



The Data Burden

Information Challenges for Snow
Safety Operations

The Data Burden: Definition

- An individual or organization tasked with the avalanche problem has conflicting needs:
 - A: The need for actionable information
 - B: The means to manage that information



The Data Burden

- Background
 - Operating Philosophies
 - Information Management Issues
- Methods
 - The CPG Model
- Discussion
 - Successes and Failures
 - Implications
 - Looking Ahead

Operating Philosophies

- Consensus
- People are visual creatures
- Scientific Method (hypothesis/forecast and testing/modification)
- In-sourcing is better than Out-sourcing
- We face *probabilistic* challenges
- We operate in a significant uncertainty

Information Needs

- Terrain
- Weather
- Snowpack
- Human Factors

Information Management Issues

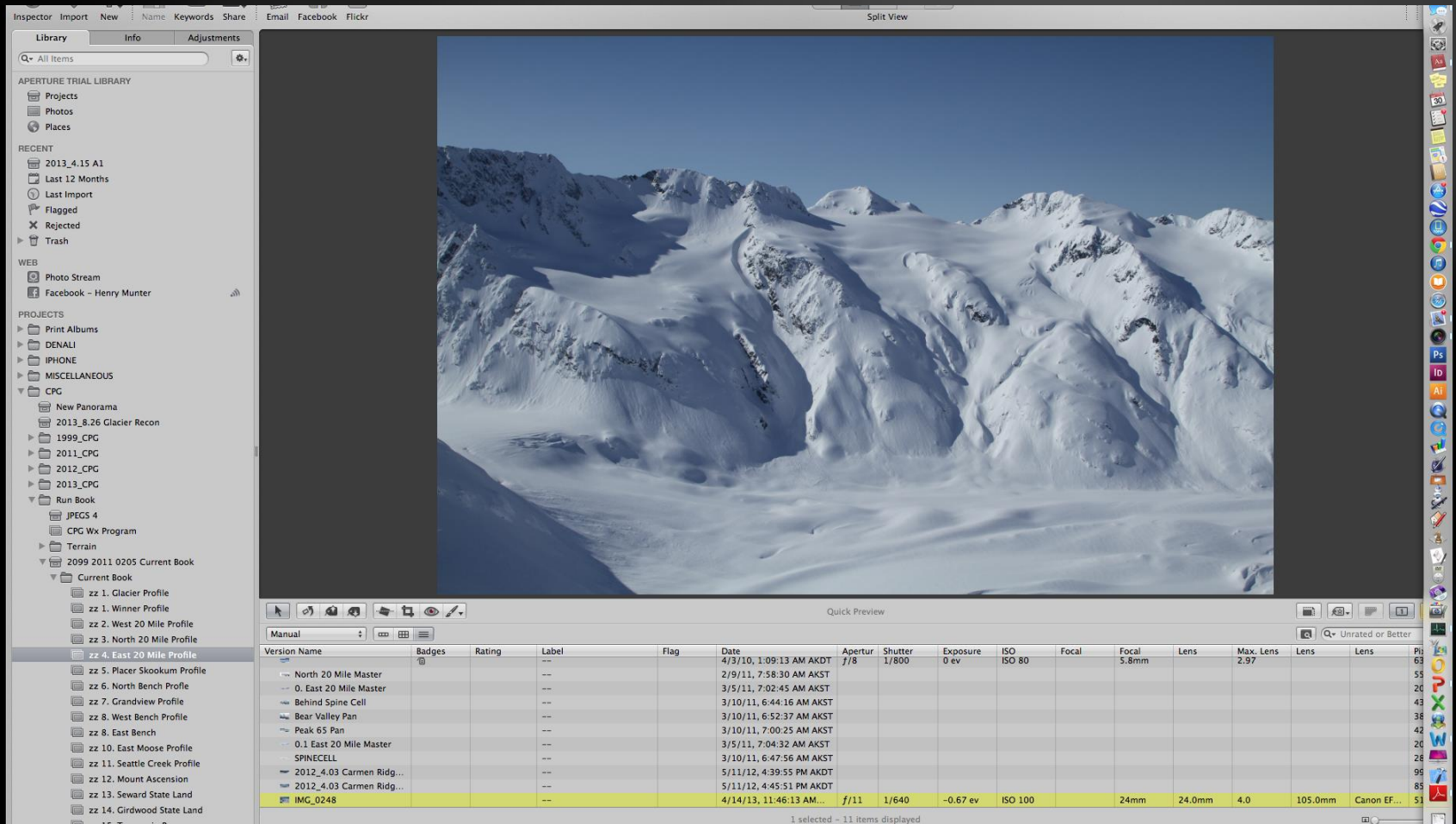
- Sorting and Parsing
- Human Issues: Tunnel Vision, Memory and Calibration
- Risky Data Acquisition
- Data Storage and Processing
- Data Accessibility
- Installation Management
- Time Management

