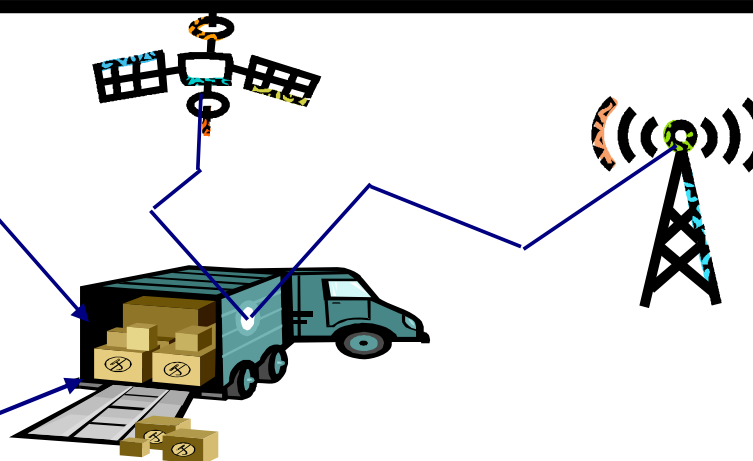
- In-Transit Visibility—Smart Asset Tracking—a form of Auto-ID which complements item, case, and pallet level RFID tags
- In-Transit Visibility directly impacts daily operations, providing real-time knowledge and proactively managing
  - cargo location, cargo condition, and operational response



## The Integrated Solution:

- Container or Trailer tagged with SPC's GlobalTrak® ,
- Contents are tagged with required labels: RFID, barcode, and/or human readable

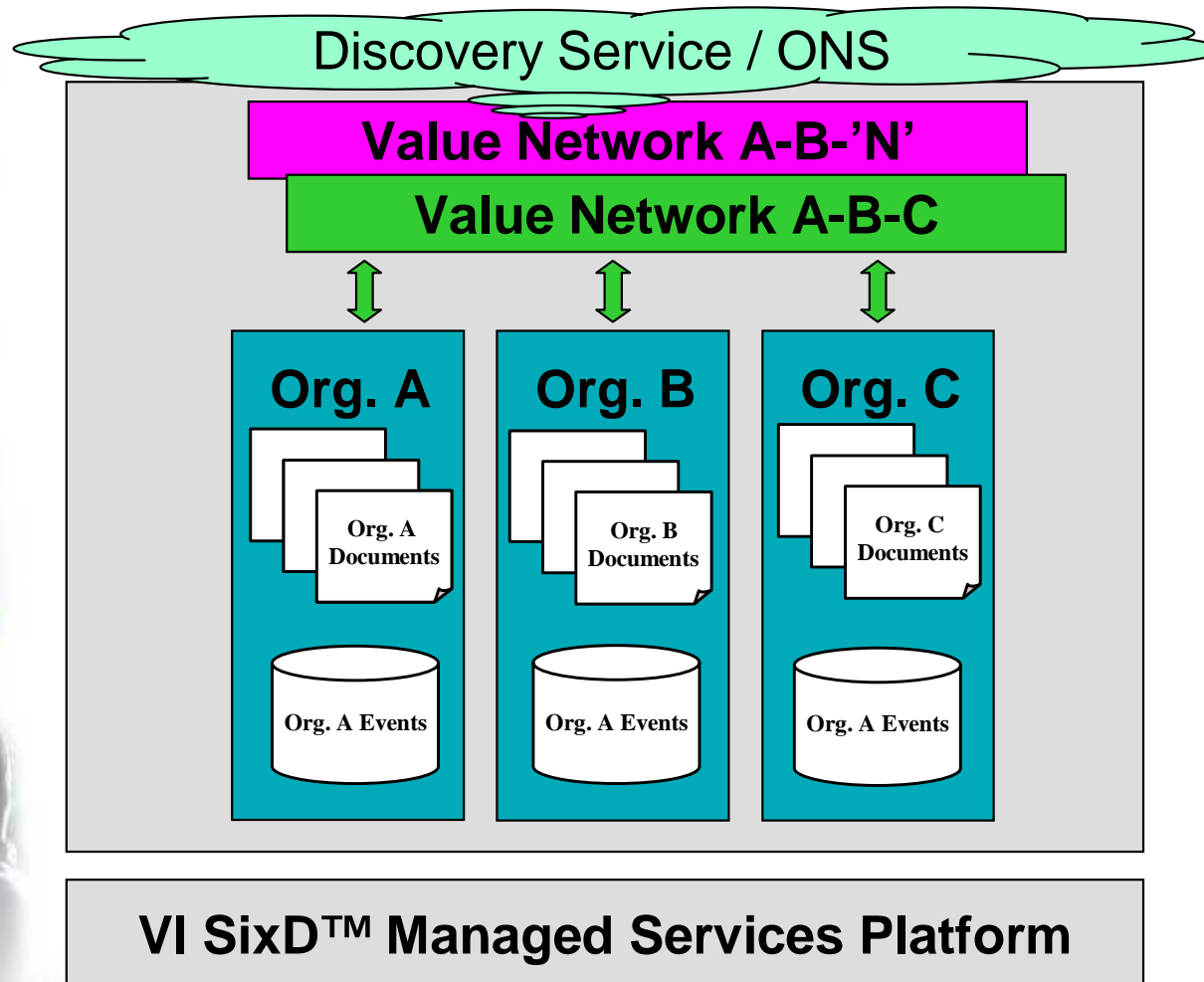
- Purchase Order 1234
  - Trailer
    - Pallet
      - Case
        - Item
        - Item
        - Item
      - Case
      - Case
    - Pallet
  - Trailer
    - Case
    - Case
  - Trailer
    - Pallet
      - Case
      - Item







