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Geospatial Services Roadmap…..

Where have we been and where are we going?

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Geospatial Market

- The current geospatial market is estimated at ~$450m
  - Federal
  - State
  - County/Municipal
  - Commercial

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Geospatial Market

- The geospatial market has increased despite……..
  - 9/11/2001….the beginning
  - Continued war(s) against terrorism
  - Housing Market /Financial debacle of 2008
  - Government in sourcing
  - Academic competition
  - Offshore production competition
  - Unproducvive “race to the bottom”

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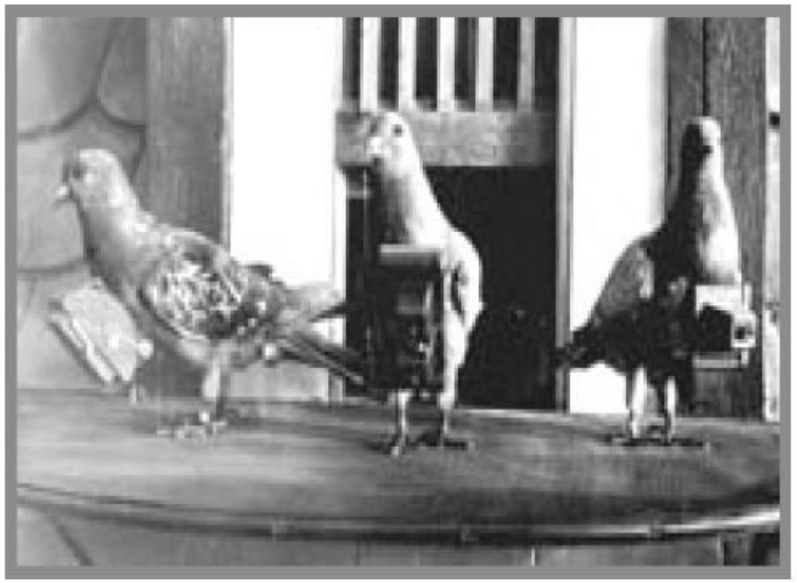
First Aerial Cameras

The fascination of seeing a 'birds-eye-view' of the world stimulated photographer's ingenuity and by 1903 Julius Neubronne had patented a breast-mounted, timer-controlled camera for homing pigeons.



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Aerial Camera System Development

1918 : handheld Camera

1922 : RMK C1

1956 : RMK

1989 : RMK TOP

2000 : DMC

(RMK = ReihenMessKammer Terminal Operated)

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Photo Aircraft then……

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And now……..

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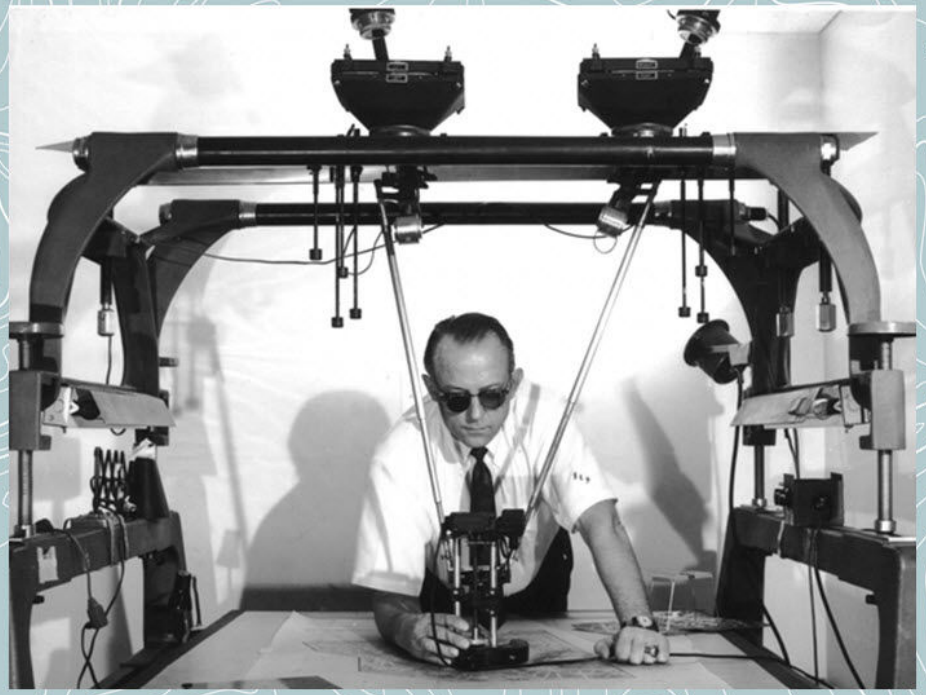
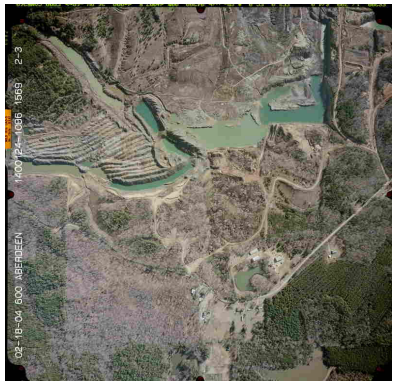
Stereo Compilation then……..