Terrain

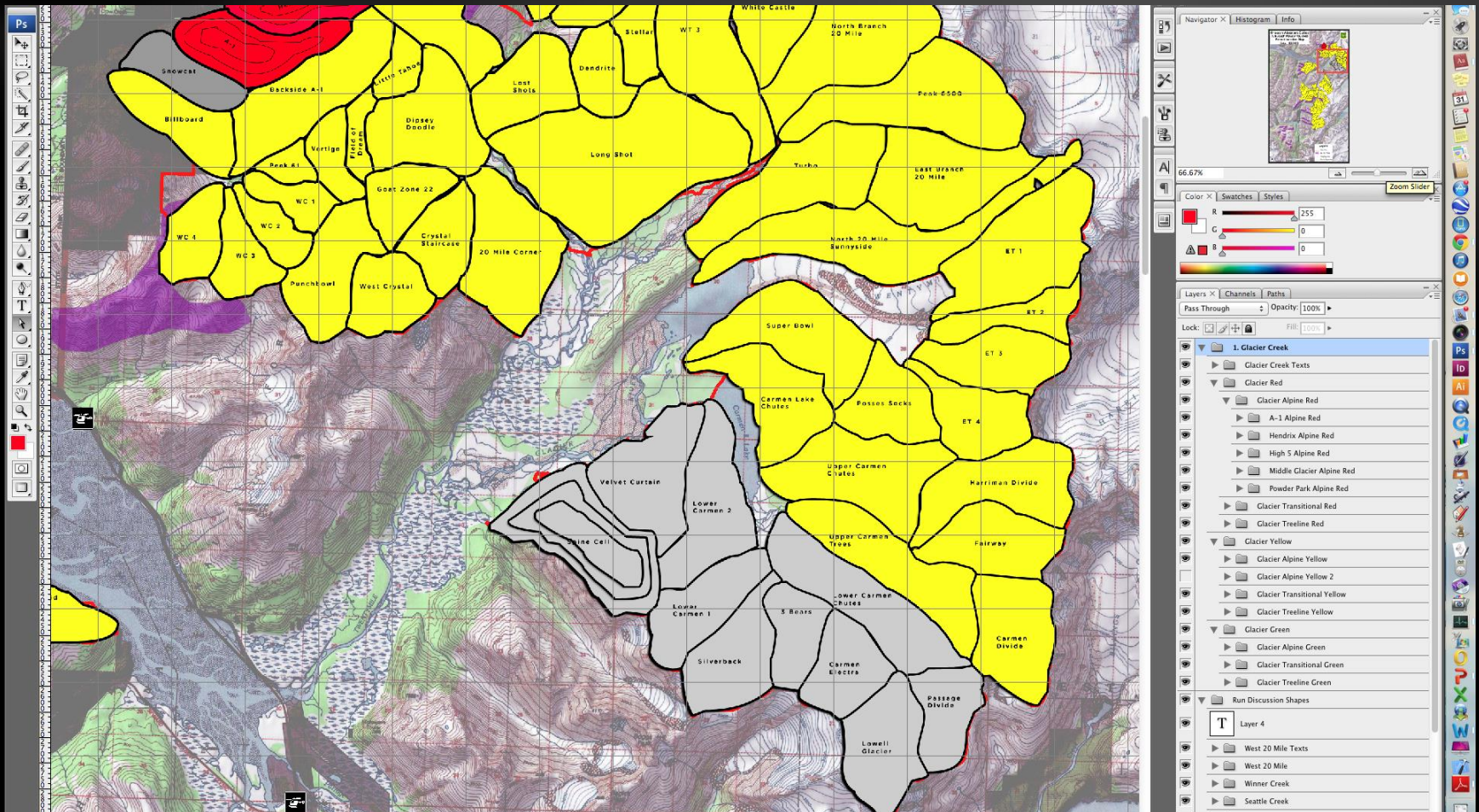
- Photos
- Maps
- Google Earth



