



Cheap Clicks

Using inexpensive digital cameras to
take great airplane pictures

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Introduction

- You can spend a lot of money and buy really good cameras
- Most of us don't need to
 - Just looking to take some snapshots
- Having expensive cameras doesn't mean your pictures will necessarily be better
 - Michelangelo with a torn 2" foam brush will still paint better pictures than Mike D'Angelo with the finest camelhair
- The digital age hasn't changed this!





Experience

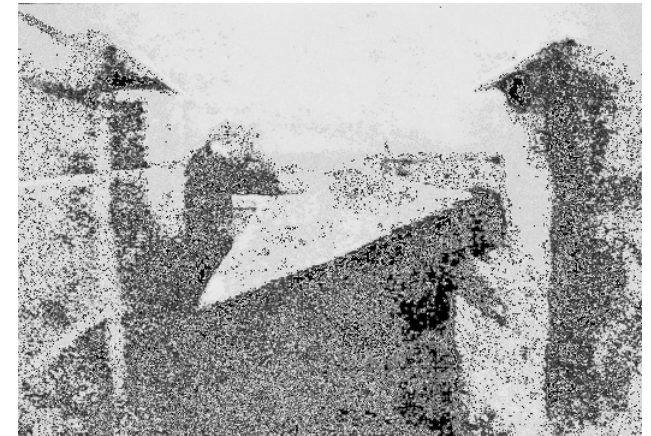
- When "working" I carry a good-quality digital Single Lens Reflex (SLR) camera
- However, the gear is a pain in the patoot
 - Camera, extra lenses, etc.
- When I'm not "on the clock," I carry an older "civilian" digital camera
 - Easier to stick in the airplane
 - Confuses people, sometimes
 - Many of those pictures have ended up in books/magazines
- Lets look at how to take better pictures using simple "point and shoot" digital cameras
 - How digital cameras came about
 - Why "Low Resolution" digital cameras can deliver good results
 - Technical tricks
 - Some shooting advice





Photography's Beginnings

- The *technology* was there in the 1600s
 - "Camera Obscura" for optics
 - Discovery that silver chloride darkened with exposure
- Joseph Niépice finally put it together in 1827
 - Then teamed with Louis Daguerre
- Drawback to daguerreotypes: No way to reproduce photos
- In 1835, William Henry Fox Talbot introduced Calotype process, which generated a paper "negative"
 - Published first book of photographs in 1844
- A cousin of Niépice introduced a glass-negative process in 1848, and photography took off
 - In 1850, there were 77 photo studios in New York alone
 - **"Our squalid society has rushed, Narcissus to a man, to gloat at its trivial image on a scrap of metal." - Baudelaire**





Going Digital

- The Charged Coupled Device (CCD) was invented in 1969
 - CCD converts images to digital signals
- First CCD applications were for video cameras
 - By 1975, had better performance than traditional ones
- Sony Mavica released in early 1980s
 - Basically a video camera that took freeze-frames
- Dycam Model 1, the first consumer digital still camera, came on market in 1990
 - Black and white, 376 x 240 pixels (0.09 Megapixels)
- Apple's QuickTake 100 camera in 1994 added an interface to a home computer





Film vs. Digital Camera

- Film and digital cameras basically work the same way
 - Expose a sensitive media to light, and process the result to duplicate the patterns of the light
- Film contains chemical "grains" that react individually to the light they are exposed to
 - Chemical processing allows them to duplicate the light they collected, and "fixes" the image so it doesn't react to light any more
- Digital imagery contains "Picture Elements" ("pixels") that react individually to the light they are exposed to
 - Brightness at each pixel is recorded electronically and processed to duplicate the image as necessary





The Byproduct of the Digital Revolution

- Point and shoot cameras in the film era were dirt simple
 - Use cassettes with a single type of film and fix the shutter speed and exposure (Kodak "Instamatic")
 - No electronics at first – later introduced simple film-canister reader to reset exposure based on type of film
- Digital Cameras needed "computers" right from the start
 - Moore's Law: Processing capability doubles every two years
- Today, the cheapest digital camera has flexibility and capability far beyond the most-expensive film cameras in the pre-computer age
- Paying more for a digital camera gives you
 - Better optics/ability to change lenses
 - More control over metering, focus, processing
 - Higher resolution (more megapixels)





Optics and Processing

- Of all the things a more-expensive camera gets you, the optics/CCD gives the biggest benefit
 - Glass vs. plastic lenses
 - Larger imaging area reduces effect of any flaws
 - Point-and-shoot camera manufacturers have been improving their optics
- Additional processor power gives flexibility, not necessarily better performance
 - Can be used to give better pictures, if you know how to use them





But What About Resolution?