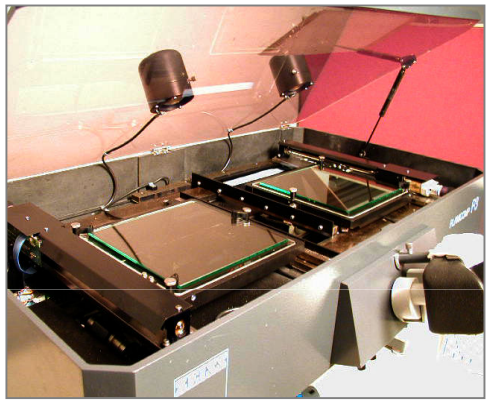
Kelsh Plotter



- Widely used for topographic mapping worldwide
- Used full-size (9” x 9”) diapositives

Stereo Compilation now……





What does the future hold……

- Cost of doing business
- Technology
- Web/Cloud/Data Hosting
- Subscription Based Services
- Contracting Vehicles
- Google Earth/Bing Map/Apple
- Low Cost Selection Environment

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Cost of doing business

- Acquisition Aircraft ~$700,000-$1mm ea.
- Sensors (Image or LiDAR) ~$1.2mm ea.
- Exploitation Software ~$250k
- Software Maintenance ~$100k
- IT Infrastructure ~$500k

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Aerial Digital Sensors

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Image Sensor Technology

Manufacturer	Camera	X-Track (p)	Down-Track (p)	Pixel Size (um)	MPixels
Hexagon Zeiss/Intergraph	DMC	13,824	7,680	12.00	106.168
	RMK-D	6,400	5,760	7.20	36.864
	DMC II-140	12,096	11,200	7.20	135.475
	DMC II-230	15,104	14,400	5.60	217.498
	DMC II-250	17,216	14,660	5.60	252.387
Microsoft UltraCam	UCL	9,500	6,600	7.00	62.700
	UCLp	11,704	7,920	6.00	92.696
	UCX	14,320	9,420	7.20	134.894
	UCXp	17,310	11,310	6.00	195.776
	UCXp WA	17,310	11,310	6.00	195.776
Hexagon Leica	ADS80 non-PS	12,000	1	6.50	0.012
	ADS80 PS	18,000	1	6.50	0.018

