

# GeoEye

## Corporate Overview

Presented to  
XIII Simposio Brasileiro de  
Sensoriamento Remoto  
April 24<sup>th</sup> , 2007

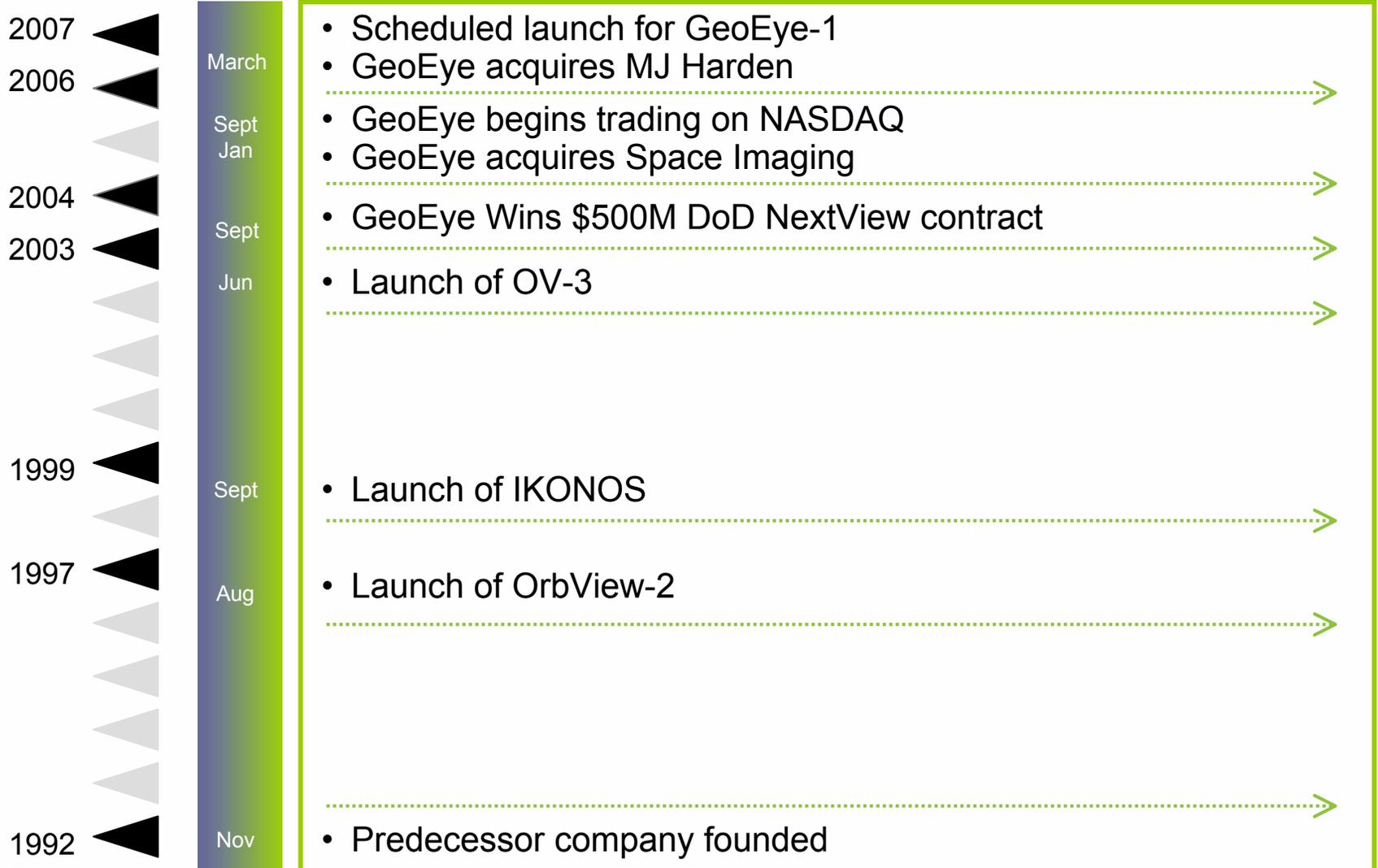


# About GeoEye

- GeoEye is a leading producer of satellite, aerial and geospatial information
- Core Capabilities
  - 2 remote-sensing satellites; 3<sup>rd</sup> this fall
  - 2 aircraft with digital mapping capability
  - Advanced geospatial imagery processing capability
  - World's largest satellite image archive: > 275 sq km
  - International network of regional ground stations to directly task, receive and process high resolution imagery
- GeoEye delivers high quality satellite imagery and products to better map, measure and monitor the world

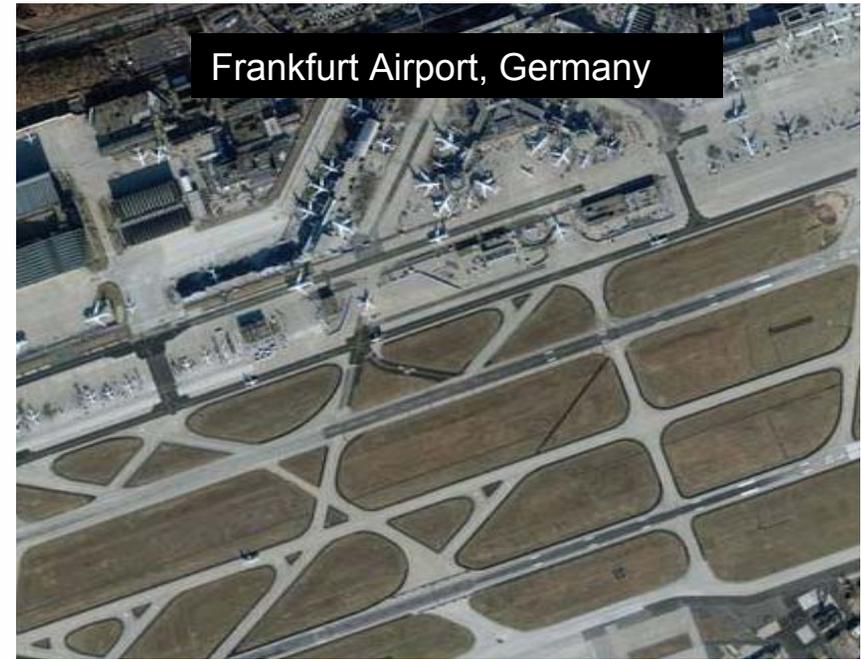


# Milestones



# Company Offerings: Imagery

- Extensive Commercial Satellite Imagery Archive
  - IKONOS and OrbView-3 combined archive: 278 million sq km as of April 2007
  - Online search for archive imagery



# Company Offerings:

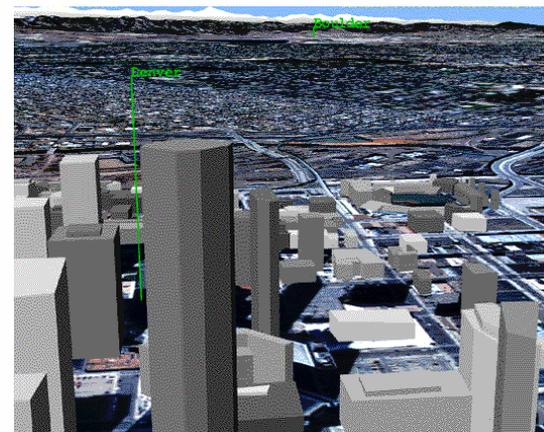
## Value Added Applications & Production

- Select Imagery Applications

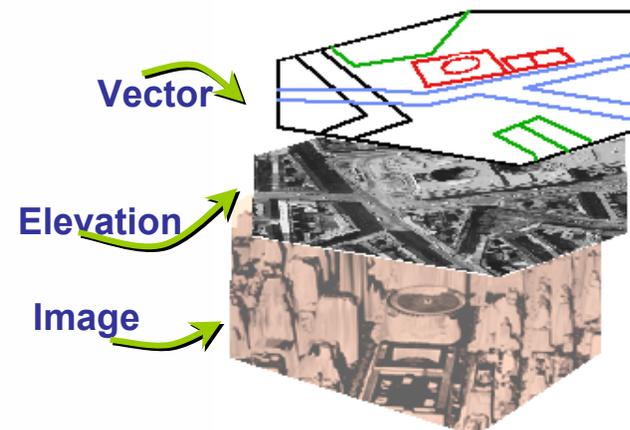
- National Security & Intelligence
- Online Mapping / Search Engines
- Homeland Defense
- Oil & Gas and Mining
- Air and Marine Transportation
- Insurance & Risk Management
- Digital Planimetric & Topographic Mapping
- Mobile GIS Services

- Value-Added Production

- Fused images, digital elevation models (DEMs), land-use classification maps
- World class facilities in:
  - St. Louis, MO
  - Thornton, CO
  - Dulles, VA
  - Mission, KS



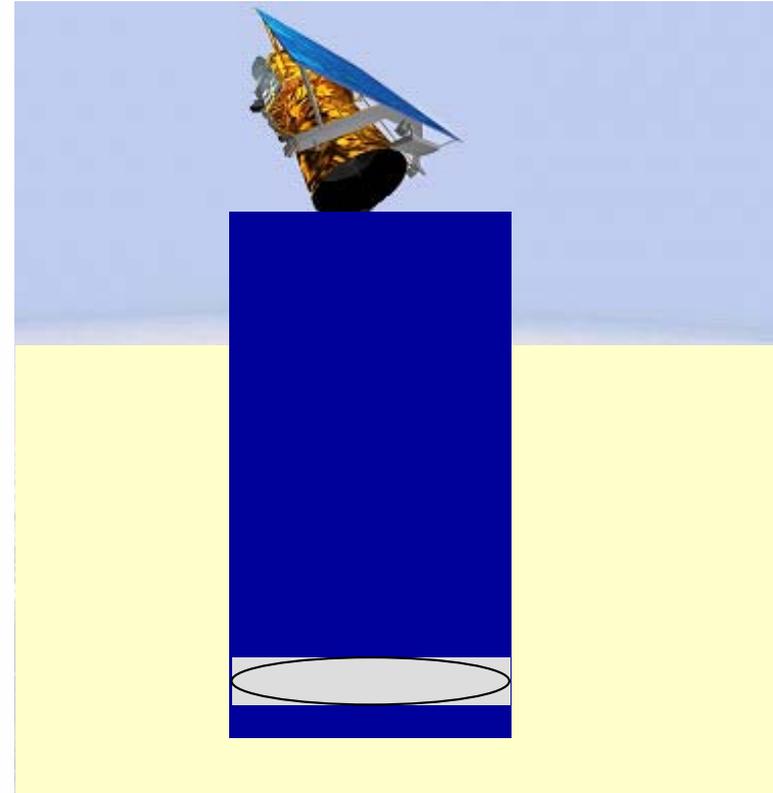
3-D Fly Through



Bundled Product Layers

# Company Offerings: Capacity

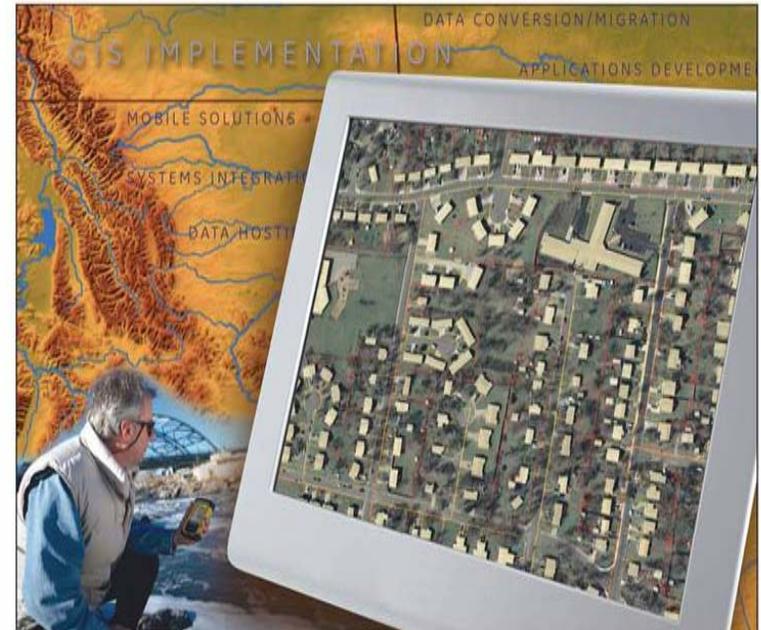
- Satellite access
- Aerial image acquisition
- Ground stations
  - Infrastructure / Upgrades
  - Operations, maintenance and training