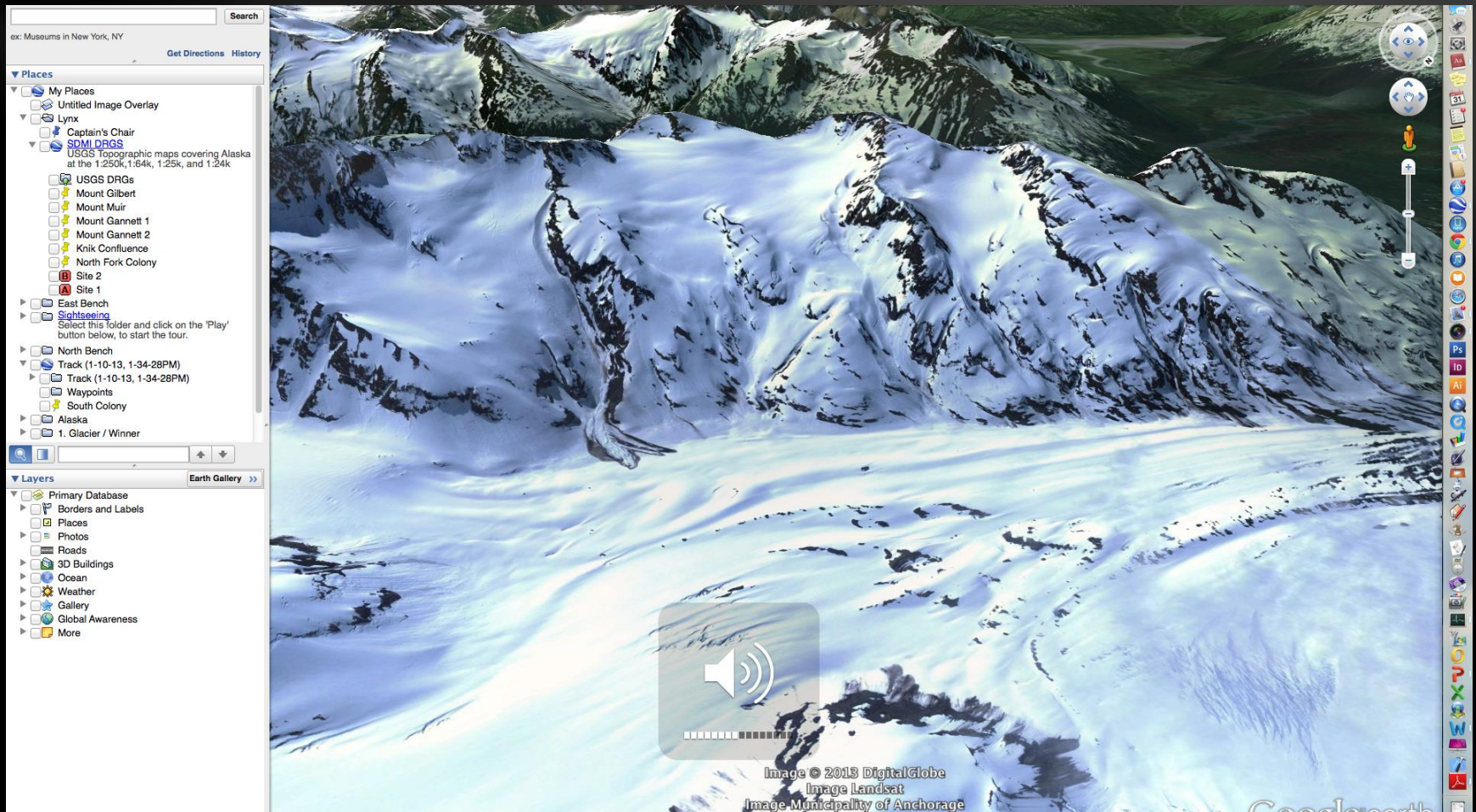
Run Catalog



Terrain Map



Google Earth



Weather