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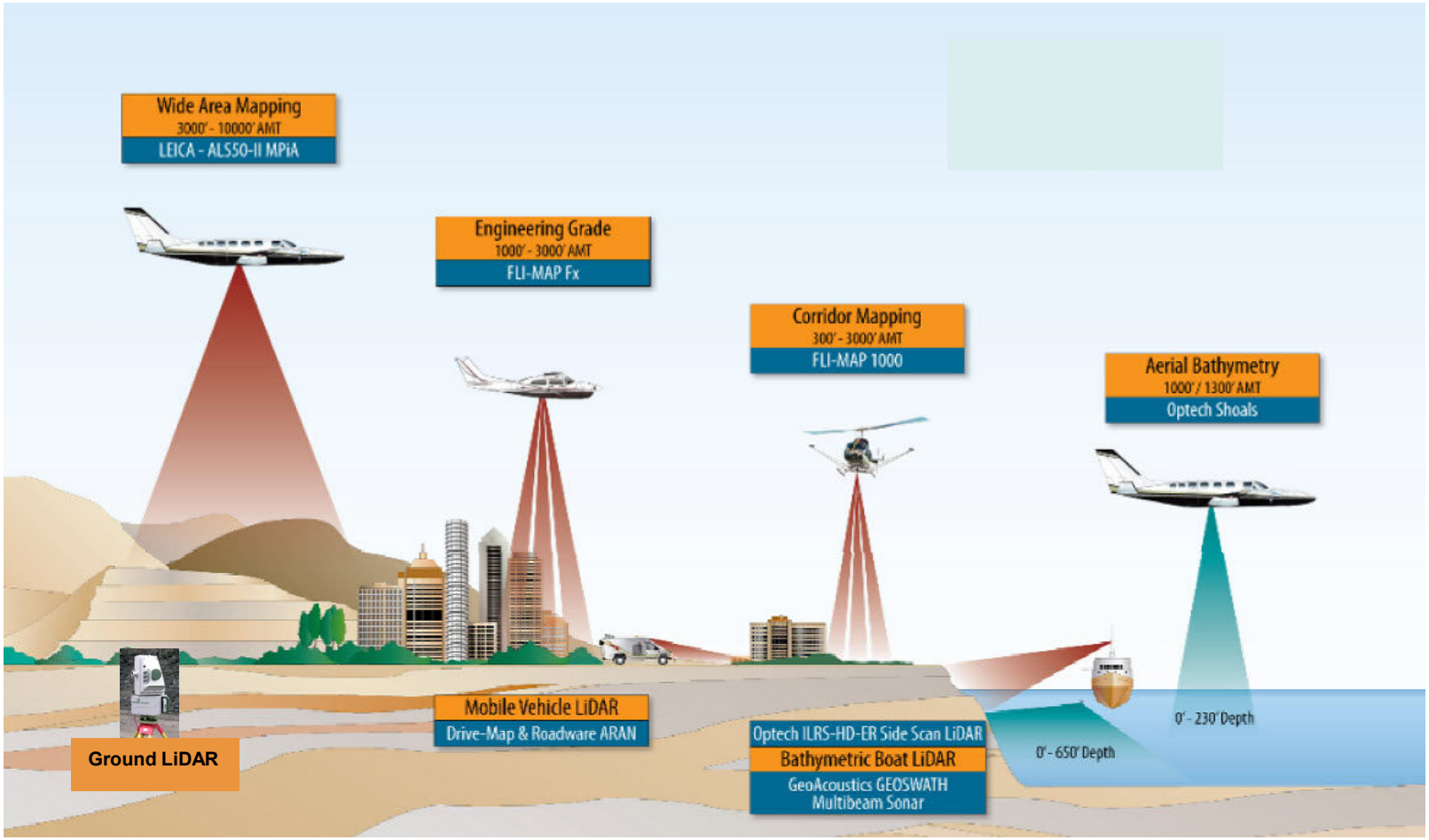
LiDAR Sensor Technology



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DRIVE-MAP
DRIVE-MAP


20100408_Houten (2)
SURVEY VESSEL STAY CLEAR

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Aerial LiDAR Manufacturers

Optech

Trimble

Trimble Harrier 68i

Leica Geosystems

RIEGL USA
www.rieglusa.com

LiteMapper 5600

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Why is LiDAR Technology Exciting

Time to Collect 1 Million Points

- Conventional Surveying: 15.5 years
- Photogrammetry: 1.5 years
- LiDAR: 6.7 seconds @ 150 kHz

Shorter production time, higher point density and efficient data collection…

A cost effective accurate solution…

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Background
effective scan rates