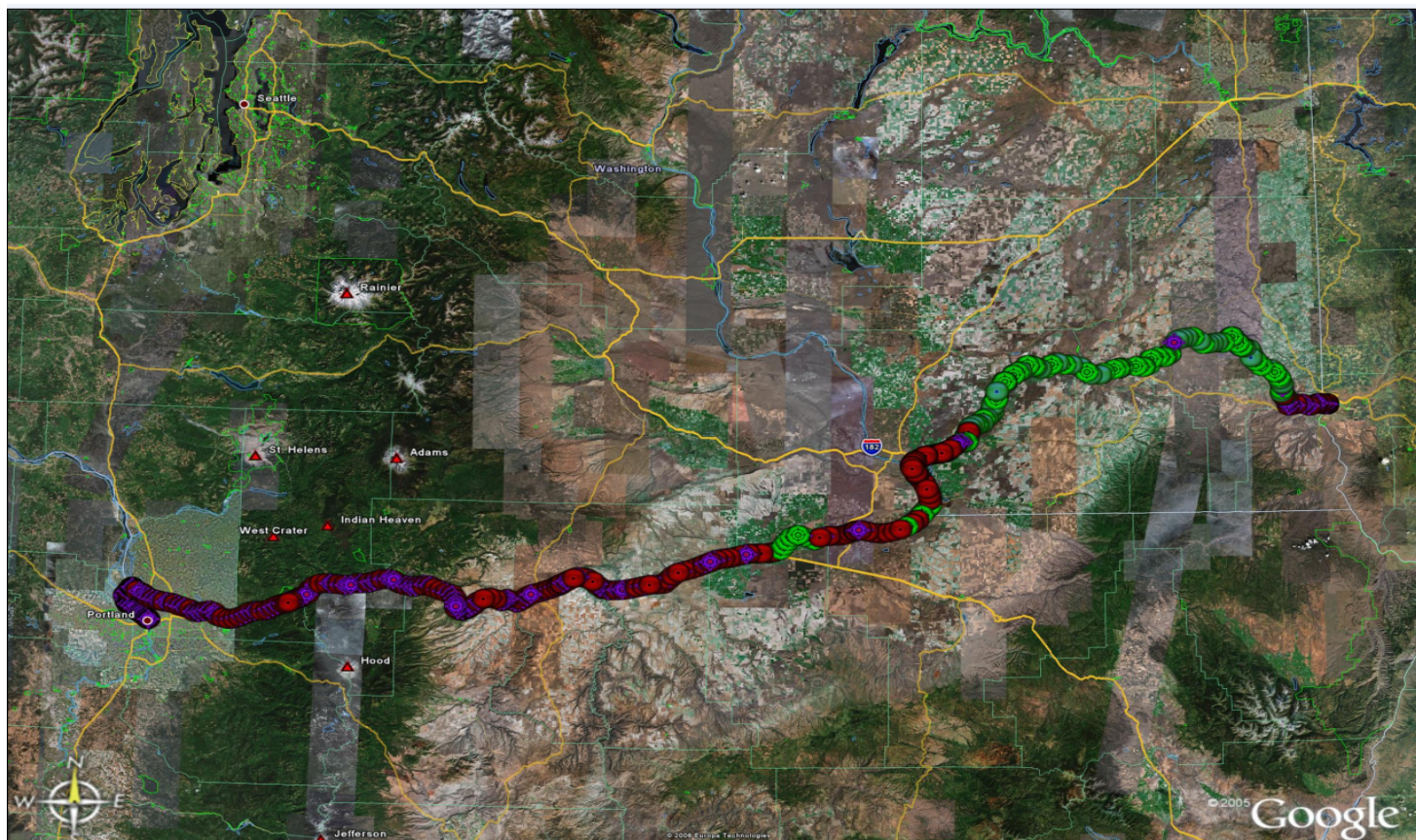
# Value Network—Multiple Participants



**Each Org. (A-C)  
has its own secure  
workspace within  
GlobalTrak®**

**Information is  
shared via  
information  