**Satellite Imagery can be sold almost anywhere.  
Ground stations with tasking capabilities controlled under  
International Traffic in Arms Regulations (ITAR)**

# MJ Harden Services

- Aerial image acquisition
- Digital planimetric and topographic mapping
- Digital orthophotography
- Remote sensing / image analysis
- Field inventories
- GIS / Mobile implementations



# Customers

- GeoEye is a vendor of choice and trusted supplier of high-quality commercial satellite and aerial imagery and value added products to:
  - U.S. Government (National Geospatial-Intelligence Agency [NGA])
  - Foreign Governments
  - Strategic International Customers
  - Global Resellers
  - Commercial Customers
  - Online Mapping / Search Engines

# The Company

## NASDAQ: GEOY

- Locations
  - Headquarters: Dulles, Virginia
  - Operation Facilities:
    - Thornton, Colorado
    - St. Louis, Missouri
    - Norman, Oklahoma
    - Mission, KS
  - 4 Secure Facilities
- Employees: 375+
- Imagery from diverse platforms
  - IKONOS
  - OrbView-2
  - Aerial
  - GeoEye-1 (IOC Fall 2007)
- NASDAQ
  - Began trading Sept. 14, 2006

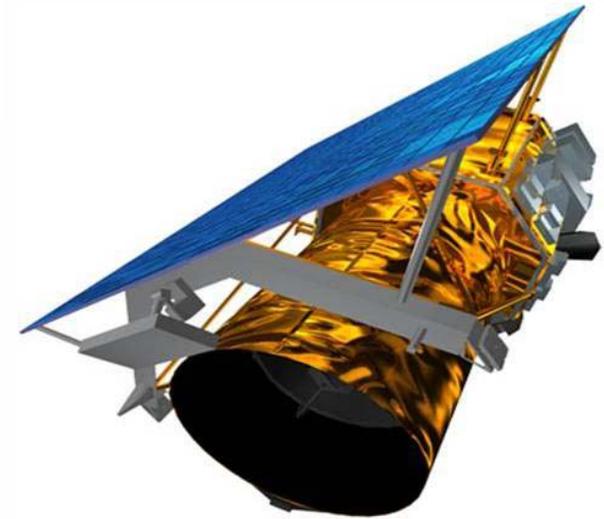
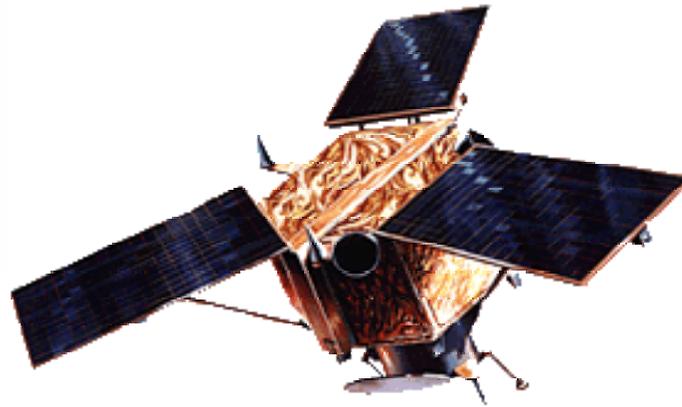


# Search Engines

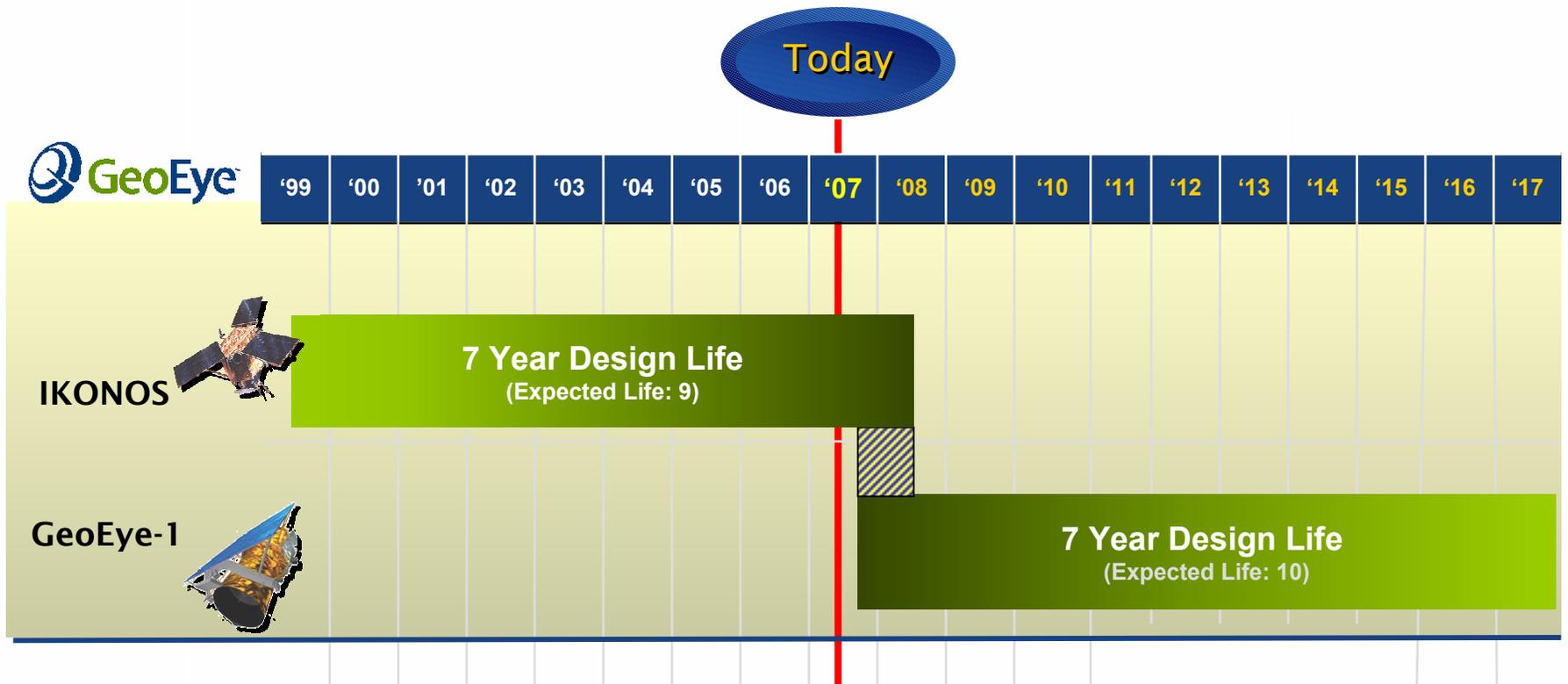
An aerial satellite-style photograph of the Golden Gate Bridge in San Francisco. The bridge spans across the dark water of the Golden Gate Strait, connecting the city to Marin County. The surrounding landscape is a mix of green hills, brownish terrain, and urban development. The sky is dark, and there are some white streaks, possibly from other aircraft or boats.

- GeoEye has contracts with Microsoft and Yahoo! as imagery content providers
- Joint marketing activities are in discussion to leverage these relationships
- Online search engines are finally...  
*"bringing satellite imagery down to earth"*

# GeoEye Imaging Constellation



# Continuity of Imagery Through 2017



**Access to uninterrupted commercial imagery assured**



# GeoEye Satellites

## Performance Summary

Performance Parameter	GeoEye-1	IKONOS
Altitude (km)	684 km	682 km
<b>Image Quality</b>		
Bands	1-PAN Band 4-MS Bands	1-PAN Band 4-MS Bands
PAN GSD at Nadir	<b>0.41m</b>	.82m
MS GSD at Nadir	<b>1.65m</b>	3.2m
<b>Geolocation</b>		
CE90 Accuracy (No Ground Control)	Designed for <3m	10m
<b>Collection Capacity</b>		
Revisit @ .5M GSD	2.8 days	n/a
Swath Width @ Nadir	15.2 km	11 km
Scene Size (sq km)	231 sq km	121 sq km
Max Nadir PAN Mono Area Collect Rate	125 sq km/sec	60 sq km/sec
PAN Point Target Rate (50 km spacing)	1,100 sq km/min 5 Points/min	484 sq km/min 4 Points/min

**PAN = Panchromatic (B&W)**  
**MS = Multispectral (Color)**  
**GSD = Ground Sample Distance**

# GeoEye-1

## Highest Performance Available In The Commercial Market

Image Quality	
Bands	1-Panchromatic Band 4-Mulitspectral Bands
Best PAN NIIRS	5.5
PAN GSD at Nadir	0.41m
MS GSD at Nadir	1.65m
Collection Capacity	
Swath Width @ Nadir	15.2 km
Daily MS Area (sq km)	350,000
Daily PAN Area (sq km)	700,000
Daily PAN Number of Points	520 - 2400
Geolocation	
CE90 Mono Accuracy (No Ground Control)	designed for < 3m
Orbit	
Altitude (km)	684 km
	Polar Orbit – Sun Sync
Equator Crossing	10:30 AM