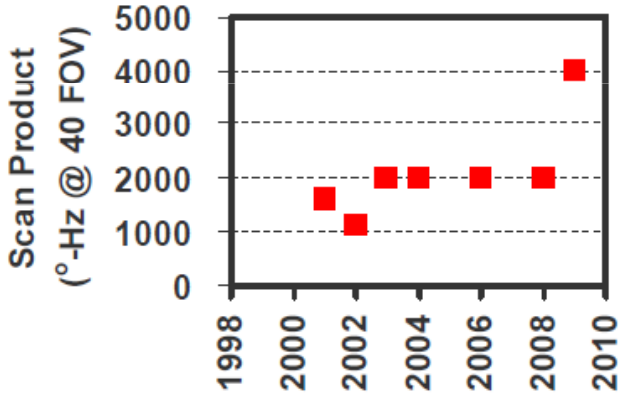
Effective scan rates more stagnant, until recently

Galvanometer-type scanners

- Max scan rate inversely proportional FOV
- Small FOV = high scan rate
- Large FOV = low scan rate
- Difficult to push envelope

Rotating mirror scanners

- High scan rates regardless of FOV
- Tradeoff is lower scan efficiency (pulse rate duty cycle) as FOV decreases below maximum designed FOV; no way to increase cross-track density by decreasing FOV



- when it has to be right

Leica Geosystems

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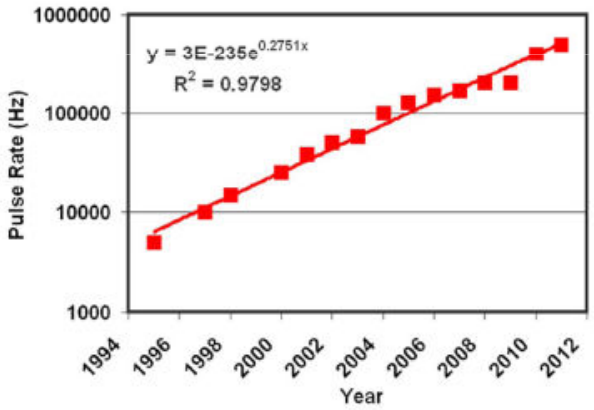
Background
effective pulse rates

Effective pulse rates double approximately 2 years

Recent new products on that trajectory

- Riegl LMS-Q680i
- Optech ALTM Pegasus
- Leica Geosystems Point Density Multiplier