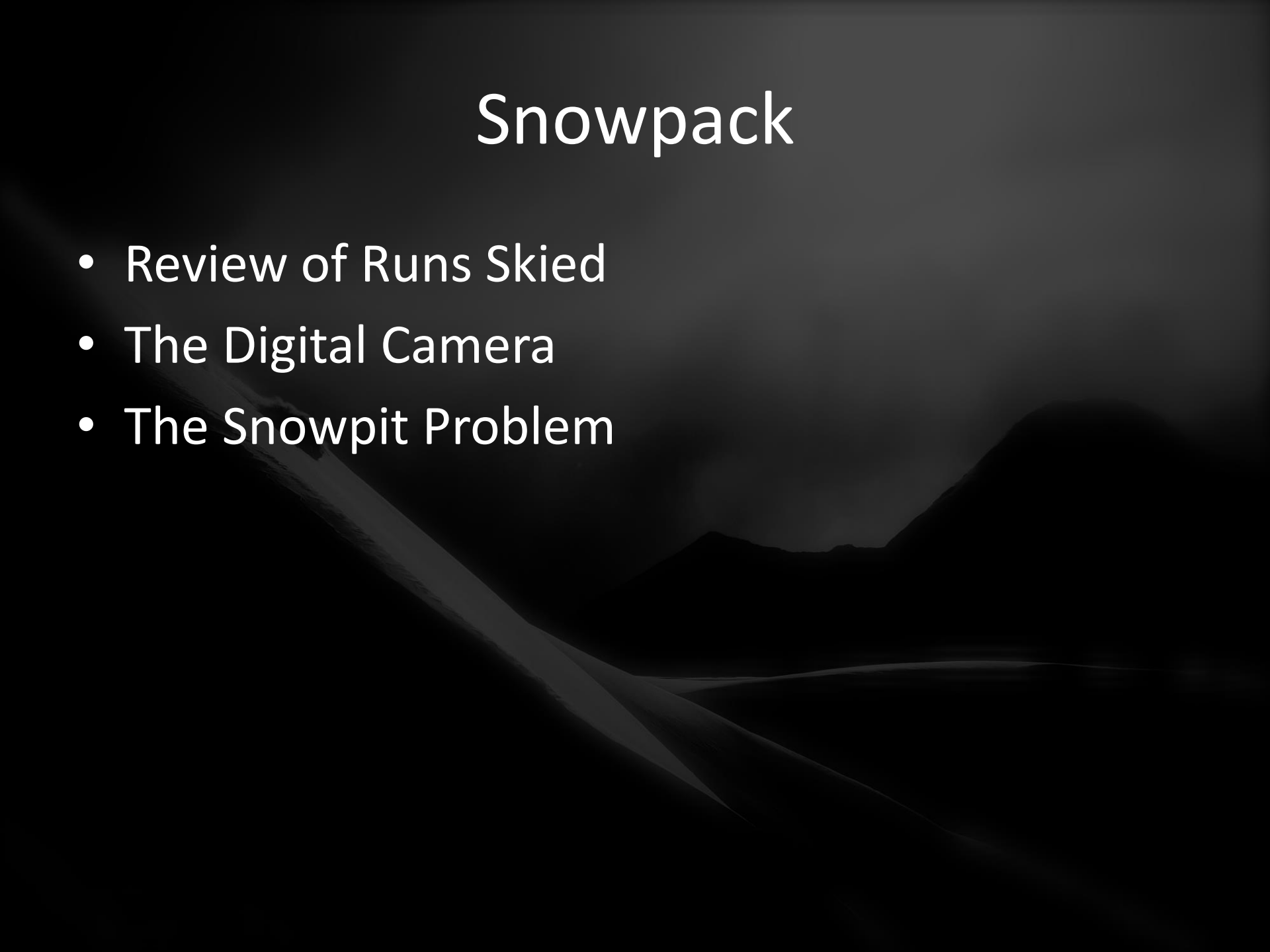
- Telemetry
- Storm Interval Tracking
- Time-Scaling Products