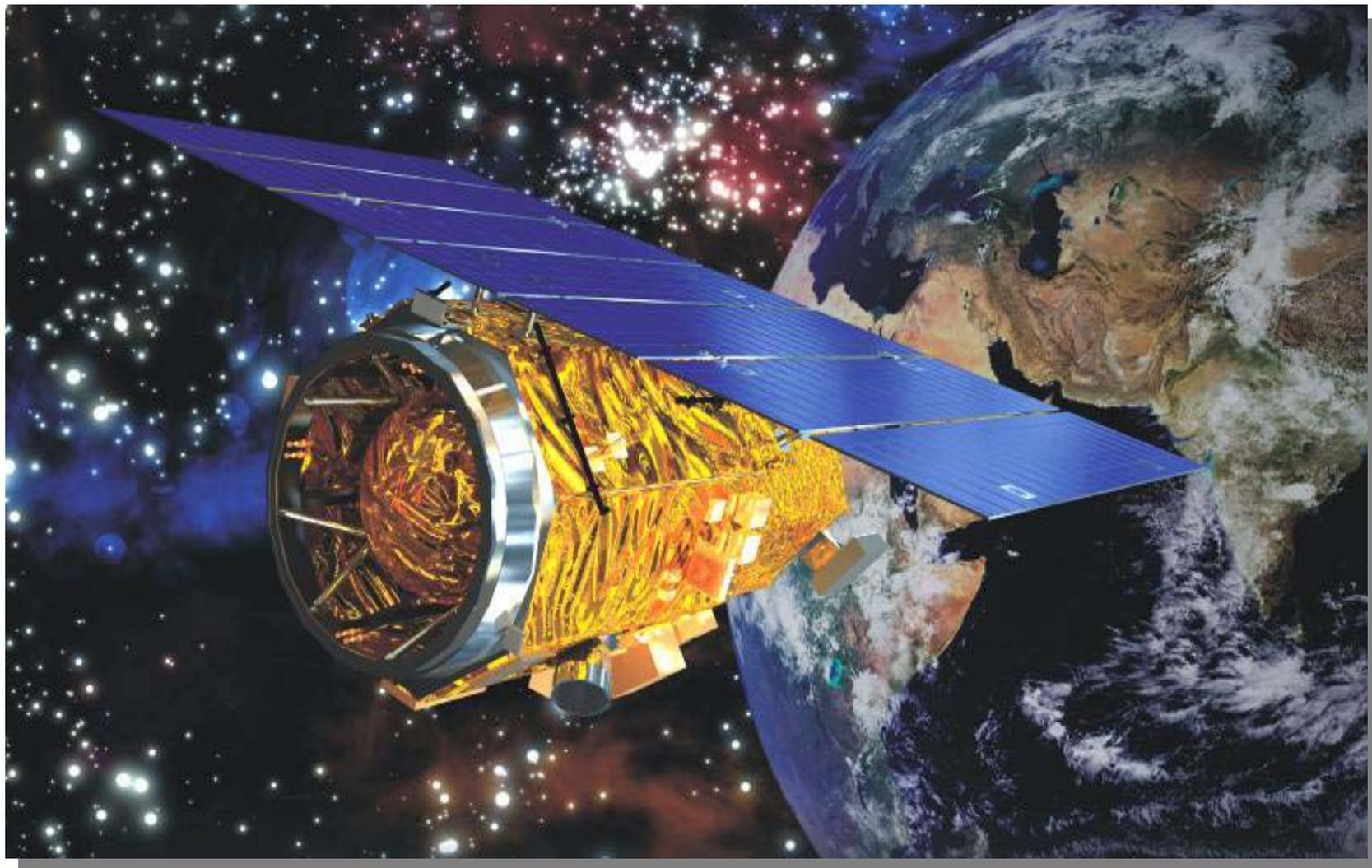
Only NextView satellite  
with Color Image

Ideal for Area Collection  
(e.g., Mapping, Charting  
and Geodesy Search)

Best Available with  
No Ground Control

Capacity Over  
Land Optimized

# GeoEye-1



# Simulated GeoEye-1 High Resolution PAN Sharpened Image



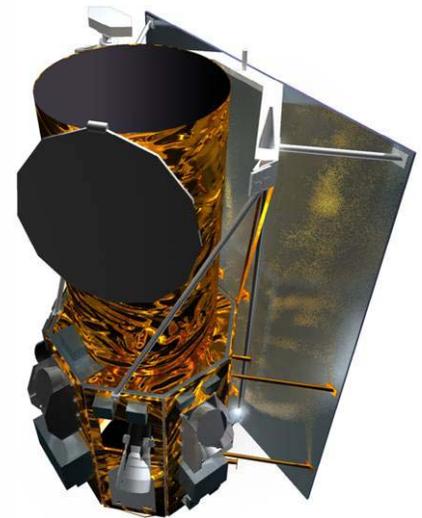
Denver City County Building

# GeoEye-1

## A Huge Collector of Global Imagery

- **Scheduled for launch 2007 with 7+ year design life**
- **GeoEye-1 incorporates next generation technology with proven IKONOS architecture**
  - Simultaneous 0.41 meter panchromatic and 1.65 meter multispectral imagery
  - Geolocation: designed for <3m accuracy without ground control
    - Best for any remote sensing satellite
- **Ground infrastructure already in place**
- **Collect up to 700,000 sq km/day in panchromatic mode (size of Texas) and 350,000 sq/km/day in multispectral mode**

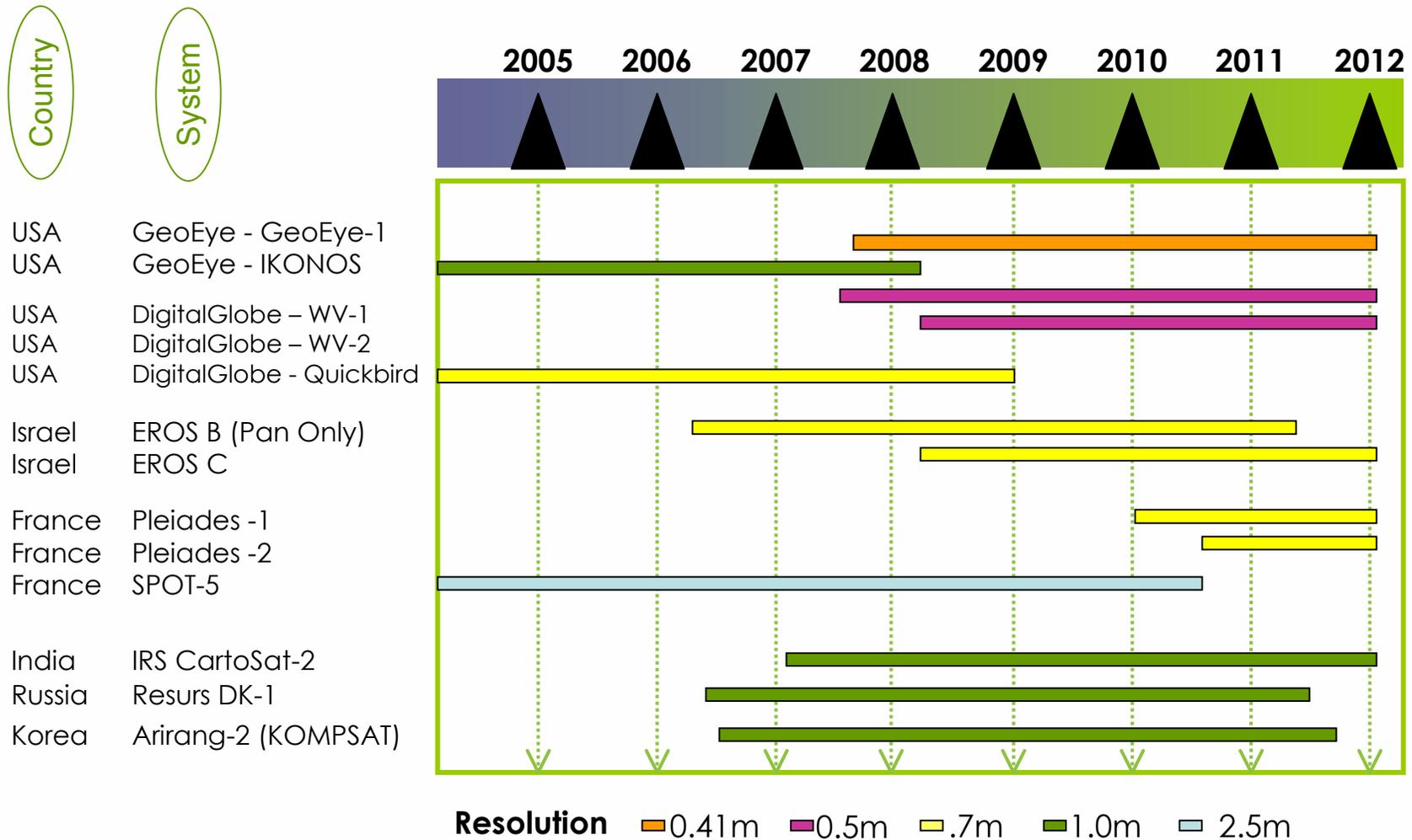
**Most Advanced  
Commercial  
Imaging Satellite in  
the World**