published to the  
particular  
Value Network**

**Data managed at  
the element**



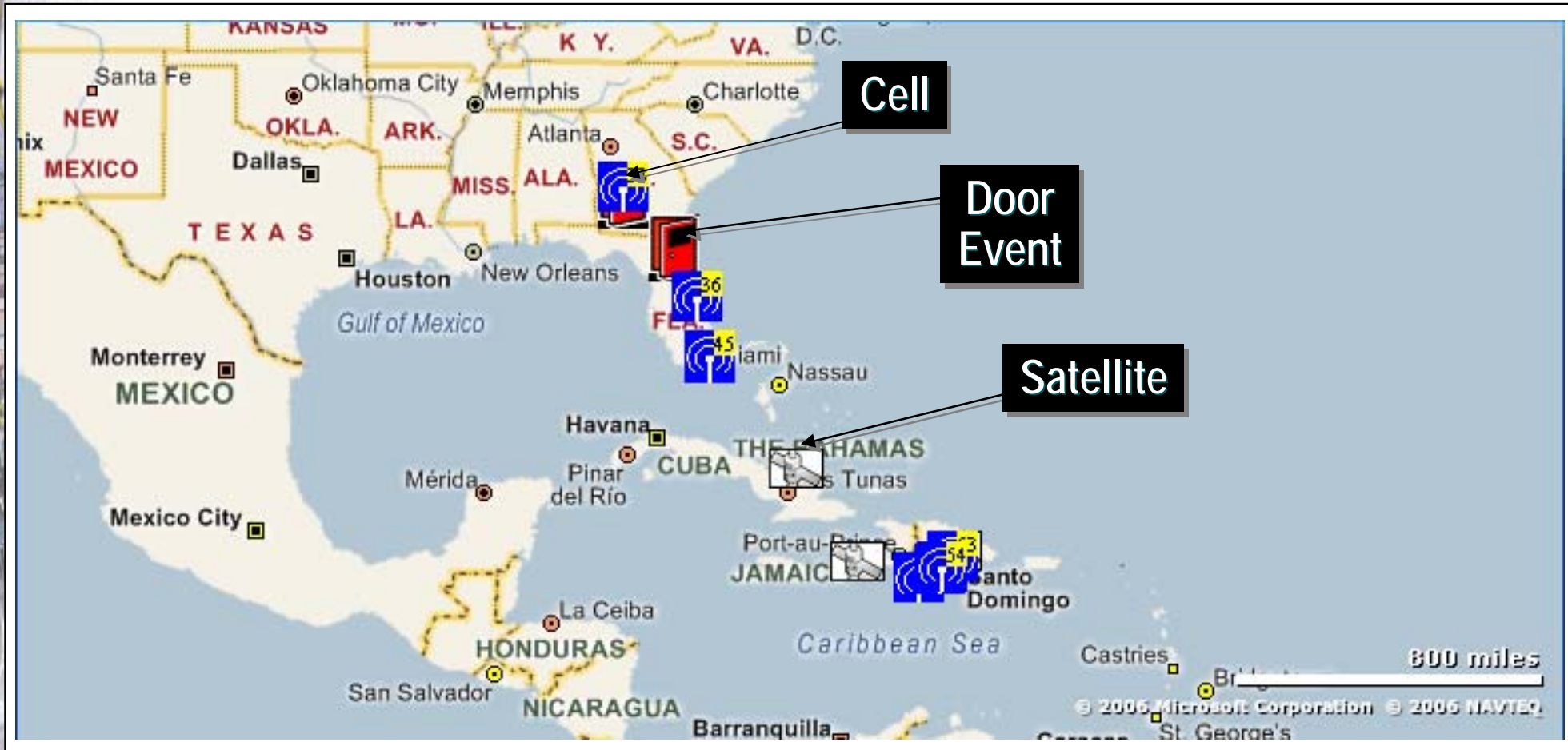
**Tracking barges from Portland, OR, USA to Lewiston, ID, USA and back:**