| Site | Elev | Date | Temp | MxTp 24hr | MnTp 24hr | RH | Spd | Dir | Gst | MxGust 24hr | SnoHt | SWE | Provider |
|-------------------------------|------|-----------------------|------|--------------|--------------|-----|-----|----------|------|----------------|-------|-----|----------|
| Gold Cord Mine | 4050 | 10/31/2013 6:00 pm | 30.7 | 34.3 | 30.7 | | 3 | NNE ↓ | 5 | 12 | | | MADIS |
| Independence Mine | 3450 | 10/11/2013 2:00 am | old | old | old | old | old | old | old | old | old | old | NWS |
| Marmot Ridge | 4500 | 10/31/2013 8:00 am | 27.1 | 33.5 | 27.1 | 98 | 1 | ENE ← | 4 | 17 | | | FCNFAIC |
| Moraine Snotel Site | 2100 | 10/31/2013 7:00 am | 36.1 | 46.0 | 35.6 | | 1 | W → | 2 | 9 | 0 | 0.0 | NRCS |
| Arctic Valley | 3900 | 10/31/2013 8:00 am | 29.8 | 37.4 | 29.8 | 100 | 4 | NW ↓ | 7 | 28 | | | FCNFAIC |
| S. Fork Eagle R. #2 | 2164 | 10/31/2013 6:57 am | 34.3 | 44.3 | 33.3 | 92 | 0 | - | 2 | 22 | | | MADIS |
| Hillside Home | 1354 | 10/31/2013 7:00 am | 37.7 | 47.7 | 36.3 | | 1 | NE ← | 3 | 10 | | | MADIS |
| Glenalps Snotel | 2080 | 10/31/2013 7:00 am | 33.7 | 43.9 | 30.2 | | 1 | S ↑ | 2 | 11 | 0 | 0.0 | FCNFAIC |
| Indian Pass | 2350 | 10/31/2013 7:00 am | 33.9 | 38.9 | 33.6 | | | - | | | 2 | 0.0 | NRCS |
| McHugh Creek DOT | 85 | 10/15/2013 1:20 pm | old | old | old | old | old | old | old | old | old | old | AKDOT |
| Mt. Alyeska | 1539 | 10/31/2013 7:00 am | 36.8 | 42.0 | 36.8 | | | - | | | 2 | 0.3 | NRCS |
| Penguin Peak (AKDOT) | 4200 | 10/31/2013 8:00 am | 27.7 | 29.1 | 26.6 | 100 | 4 | WNW → | 5 | 31 | | | FCNFAIC |
| Alyeska(Top of Quad) | 2800 | 10/31/2013 6:00 am | 33.0 | 36.0 | 32.0 | 0 | 1 | W → | 4 | 19 | | | Alyeska |
| Alyeska (summit) | 3664 | 10/31/2013 6:00 am | 31.0 | 31.0 | 30.0 | 13 | 3 | ESE ← | 8 | 31 | | | Alyeska |
| Alyeska (max mtn.) | 3200 | 10/31/2013 7:00 am | 31.0 | 33.0 | 31.0 | 100 | 0 | - | 13 | 100 | | | Alyeska |
| Bird Point DOT | 62 | 10/31/2013 6:22 am | 40.9 | 45.6 | 40.9 | 93 | 7 | ENE ← | 9 | 25 | | | AKDOT |
| Portage | 10 | 10/31/2013 6:00 am | 39.0 | 43.0 | 39.0 | | 2 | S ↑ | 5 | 21 | 4 | | AKRR |
| Seattle Ridge | 2400 | 10/31/2013 7:00 am | 30.4 | 31.3 | 30.0 | 100 | 0 | - | 0 | 0 | | | FCNFAIC |
| Portage DOT | 66 | 10/31/2013 6:21 am | 39.5 | 43.6 | 39.5 | 99 | 0 | - | 2 | 23 | | | AKDOT |
| Turnagain Pass DOT | 1020 | 07/07/2012 3:01 pm | old | old | old | old | old | old | old | old | old | old | AKDOT |
| Portage (PATO) | 95 | 10/31/2013 6:53 am | 39.5 | 44.9 | 39.5 | 100 | 0 | - | 9999 | 26 | | | MADIS |
| Turnagain Pass (Center Ridge) | 1880 | 10/31/2013 7:00 am | 34.4 | 38.7 | 34.3 | | | - | | | 0 | 0.2 | NRCS |
| Whittier Harbor | 13 | 10/31/2013 6:19 am | 41.3 | 44.3 | 41.3 | 95 | 0 | - | 3 | 20 | | | NWS |
| Sunburst | 3812 | 10/31/2013 8:00 am | 28.8 | 29.1 | 28.0 | 100 | 9 | ENE ← | 13 | 42 | | | FCNFAIC |
| Granite | 512 | 10/31/2013 5:55 am | 36.3 | 41.3 | 36.3 | 100 | 0 | - | 4 | 14 | | | MADIS |
| Fresno Ridge | 3440 | 10/31/2013 8:00 am | 30.4 | 31.0 | 29.7 | 96 | 9 | N ↓ | 17 | 42 | | | FCNFAIC |
| Summit Lake DOT | 1348 | 10/31/2013 6:21 am | 36.4 | 43.3 | 36.4 | 98 | 2 | NNE ↓ | 4 | 17 | | | AKDOT |
| Summit Lake | 1400 | 10/31/2013 7:00 am | 35.8 | 42.1 | 35.8 | | 1 | NNE ↓ | 5 | 13 | 0 | 0.1 | NRCS |