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Web Hosting/Cloud

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Web Hosting/Cloud

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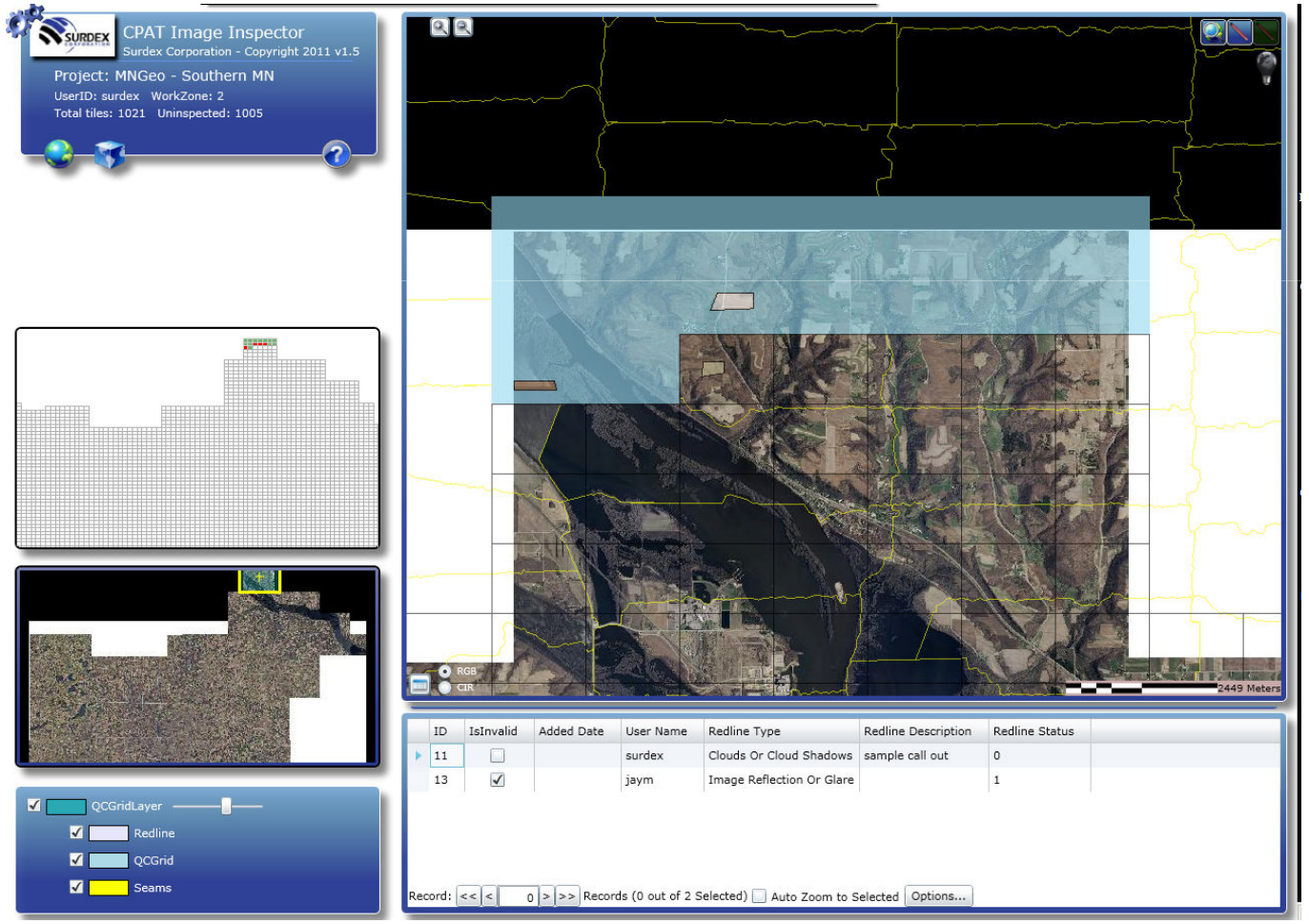
Web Hosted QA/QC



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Subscription Geospatial Services

- Normalizing Budgets
- Possible reduced budgets due to resale
- Increase refresh rate
- Reduced administration costs

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Contracting Vehicles

Cooperation and collaboration becoming the norm

- USGS
- USACE
- NOAA
- NRCS
- Statewide buy up option
- Treating geospatial as GIS; Map it once and share

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Google/Bing/Apple

- Will continue to acquire and publish imagery to drive “hits” to the web sites
- Closely held business models
- Currently, not in the “data for sale” market

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Race to the bottom……

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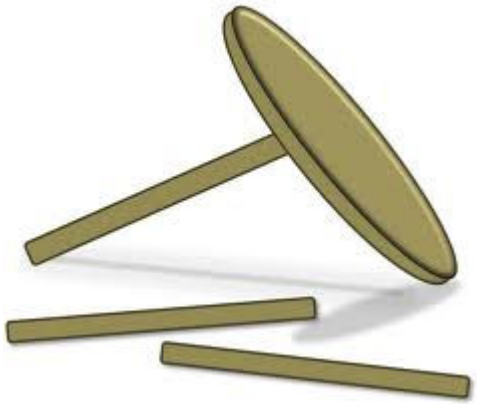
Race to the bottom……

- Economic pressure has created primarily "price based decisions"
- Neither party truly benefits
- I've never heard anyone say…."I'm sorry I bought the best I could afford"



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Conclusions

- Need for high quality geospatial services is growing
- Technology is influencing the way those services are delivered
- Cost of doing business continues to rise
- Clients are under pressure to place emphasis on cost-but at what cost?
- Web Solutions may revolution the mapping industry

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