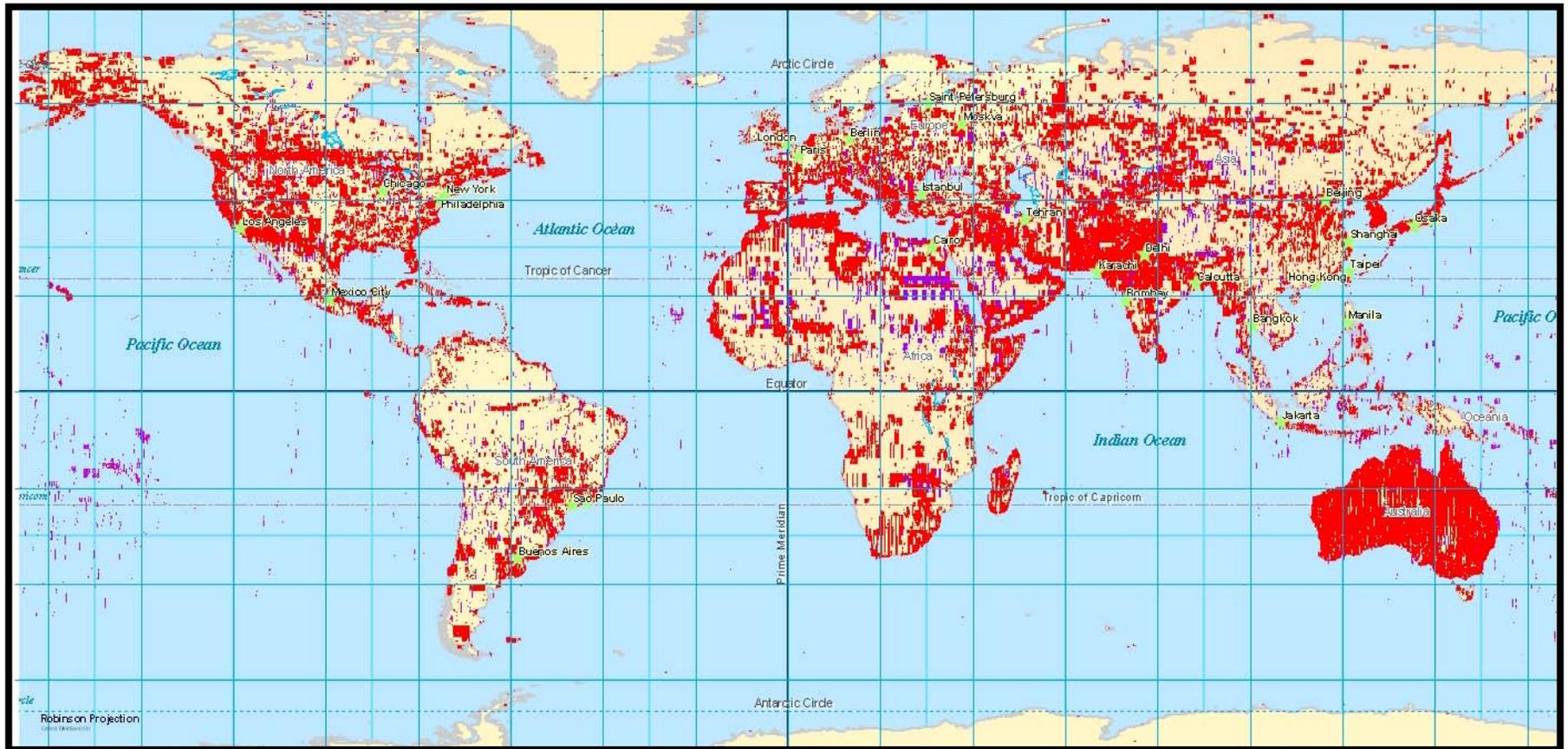
G040533-002

# Competitive Landscape

## Selected High Resolution Imaging Satellites



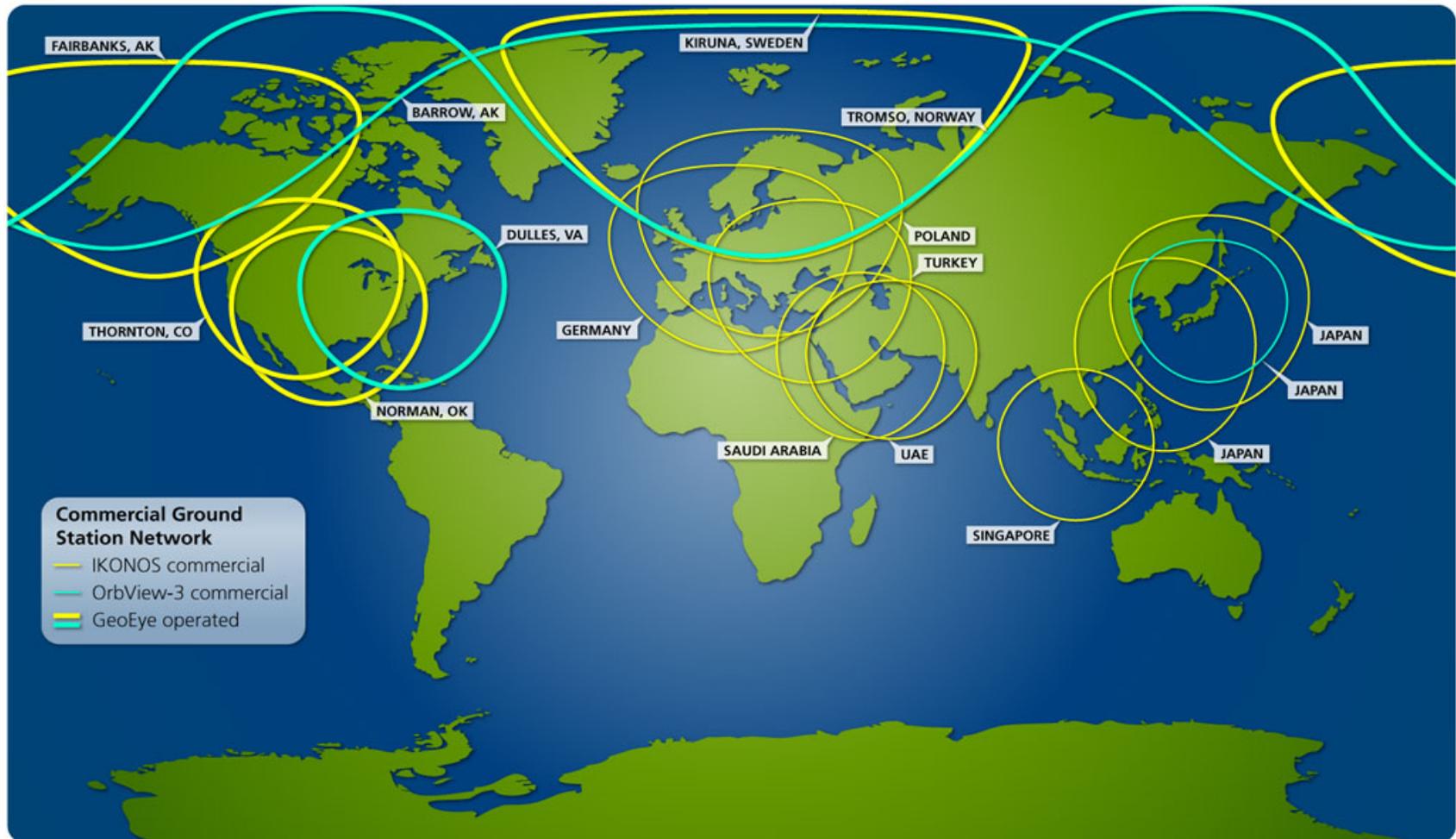
# Largest Commercial Imagery Archive



IKONOS and OrbView-3 archive contains over 278 million sq km of imagery as of April 2007.

# IKONOS, OrbView-3 & OrbView-2

## Ground Station Network



A global footprint with access to an international network of ground receiving stations



# GeoEye-1

## Ground Station Network



Imagery downlinked on every orbit due to ground station locations

# Key Themes

- Operating high-resolution satellites and even higher resolution aircrafts lets GeoEye offer complementary imagery to its customers and resellers
- The commercial remote sensing industry is stable and backed by Wall Street
- The U.S. Government alone has committed >\$1.5 billion to the commercial satellite imagery industry
- Approximately 50% of our revenues are from non-U.S. Government customers
- GeoEye's customers will have assured access to commercial color satellite imagery into the 2017 timeframe with systems that are robust and redundant

# GeoEye

## Products & Applications



# IKONOS

- Launch
  - September 24, 1999
- Orbit
  - 681 km (423 miles), Sun-synchronous
  - 10:20 equatorial crossing
  - 14 times a day, every 98-minutes
- Imaging Sensors
  - 0.82-meter Pan (processed at 1m)
  - 3.2-meter MS (processed at 4m)
    - Blue, Green, Red, NIR
  - 11 km swath
  - 11-bit radiometry
- Collection
  - Agile pointing & scanning
  - Bi-directional scanning
  - Mono or Stereo
- Revisit
  - 3 days