[illegible]

Snowpack

- Review of Runs Skied
- The Digital Camera
- The Snowpit Problem



Review of Runs Skied

USGS AkNewsWeather Other Weather SitesGuide Daily ReportSurf FxFall WxRail Wx

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FORMSCENTRALDaily Report

FileEditInsertTableViewHelp

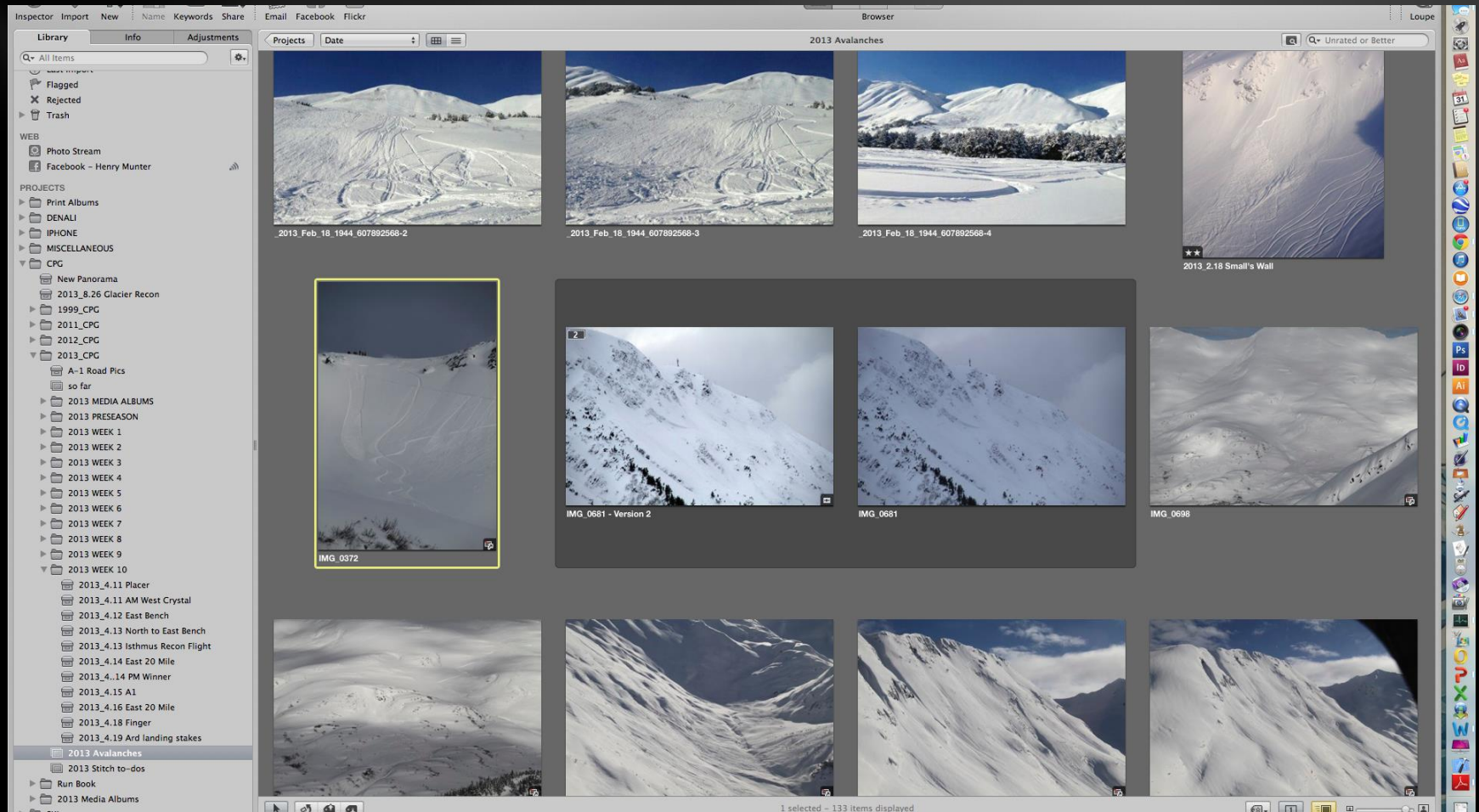
DesignOptionsTestDistributeView ResponsesSummary Report