**The river cliffs made having both cell and satellite communications essential. Red and purple icons are cellular messages. Green and blue are satellite messages.**





# GlobalTrak Information Management Bureau (IMB)





# GlobalTrak - Intellectual Property Strategy

- SPC made early strategic decision to develop core technology lead and to pursue an aggressive Intellectual Property protection program
- Broad technology window
  - Provides product edge
  - Prevents-raises the bar of difficulty for existing competitors from selling system in this marketplace
  - Increases entry barriers for new competition
  - Provides licensing revenue stream
- Patents
  - 1 Granted
  - 10 Patents pending
  - 2 Provisionals in process







# GlobalTrak - Intellectual Property Strategy

- **Granted (July 2006):**
  - US Patent #7,098,784 Core Container Monitoring System – very broad patent for container monitoring system using sensors, data fusion, and communication channels
- **Patent Pending**
  - A **Data Fusion Center** (GlobalTrak IMB) that collects data from a multitude of sensor and units and performs intelligent processing of the data to determine the occurrence of complex events.
  - Using **wireless ad-hoc networks** communications in the GlobalTrak system to allow containers to communicate directly with each other as part of a dynamically assigned network to share common assets and information.
  - An **flock algorithm and system** tracking methodology for containers together being transported in groups or lots where containers “watch” each other.
  - A method and system for allowing various sensors to be used in the GlobalTrak system through an **open architecture sensor design** – analogous to Windows XP automatically recognizing and accepting peripherals such as a printer or mouse into the system.



# GlobalTrak - Intellectual Property Strategy

- **Patent Pending (continued)**
  - A **distributed processing architecture** where each computing element of the GlobalTrak system forms an aggregate massively parallel computer.
  - A **fully integrated wireless and satellite antenna** actually into the wall of roof of the container to increase performance, reduce cost, and make it stealthier.
  - A **fully integrated solar panel using a special spray film coating** on the wall or roof of the container to power and recharge the GlobalTrak system batteries.
  - A **Meteor Burst communication** channel to operate the GlobalTrak system which would require no wireless towers or satellites, but exploits communication properties naturally present in the earth's atmosphere.
  - Low cost CCD devices for a **visible and infrared image processing** to detect and record intrusions and security violations, monitoring contents of a container, and thermal profiling to detect things such as living persons or WMDs.
  - **Integrating the entire GlobalTrak unit into the walls** of the container "G-Wall" , including electronics, sensors, and power systems. We expect this to be the future trend for all smart containers.
- **2 other provisional patents in process**