- Biggest sales factor is the number of pixels in the imaging system
 - First digital cameras were "TV" resolution (0.1 megapixel) or less
- Current maximum is about 40 Megapixels
- In 1994, I was using a Kodak digital camera with 1 Megapixel resolution
 - Was a digital box with a standard Nikon body
 - Cost \$10,000
 - With a dye transfer printer, results were good even at 8x10 size
- So...what does the resolution really mean?





Resolution

- Most digital cameras use the standard 35mm film image ratio of 3:2
- 1 Megapixel ~ 1200 pixels across, 800 high
- If the image were printed in the standard 6x4 size, that yields 200 dots per inch (DPI)
- DPI Guidelines:
 - Computer display: 96 dpi
 - Usual advice for image printing: 200 dpi
 - Minimum I use for publication: 300 dpi





Minimum Required Camera Resolution For Print Size

Print Size	200 DPI	300 DPI
4x6	1 MP	2 MP
5x7	2 MP	4 MP
8x10	4 MP	8 MP
11x17	8 MP	16 MP

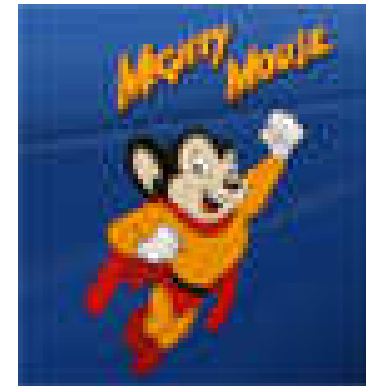
If you want to print a full-size sheet, a 4 Megapixel camera will give you acceptable resolution!





So Extra Megapixels are Worthless?

- Higher-resolution cameras give more flexibility
- With a higher-resolution image, you can crop down an image to emphasize a given feature without sacrificing resolution



- Publications like higher resolution for cover shots
- Going to print posters? Need more resolution
- But if you're going to mostly "Point and shoot," you don't need to search for higher and higher resolution





Technical (and other) Tricks

- Digital cameras need computer power...adding more flexibility is just a minor cost at that point
 - Side note: Flexibility comes at a operability cost
- They don't give users manual control of shutter speed and aperture, but even the cheap cameras give users flexibility that point-and-shoot film camera owners never had
- Following charts discuss common problems and their solutions
 - Both "technical" and "operational" solutions





Blurred Images

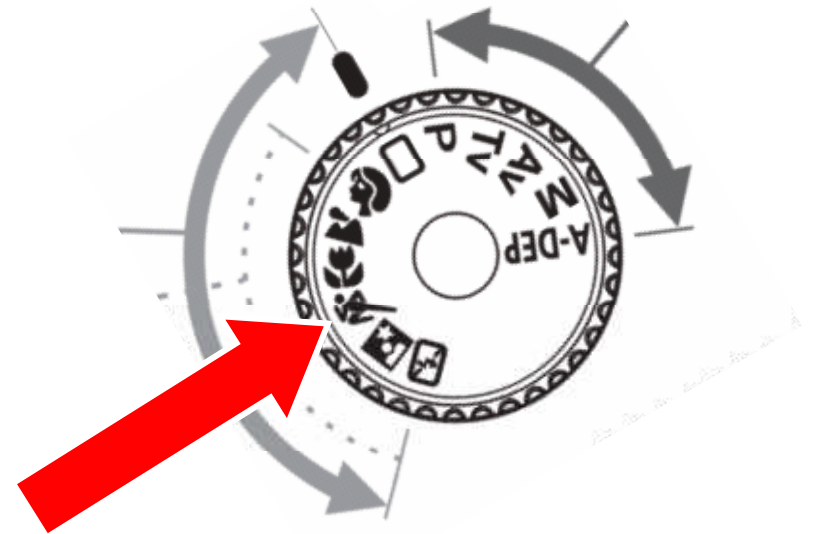
- In some situations, have encountered problems with blurred pictures
- Reason: Slow shutter speed
 - Cheap cameras automatically select combinations of aperture size ("F-Stop") and shutter speed
 - High-vibration environment, low light levels, etc. can result in too slow of a shutter speed
 - The expensive cameras give you direct control