# IKONOS 1-meter Panchromatic



Hoover Dam, Nevada

# IKONOS 1-meter Color



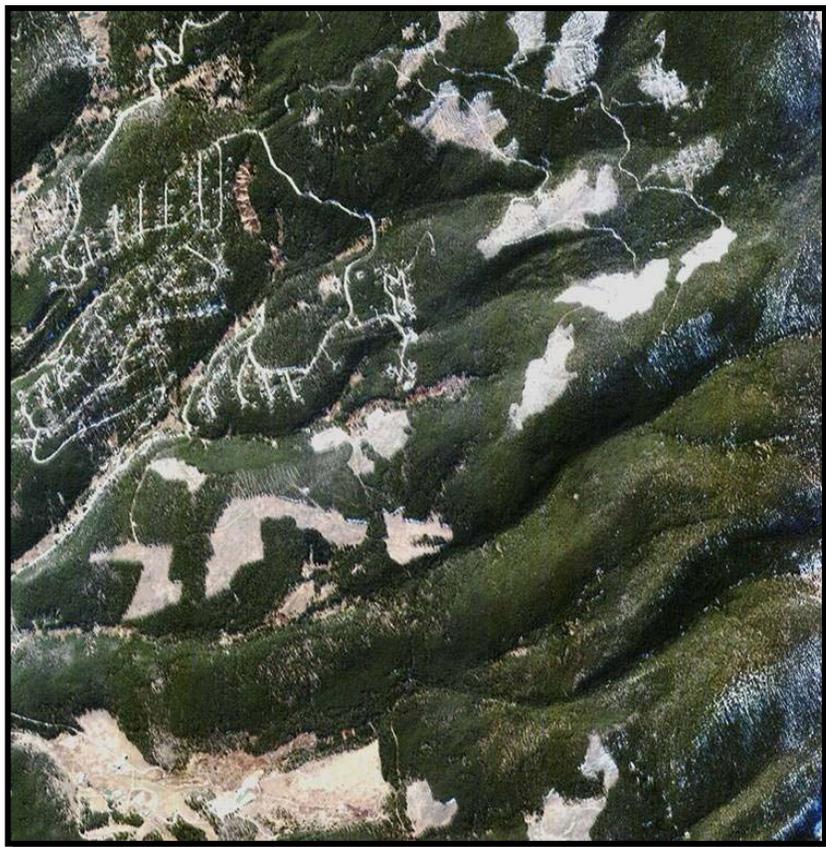
Big Bear Glacier, Alaska

# IKONOS 1-meter Color

March 22, 2006



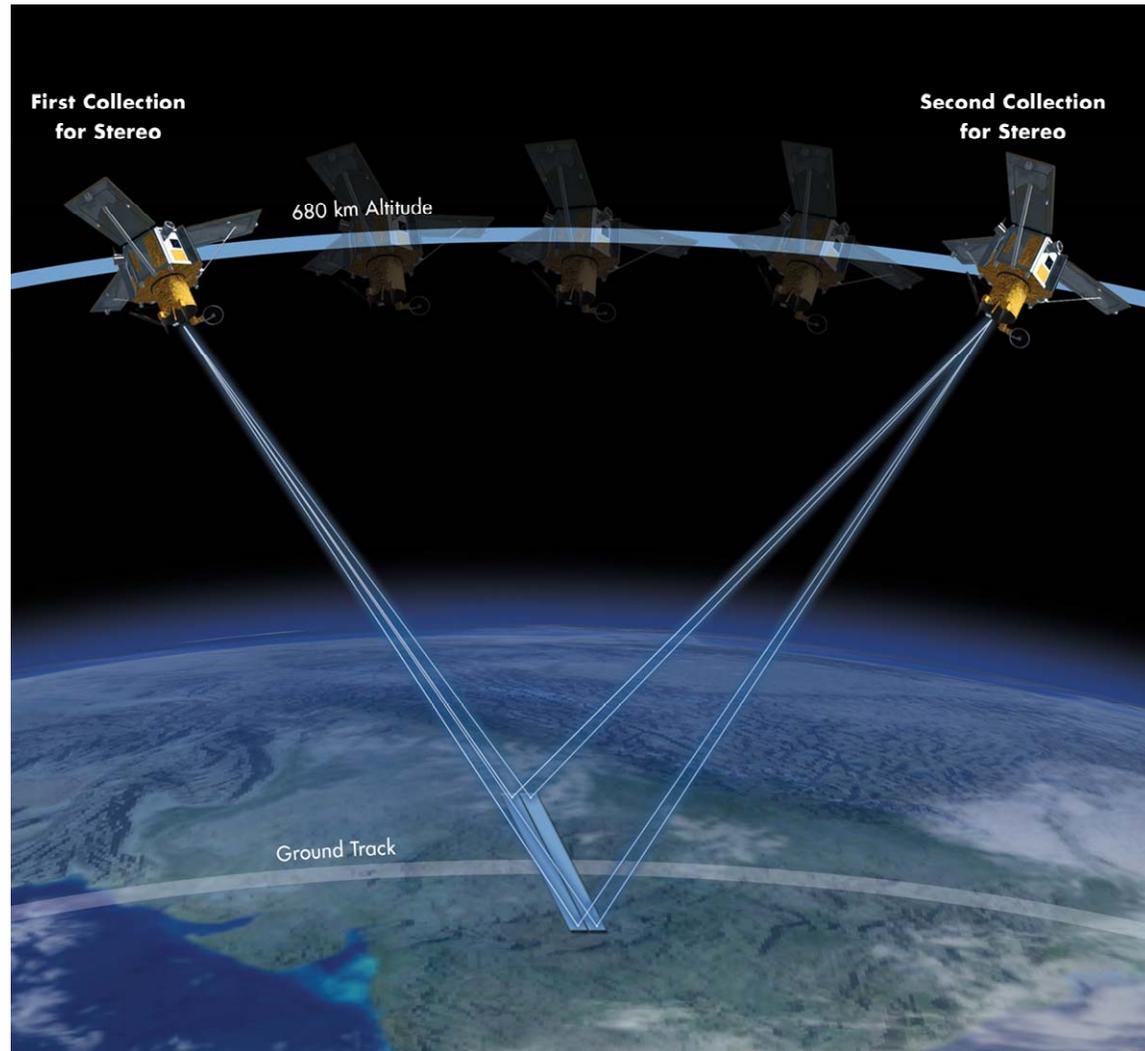
# IKONOS True Color & False Color



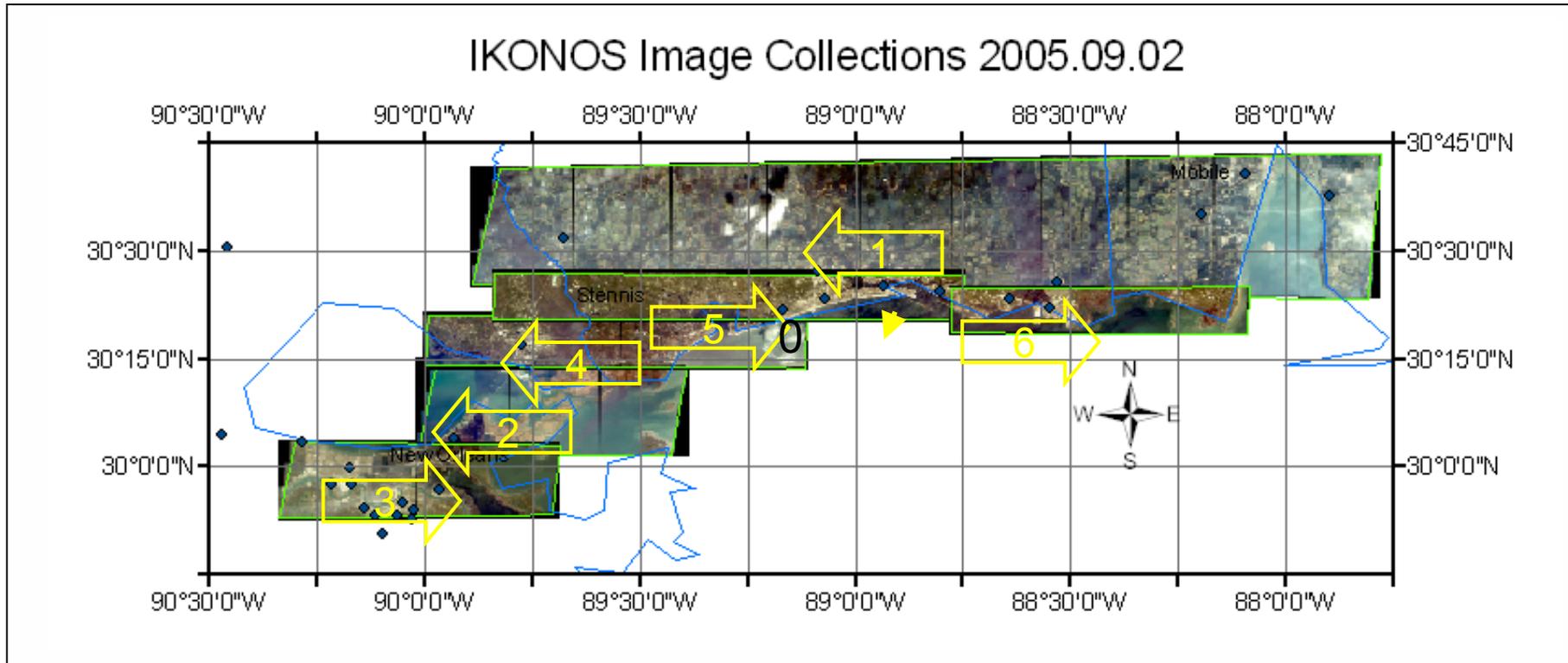
4-meter multispectral image of Copper Mountain, Colorado

# IKONOS Stereo Collection

- Same Pass Collection of Large Areas
  - 3-D feature extraction
  - DEM Creation
  - Worldwide Ortho
  - Reference Stereo (25m CE90)
  - Precision Stereo (4m CE90)



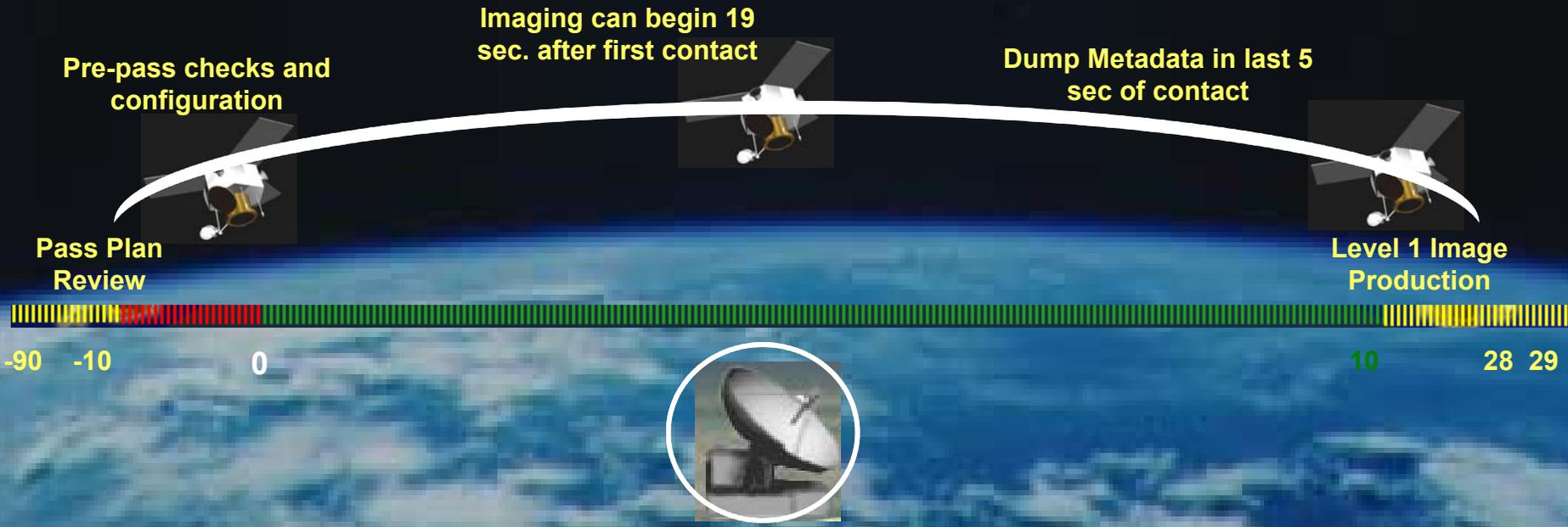
# Rapid Collection Capability Hurricane Katrina



**IKONOS collected 13,000 sq km of unclassified  
imagery on one orbital pass**

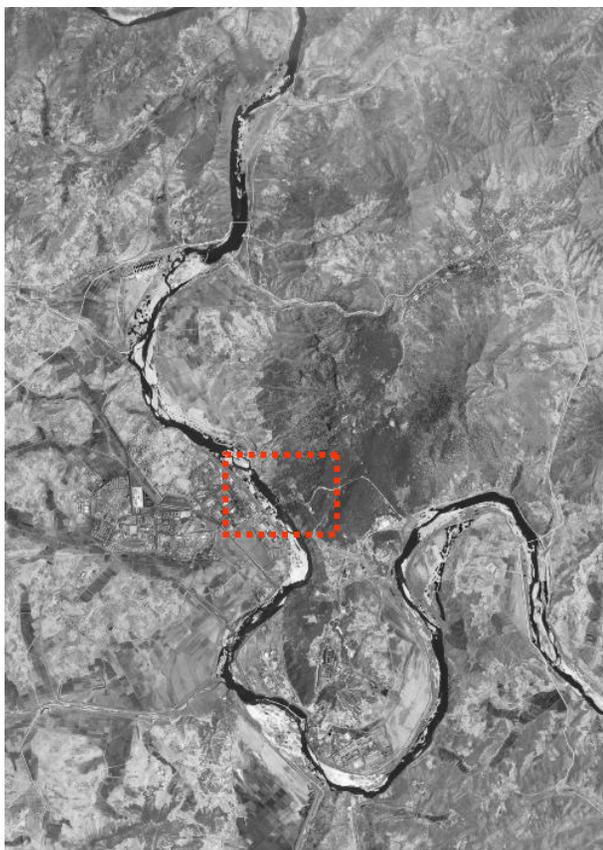
# IKONOS Operations Orbital Pass

## Contact Window



-90	-10	5° comm cone	0	10	28	29	n+3
Receive Weather Data	Finalize Satellite Tasking	Uplink Tasking Load	Begin Image Collection and WB Data Downlink	Last Opportunity for In-Contact Imaging	Deliver 1st Pan Image	Deliver 1st Multispectral Image	Deliver Additional Images.

# OrbView-3 Pan 1-meter



Yongbyon, North Korea – Nuclear Facility

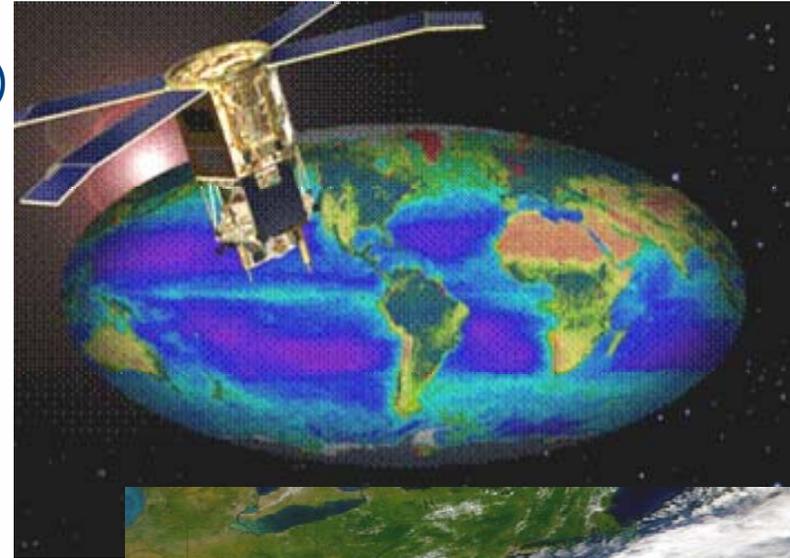
# OrbView-3 Multispectral 4-meter



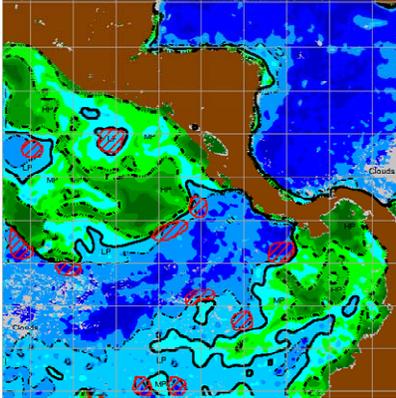
Livorno, Italy - February 12, 2006

# OrbView-2

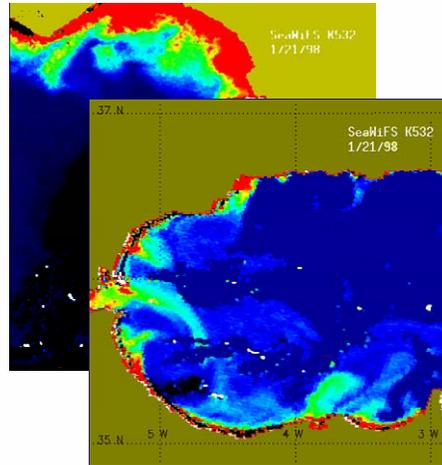
- Capabilities
  - Imaging Mode - Multispectral (Color)
  - Color Bands - 8
  - Spatial Resolution - 1 km
  - Swath Width - 2,800 km
  - Revisit Time - 1 day
  - Orbital Altitude - 705 km (423 mi)
  - Expected Life - 10 years
- Operations
  - Launched 1997
  - In-service availability >99%
  - Operated by equivalent staff of 2
  - Mission planning twice per week