# Embracing Regulatory Trends

- Added security will facilitate supply chain speed, efficiency resulting in cost benefits
- Take on CBP and C-TPAT requirements as partners
- Turn the national security information requirements into a management tool for your international supply chain
- Initial focus on most penetrable market segments
  - Reefers
  - Pharmaceuticals
  - Chemicals and HAZMAT
  - Rail
  - Other high value cargo



**Supply chain efficiency and security become a partnership**





# Supply Chain Management Benefits

- **Companies using SCM vs. no SCM**
  - 2X as likely to achieve 97% on time and complete delivery
  - 3X more likely to have faster delivery cycles
  - 13.6 day reduction in Days Payable Outstanding (DPOs)
  - 20-30% reduction in inventory
  - 2X more likely to increase market share
- **SCM is growing**
  - 52% companies will spend more in 2007 than 2006
  - 43% will spend more than \$500K
  - 55% have SCM as #1 priority

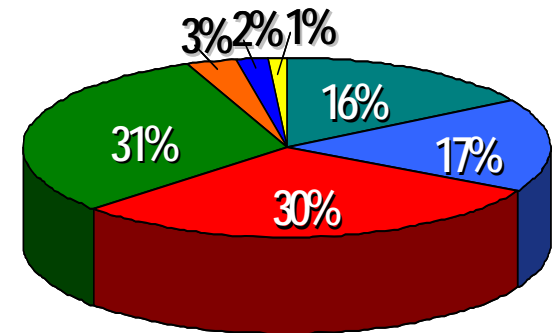


Source: Aberdeen Group, 2007



# Quantitative Benefits of Supply Chain Management

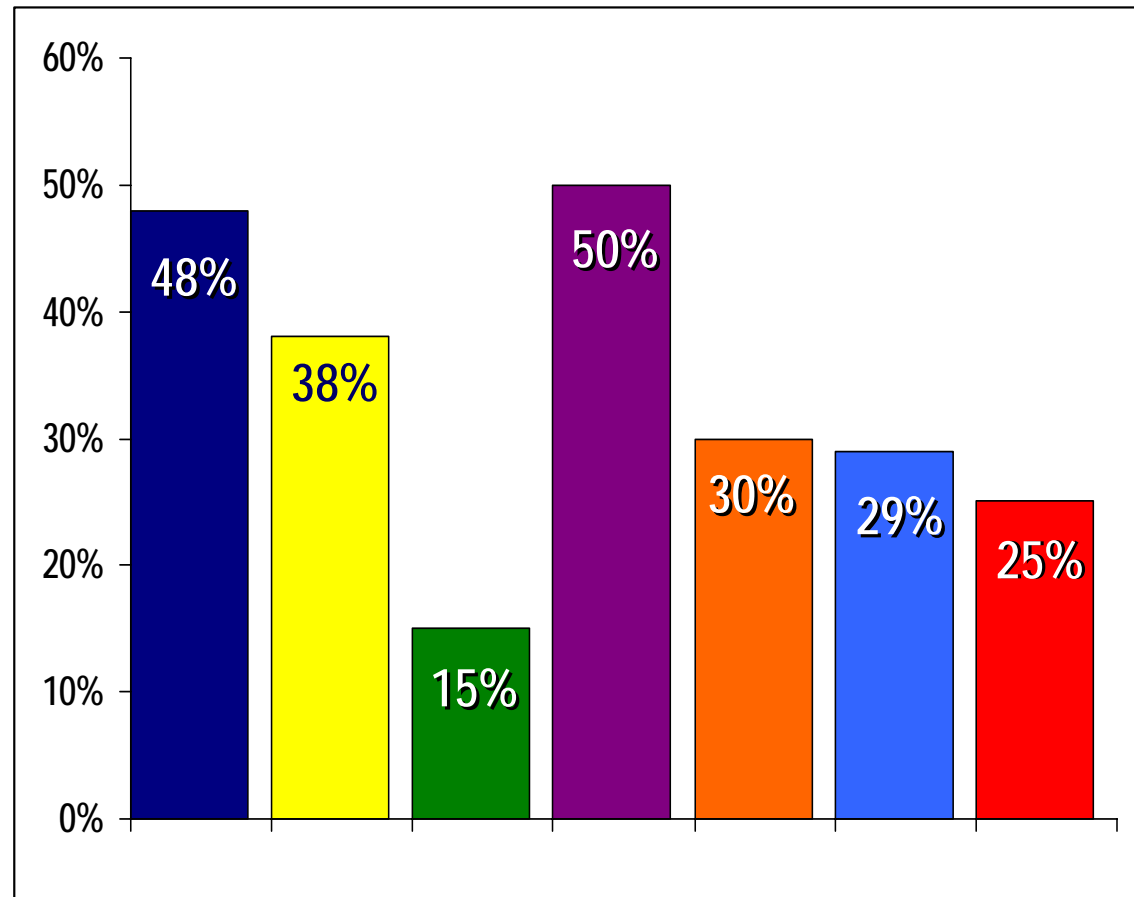
	Benefit per Container Trip	%	\$
	Increased manufacturing uptime	16	184.00
	Reduced lead-time variance	17	195.50
	Reduced out-of-stocks	30	345.00
	Reduced inventory	31	356.50
	Reduced labor and fees	3	34.50
	Increased container security	2	23.00
	Prevention of lost containers	1	11.50
	<b>Totals</b>	<b>100</b>	<b>\$1,150</b>