Camera May Give You Direct Option

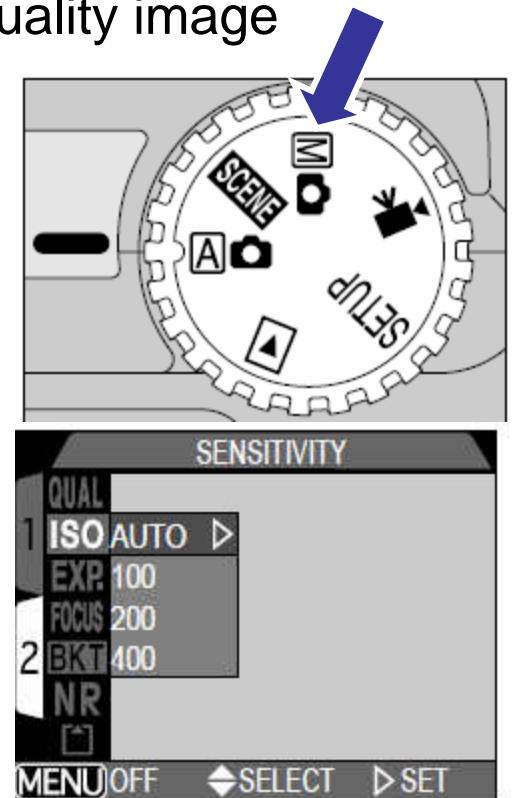
- Some cameras have a mode switch
- Look for "Sport" icon
 - Will bias settings towards faster shutter speed





Technical Solution: Higher ISO

- ISO is shorthand for "Film Speed"
 - "Faster" film can image the same amount of light with a faster shutter speed
 - Film ISOs ran from ~25 (original Kodachrome) to 3200+
 - Low number: Slower shutter speed, better quality image
 - High number: Faster shutter speed, lose some image quality
- Many low-buck cameras let you select the ISO speed
 - May have to switch to "Manual" to be able to set ISO
 - Good compromise setting: ISO 400
 - Too high, and the pictures get "noisy"





Other Solutions to Blurring

- Steady the camera
 - Set the camera down on a fencepost, table, etc. and try the shot
 - Use a tripod (or equivalent)
 - If very slow shutter speed, try a tripod with the self-timer!
- Isolate the camera from the noise
 - Don't let the camera touch the airframe!
 - Including windows
 - Human body is a good vibration absorber



Ron's
hat as a
tripod





Too Dark

- Common problem when taking pictures towards daylight or towards a window
 - Inexpensive cameras set their exposure based on the overall light level
 - What you're trying to take the picture of is dark, while the background is bright
 - Typical example is trying to take a picture of people sitting in a cafe





Technical Solution: Fill Flash

- Look for the Lightning Bolt
- Set the camera so the "Always flash" symbol is showing for the picture
- Will still set exposure to background, but will fire the flash to brighten the immediate foreground

Icon	Flash mode (⚡👁)
None	Auto
⚡	Flash Cancel
👁	Auto with red-eye reduction
⚡	Anytime Flash (fill flash)
SLOW	Slow sync