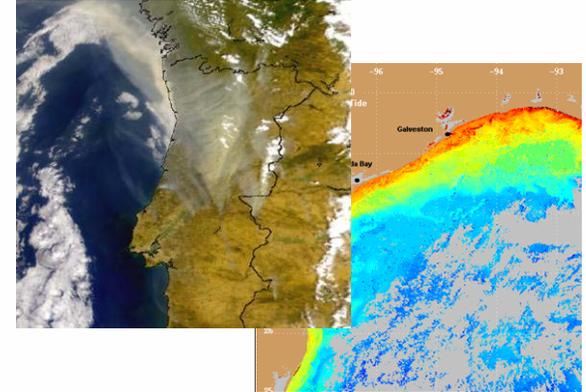
# OrbView-2 Applications



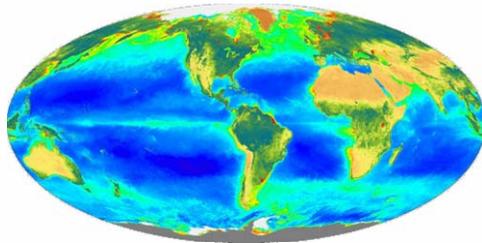
Fishing



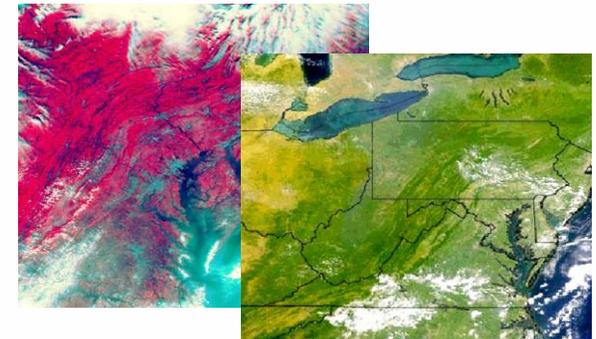
Naval Operations



Environmental Monitoring



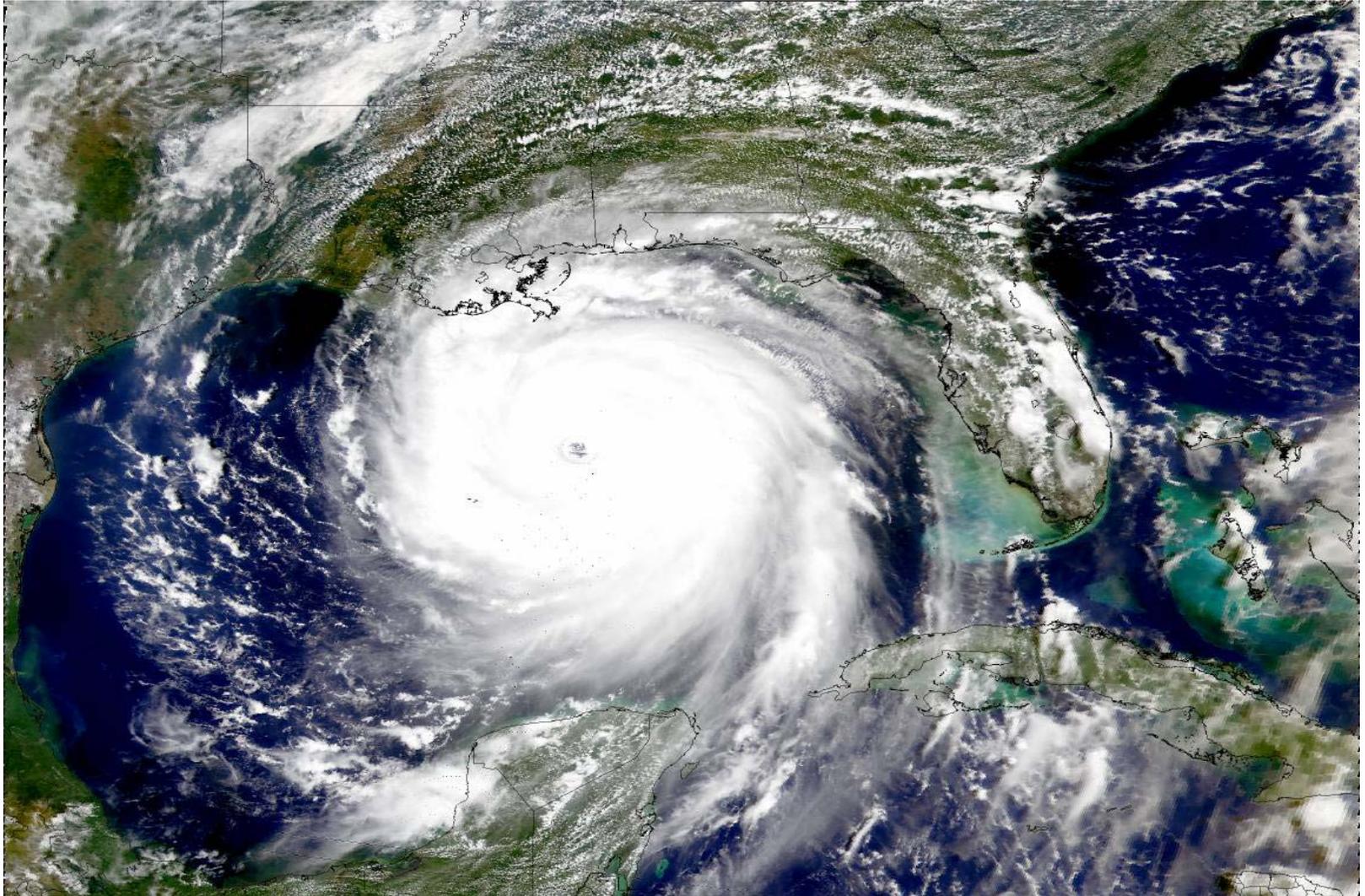
Scientific Research



Agriculture

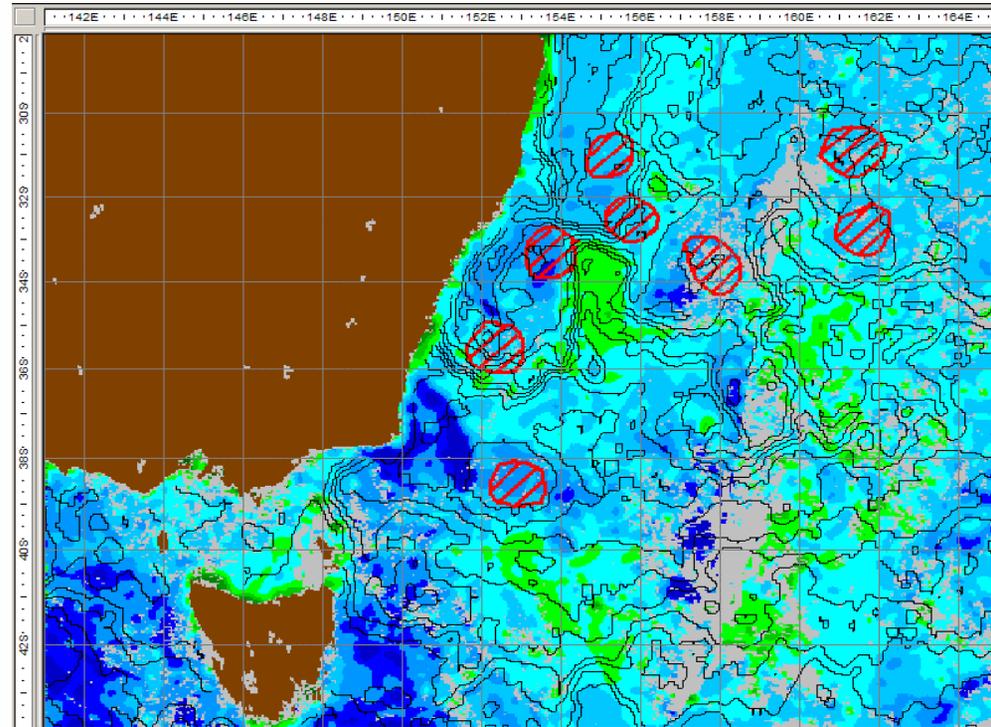
# OrbView-2

## Hurricane Katrina



# SeaStar Fisheries Information Service

- Find Fish Faster!
- Sea Surface Temperature contours overlay OrbView-2 Plankton Image map
- Recommended fishing grounds are shown in red (off coast of Australia)



**Save Time and Fuel!**



# GeoEye-1

## Technical Specifications

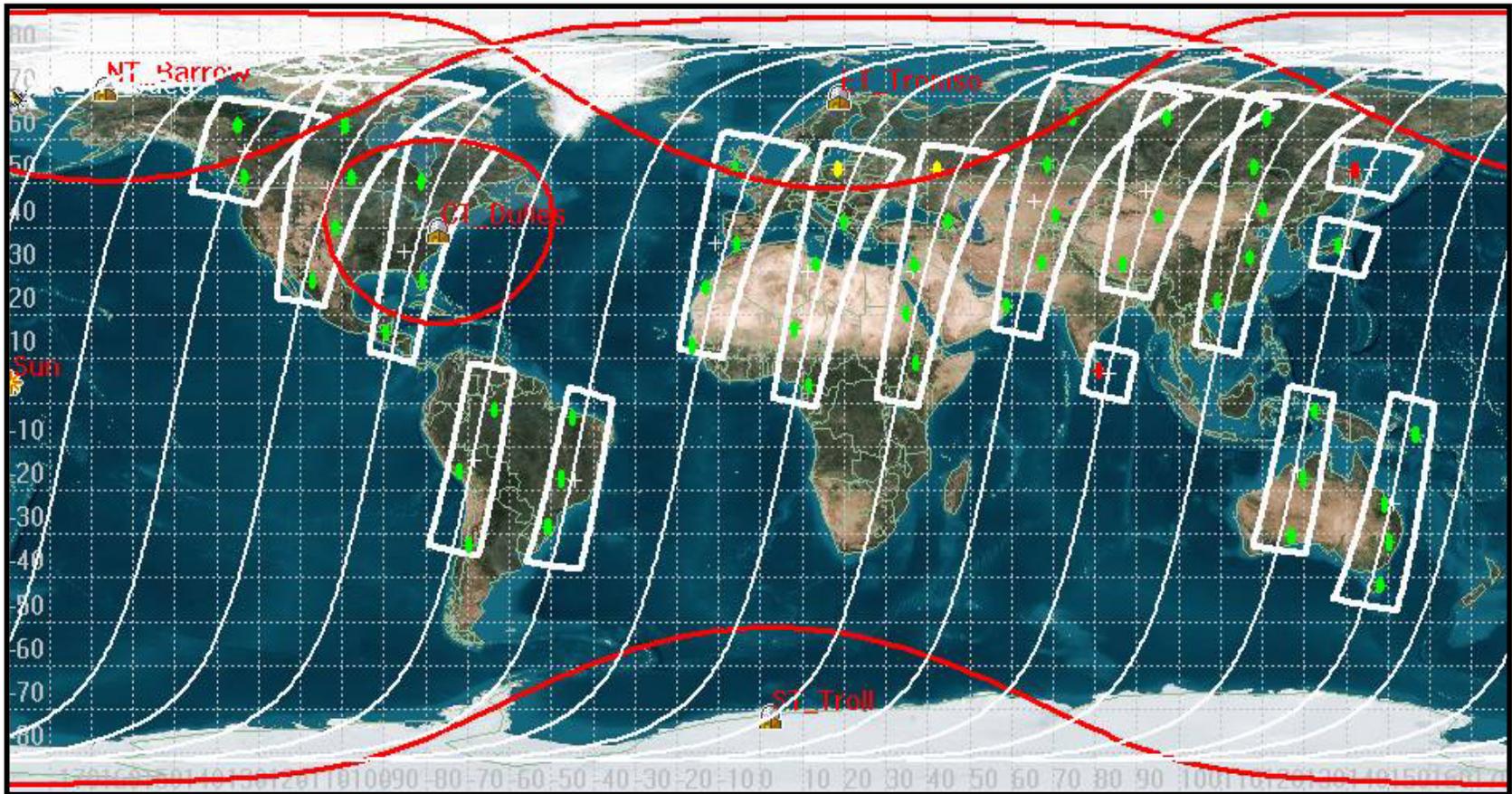
- Resolution/Swath-Width
  - Panchromatic: 0.41-meter
  - Multispectral: 1.65-meter
  - Swath Width 15.2 km
- On-Board 1.0 Terabit Solid Stage Recorder
- 700,000 sq km per day panchromatic mode
- 350,000 sq km per day multispectral mode
- 11 Bit Detector Dynamic Range
- Data Rates
  - 700 Mbps
  - 150 mbps
- Gimbaled X-Band Antenna
- Revisit Time: <3 Days
- Orbit: 98° Sun Sync at 10:30 a.m.
- Altitude: 684 km
- Mission Life: 7 years (Fuel >10 Years)
- Launch Mass: 2050 kg – Boeing Delta II launch vehicle
- Launch: August 2007