Reference: *Smart Boxes*, AT Kearney®, pub. Copyright 2005

# Relative Benefits of Supply Chain Management

- More efficient customs clearance: Reduction in cargo inspections
- Improved product safety: Reduction in theft
- Improved inventory management: Reduction in excess inventory
- Improved supply chain visibility: Increased access to data
- Resilience: Improvement in reported on-time shipping to customers
- Speed Improvements: Reduction in transit time
- Higher customer satisfaction: reduction in customer attrition



Reference: *Smart Boxes*, AT Kearney®, pub. Copyright 2005





# GlobalTrak Applications

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- **Current portfolio**
  - ❖ **Several Global Pharmaceutical firms**
  - ❖ **Major US inland barge operator**
  - ❖ **US importer of retail goods**
  - ❖ **Ocean-going container shipping line**
  - ❖ **Customs Agency overseas (Middle East)**
  - ❖ **Global Third Party Logistics Provider (3PL)**
  - ❖ **Major US defense sector supplier**
  - ❖ **Several major US Railroads**



# Summary - Market

- The container/reefer tracking and monitoring market is gaining significant momentum based on:
  - Multiple studies indicate strong and rapid return-on-investment for increasing supply chain efficiency, cargo condition monitoring, and enhancing cargo quality
  - Carriers and container/reefer manufacturers recognize the ubiquitous future of tracking and monitoring in supply chain management and are embracing this concept into their strategic plans
  - Regulatory trends and security initiatives such as Safe Port Act, C-TPAT and 10+2 are coming and tracking technology will play a strong role with in carriers meeting and embracing these requirements
  - Reefer control, remote diagnostics, and enhanced maintenance offers significant advantages to carriers who are current “flying blind”





# Initiative: Container Physics Research Forum

## Container Physics Research Forum (CPRF)

Government

Industry

Education

- **Problem:** Embryonic market, technology adoption barriers, and slow pace of regulation has inhibited much of the core research related to solving container security problems
- **Solution:** Pool resources
- **Charter:**
  - Establish priorities in core research areas related to container security and supply chain management
  - Foster collaboration between government, industry, and education
  - Share resources and technology
  - Offer a single voice to community
  - Contribute to and drive standards



# **Thank-you for your time attention and input**

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