Fill Flash Example

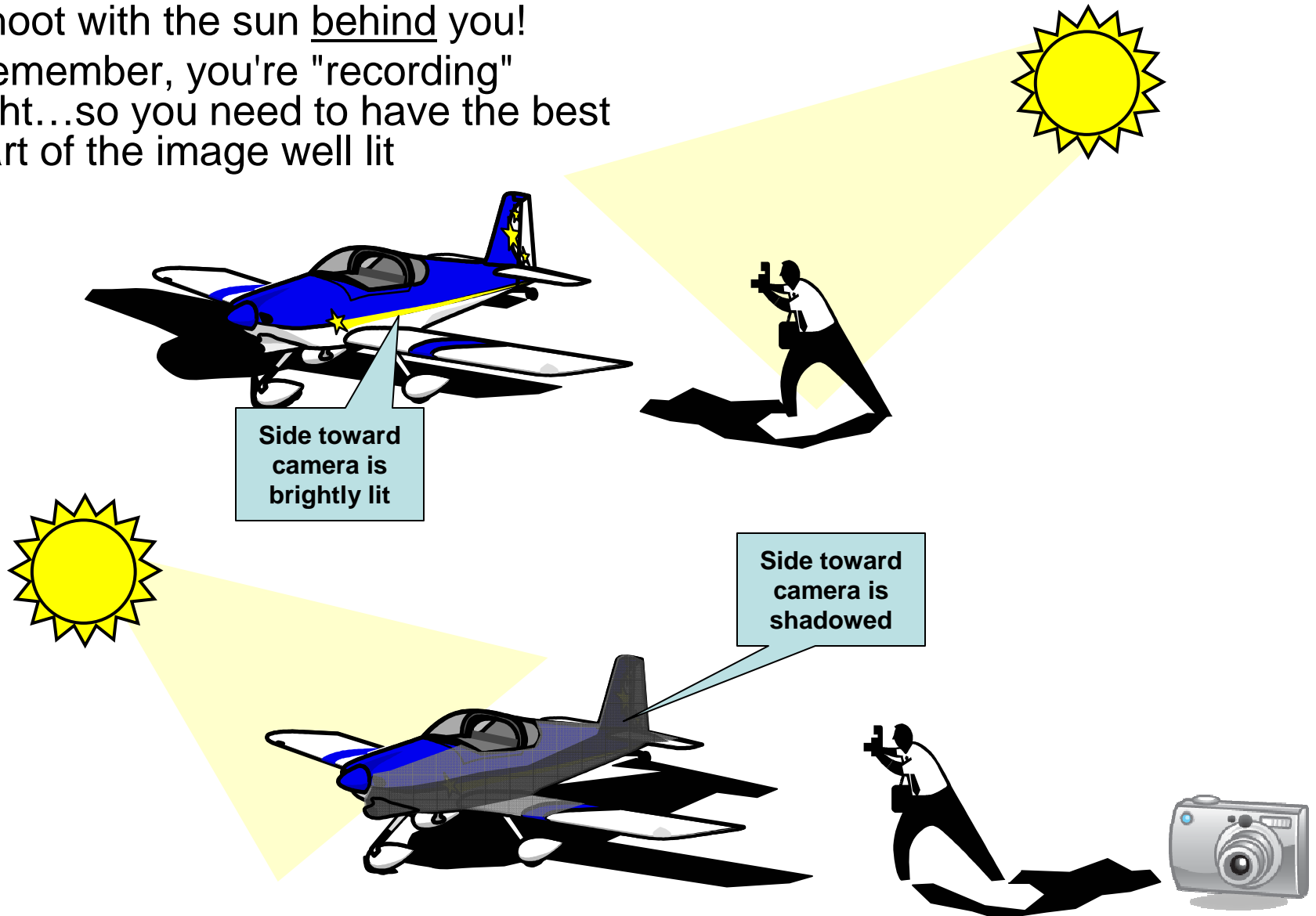
- Picture on right used Fill Flash





More on Light

- Shoot with the sun behind you!
- Remember, you're "recording" light...so you need to have the best part of the image well lit





Example of "Wrong Side" Shooting

- Little or no detail of the aircraft fuselage is visible
- People's faces in shadow
- A dull image of an interesting airplane
 - Only took it because of the de-rigging going on





Better (But not perfect) Shot of Same Airplane

- Sun really not in the right position, here, either, but it's illuminating the fuselage better
 - Notice the color & fabric pattern
- Would work a lot better if the plane were rotated $\sim 45^\circ$ right
 - But you have to take what you get at fly-ins
- If you want the finest details...try it on a cloudy day, instead