**Most Advanced  
Commercial  
Imaging Satellite in  
the World**



G050073-001

# GeoEye-1 Daily Imaging Collection Tracks



- GeoEye-1 has 4 ground receiving stations
- It will make 12-13 orbits/day over land, with 16 minute-long imaging windows

# GeoEye-1 Accuracy: Latest Generation Technology Employed



- **High accuracy star trackers from Ball Aerospace**
  - Used on US Government satellite systems
  - Only commercial satellite to use this technology
- **Monarch GPS receiver**
  - Best available on market with 1M accuracy
  - More accurate than older technology Viceroy receiver
- **Litton Scaleable Inertial Reference Unit (SIRU) Gyros**
  - High precision, low drift rates

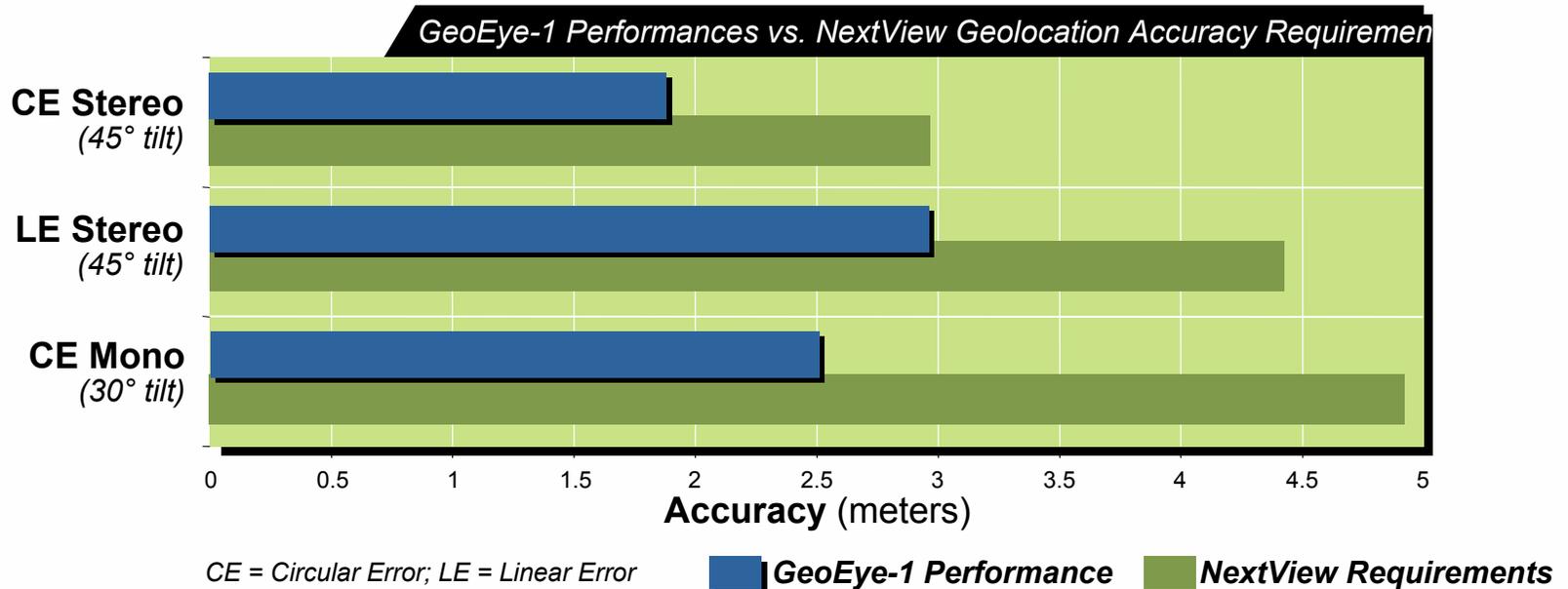


**State-of-the-art technologies previously flown only on USG intelligence satellites**

# GeoEye-1 Metric Accuracy:

## Best Available Commercial Geolocation Design

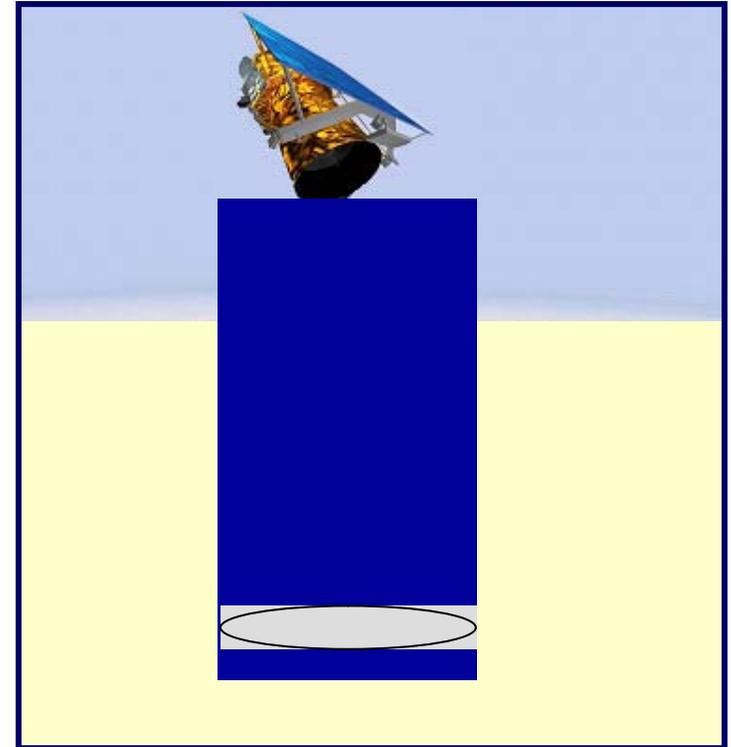
- System geolocation accuracy performance using only ancillary data produced by the satellite
  - No ground control points or other external data sources required
  - Single look mono and stereo



**GeoEye-1 exceeds NGA geolocation accuracy requirements**

# Benefits of GeoEye's Approach

Features	Benefits
Proven spacecraft and design based on IKONOS architecture	<ul style="list-style-type: none"><li>• Risk significantly reduced to implement upgrades to regional affiliates</li></ul>
Best-in-class Geoeye-1 team	<ul style="list-style-type: none"><li>• Most advanced commercial earth imaging satellite</li></ul>
Uses best available sensors	<ul style="list-style-type: none"><li>• Increased performance and reduced schedule to implement and test subsystems</li></ul>
Delta II launch vehicle	<ul style="list-style-type: none"><li>• Proven performance launch reduces risk of launch failure</li></ul>



**The GeoEye-1 program has the highest performance at the lowest risk**

# MJ Harden Aerial Imaging

- Photogrammetric Mapping Offerings
  - Digital Aerial Imaging
  - Orthophotography
  - Planimetric Mapping
  - Topographic Mapping
  - Field Inventory and Survey Services
  - Satellite Imagery
  - Image Analysis
- MJ Harden's aircraft are specially equipped to maximize image quality and accuracy
- The on-board Aerial Sensor Management System (ASMS) manages the collection of all image and GPS data



Panchromatic (Grayscale)



Natural Color (RGB)



Color Infrared (CIR)



# Aerial Capability

- Intergraph DMC<sup>®</sup> (Digital Mapping Camera)
- 12-bit imagery
- Ground resolutions <1½" per image pixel
- Bands
  - Panchromatic (Grayscale)
  - Natural Color (RBG)
  - Color Infrared (CIR)
- One pass imaging process



# Change Detection



# Change Detection

## Madras, India

Before Tsunami



After Tsunami



# Environmental Monitoring



Santa Clarita, CA - Wildfires

# Thank You!



# Miscellaneous Back Up Slides



# From the Commander in Chief Looking at Imagery...



President Bush, Vice President Cheney and former SECDEF Rumsfeld  
September 17, 2001

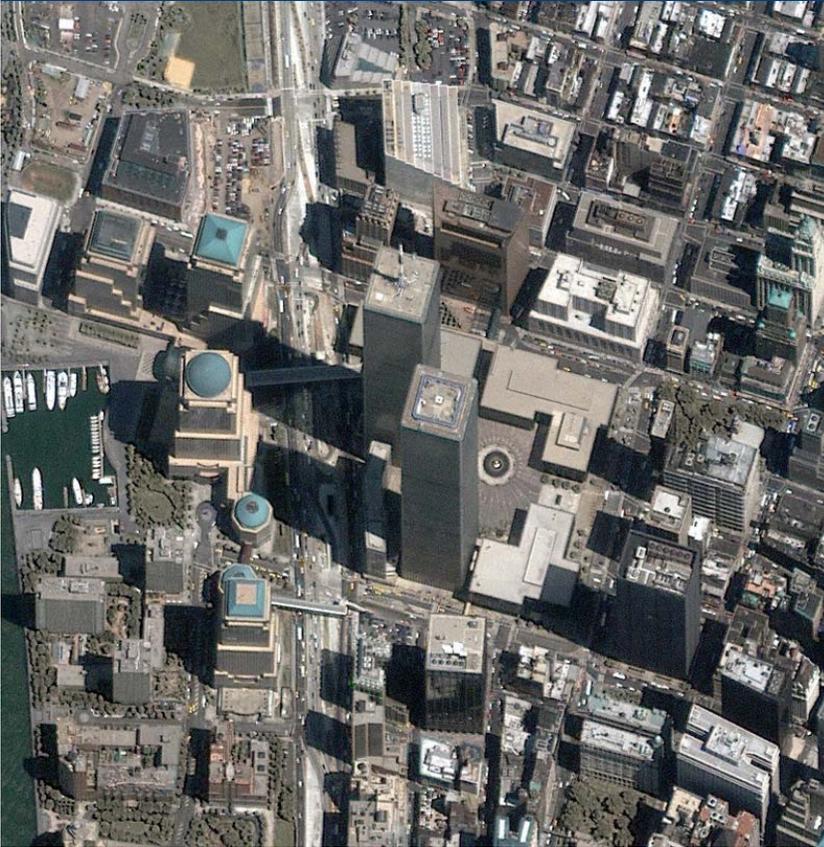
# ...to US Marines Looking at Imagery in Baghdad