Save as ExcelSave as PDFFilterSort

All ResponsesSheet1Sheet2Sheet3Sheet4

| | BL | BI | BJ | BK | BD | R | Q | P | O | N |
|----|---------------------------------|---------------------------------|---------------|---------------|---------------------|--------------------------------|---------------|--|--|----------------------|
| | Additional Comments | Local Stability of this Concern | | | Primary Concern | Snowpack Observation | Related File? | General Observations | Description | Avalanches Observed? |
| | | 0' - 2000' | 2000' - 4000' | 4000' - 6000' | | | | | | |
| 1 | | Good | Fair | Fair | Wet Loose | travel only | | | Wet loose slides | Natural |
| 2 | | Good | Good | Good | Dry Loose | none | | | | None |
| 3 | | Fair | Fair | Fair | Cornice, Ice, Glide | travel only | | | | None |
| 4 | | Good | Fair | Good | Persistent Slab | travel only; test, test + pits | | Soft snow on N'erly with various wind texture and skins. Overall good quality snow. Super Mumble was very good surface faceted snow. | Lost Shots, D-1, 20 cm deep, 50' wide 100' run Facets on old snow new snow interface. | Human |
| 5 | | Good | Good | Good | Wind Slab | hand, pole, other pits | | Warming on south half in the afternoon | | None |
| 6 | Good skiing on white buffalo... | Very Good | Good | Good | Wind Slab | hand, pole, other pits | | | | None |
| 7 | | Fair | Fair | Fair | Persistent Slab | hand, pole, other pits | | Good snow with pockets of windcrust & sun crust | Skier triggered slide rolies Skier triggered slide to 20 mile corner Surface hoar related Both approx 20 cm deep | Human |
| 8 | | Fair | Fair | Fair | Persistent Slab | travel only | | | My last skier triggered a small D1 off a knob in the gulley skiing to the valley floor from twenty mile corner. He was the sixth skier on slope. Broke about 30 feet wide, 35 cm deep and ran for about 50 feet. I assume buried surface hoar. | Human |
| 9 | Fun day.... Skied 20,300' | Good | Good | Good | Persistent Slab | test, test + pits | | | | None |
| 10 | | Good | Good | Good | Wind Slab | hand, pole, other pits | | Decomposing wind board and pow in protected areas | | None |
| 11 | | Good | Good | Good | Wind Slab | travel only | | | | None |

The iPhone as a fieldbook



Human Factors

- Decision-Making Review
- Incident Documentation

Decision-Making Review

USGS Ak News Weather Fx Weather Other Weather Sites Guide Daily Report Surf Fx Fall Wx Rail Wx