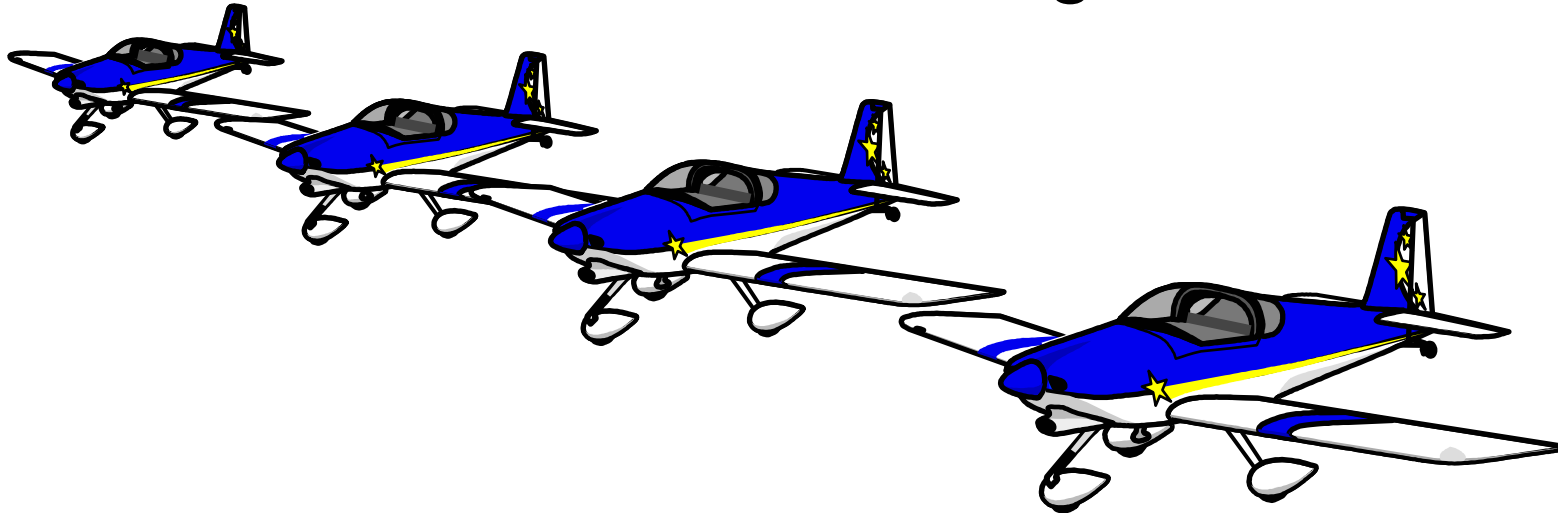
A Shot by the Master





Go Up/Go Down for Better Pictures

- Fly-In backgrounds are usually pretty cluttered with other airplanes
- If you crouch down, you can use the airplane in the foreground to block (most) of the clutter in the background





Using the Target Airplane to Block the Background





The Other Direction

- Try holding the camera above your head for a different perspective





My Favorite Trick: Telephoto & Mount Rainier





Using the Telephoto Trick

- Shoot an airplane and the mountain at the maximum distance that the airplane fills the frame at full zoom

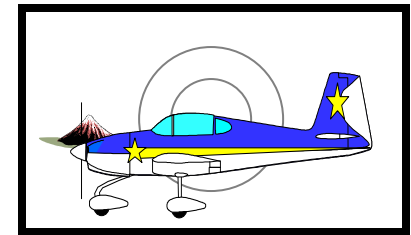
Far-off Mountain



Shooting close to airplane



Big airplane, far-off teeny mountain



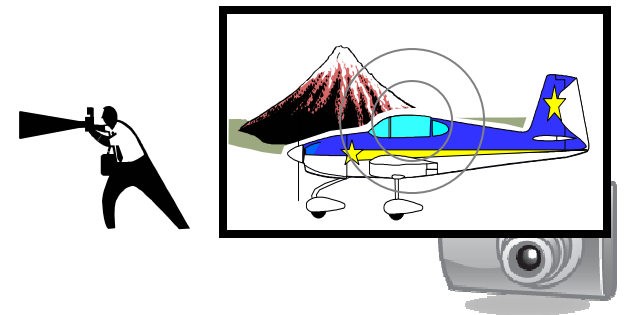
Far-off Mountain



Back way off from airplane and zoom in



Zoom Makes Mountain Bigger!





Finally: Pictures is People

- We've all seen someone glowering with a camera, waiting until the "lookie-loos" get away from an airplane so a "clean" picture can be taken
- Sometimes...the shot is better with a person or two in it
 - Gives scale
 - Give makes the shot more dynamic
 - More like "you were there"





Wrap-Up

- You can do quite a bit with an "everyday" digital camera
 - Massive amount of processing power
- The neat thing about digital cameras is that you can see your results in real-time
 - Especially handy for overhead shots
- "Rules are meant to be broken"
 - Try a bunch of things see what works
 - Bits are cheap, opportunities are expensive
- Plenty of cheap editing tools to help compensate for any problems