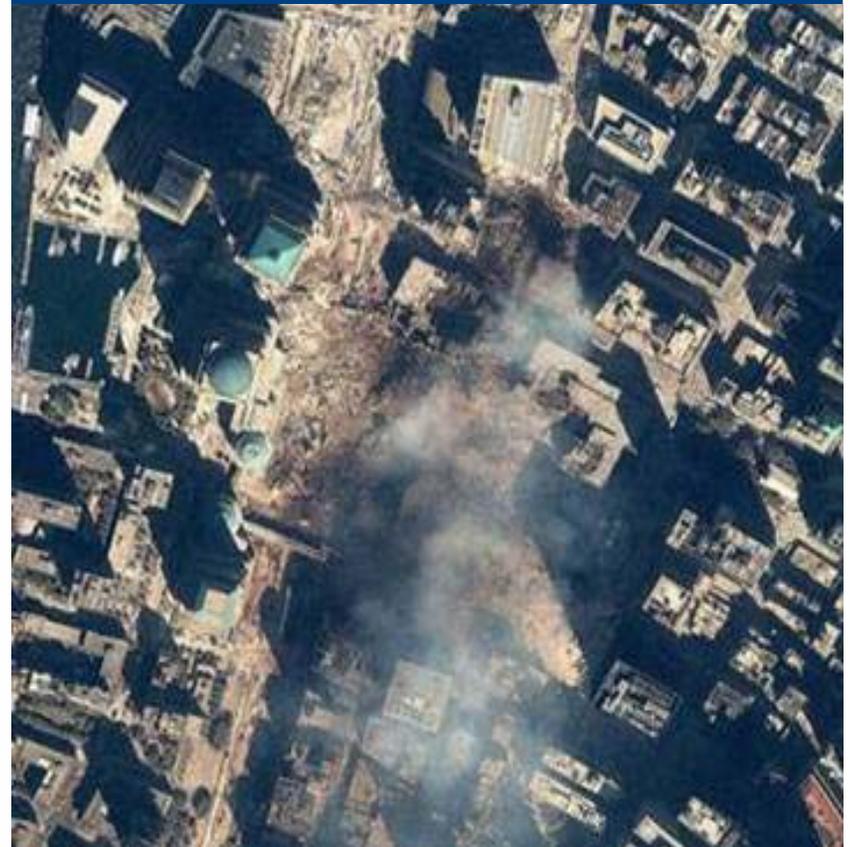
Time Magazine - January 2004

# America Under Attack: Defining Moments for the Commercial Imagery Industry

June 28, 2000



September 15, 2001



World Trade Center Site – Before and After

# America Under Attack: The Pentagon

June 3, 2001



September 12, 2001

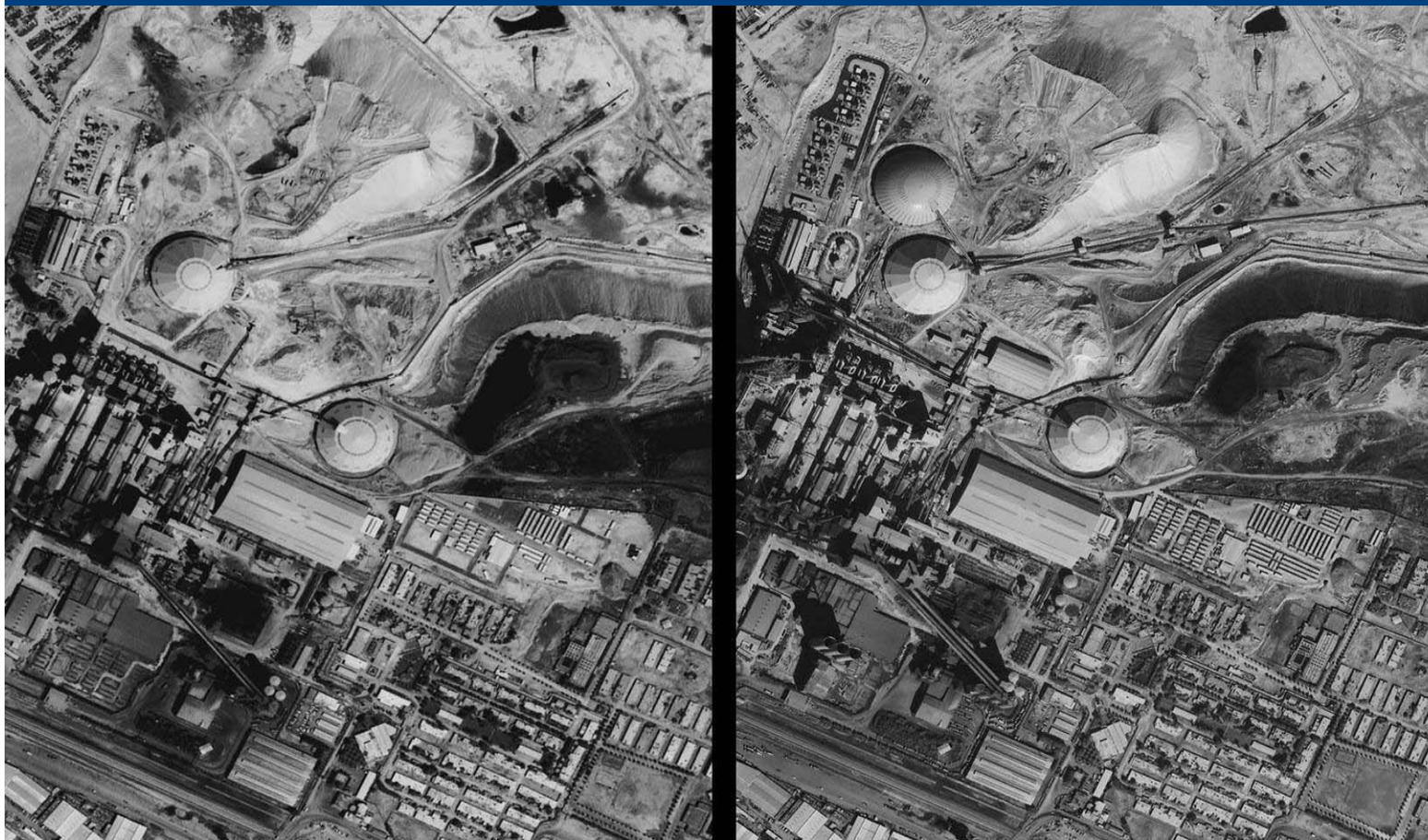


# Robust Archive Offerings for Analysis

## Riyadh, Saudi Arabia

March 6, 2005 - OrbView-3 1m

December 3, 2006 - IKONOS 1m



# Tsunami Post-Disaster Assessment

## Blue Village Pankarang Resort, Khao Lak, Thailand



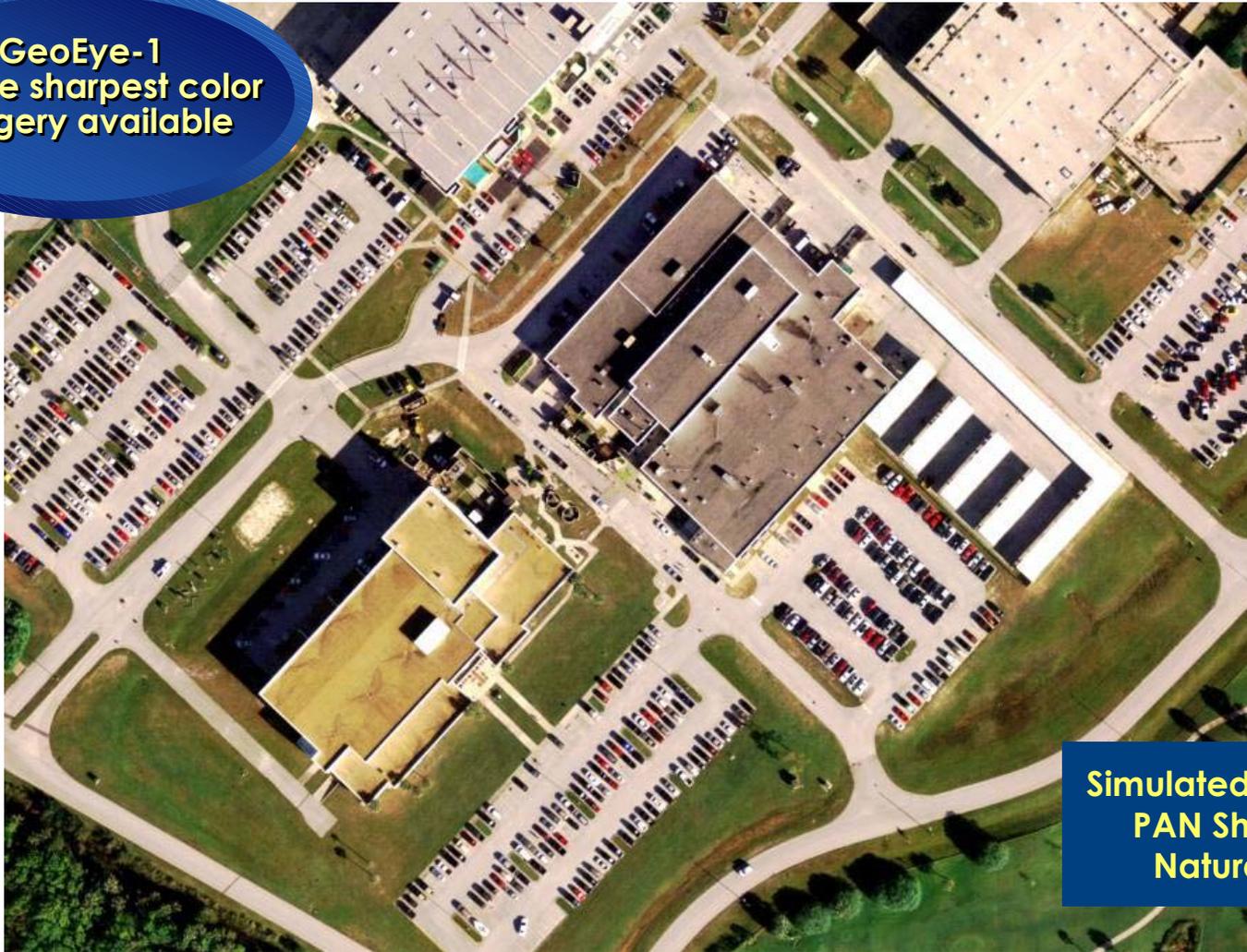
December 29, 2004  
IKONOS 1m

The coastline is forever altered

January 13, 2006  
IKONOS 1m

# Simulated GeoEye-1 Color Imagery

GeoEye-1  
has the sharpest color  
imagery available



Simulated 0.41-meter  
PAN Sharpened  
Natural Color