Sign in or create an account | Adobe FormsCentral Reset Your Adobe Acrobat.com Service Password - henrymunter@gmail.com - Gmail

Daily Report (Form File & Responses)

FORMSCENTRAL Daily Report

File Edit Insert Table View Help

Design Options Test Distribute View Responses Summary Report

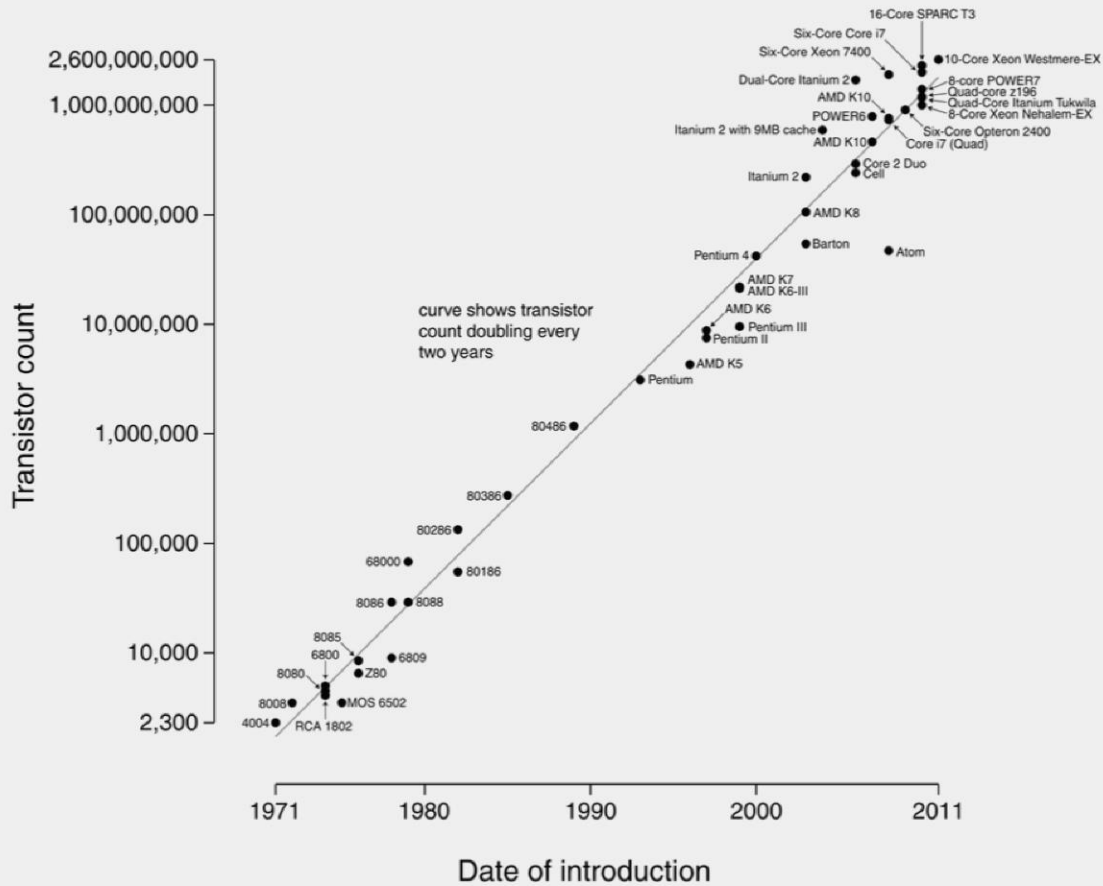
Save as Excel Save as PDF Filter Sort

All Responses Sheet1 Sheet2 Sheet3 Sheet4

| | BL | BI | BJ | BK | BD | B | O | P | O | N |
|----|---------------------------------|---------------------------------|---------------|---------------|---------------------|--------------------------------|---------------|--|---|----------------------|
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| 2 | | Good | Good | Good | Dry Loose | none | | | | None |
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| 10 | | Good | Good | Good | Wind Slab | hand, pole, other pits | | Decomposing wind board and pow in protected areas | | None |
| 11 | | Good | Good | Good | Wind Slab | travel only | | | | None |

Discussion

Microprocessor Transistor Counts 1971-2011 & Moore's Law



Thank You

