



Inspection Certification Associates

**Using Drones for
Home Inspections**

Course Topics

- Overview of Drones
- Current FAA Regulations
- Learning to Fly
- Buying a Drone
- Drones for Home Inspections

Drones are the Future

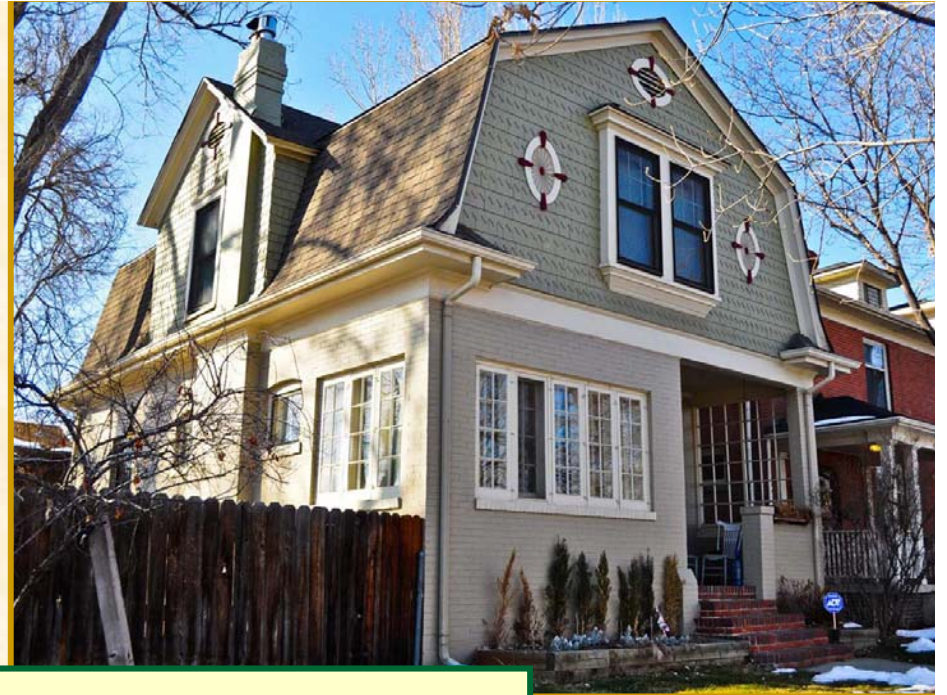
- Commercial use of *Unmanned Aerial Vehicles* (UAV), or **drones**, allows work to be completed more efficiently and safely.
- Companies such as Amazon are actively planning to deliver purchases by drone.
- Roofers, chimney contractors and insurance adjusters are starting to use drones to prepare estimates.

Insurance adjuster using a drone

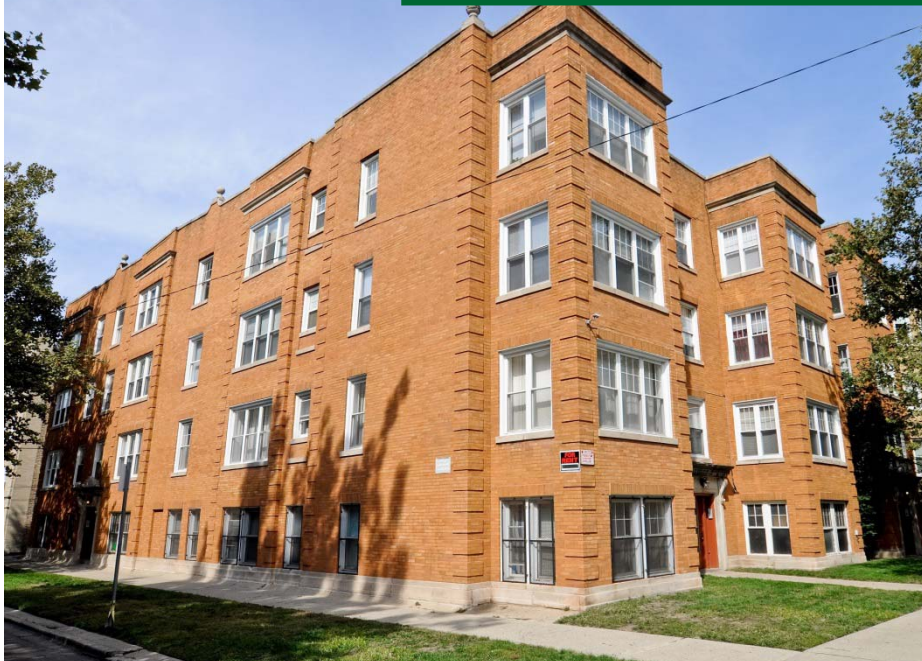


Drones for Roof Inspections

- Home inspectors are just starting to use drone technology - some use it for every roof...
- ...while others use a ladder where they can and use the drone when they can't:
 - ❖ for roofs that are too steep to walk on,
 - ❖ roofs that are too high for a ladder and have no access,
 - ❖ and roofing materials that could be damaged by walking on them or that may be too slick for safety

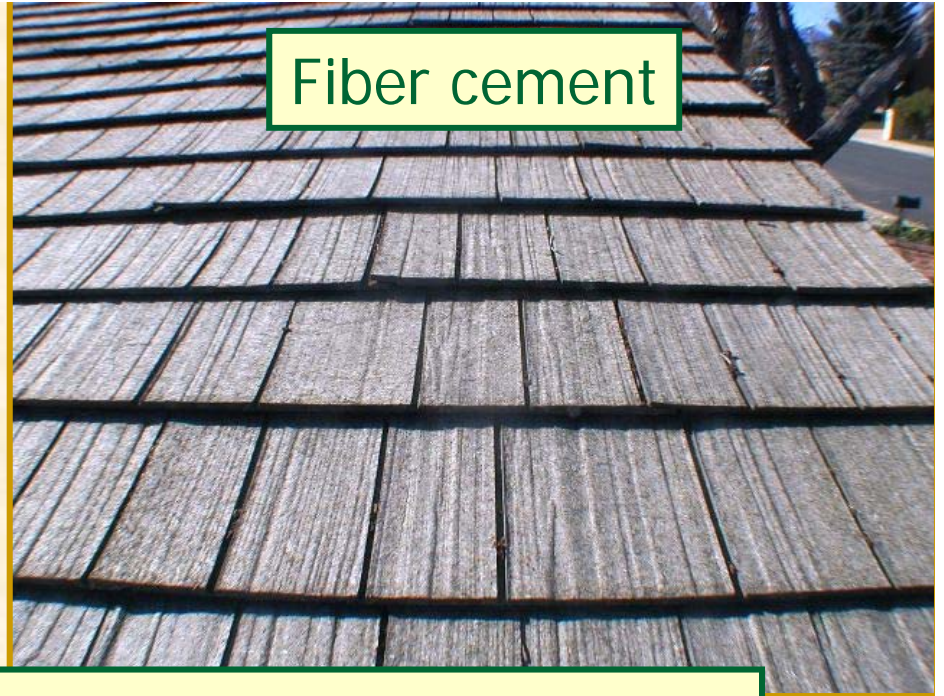


These roofs have difficult access





Clay tile

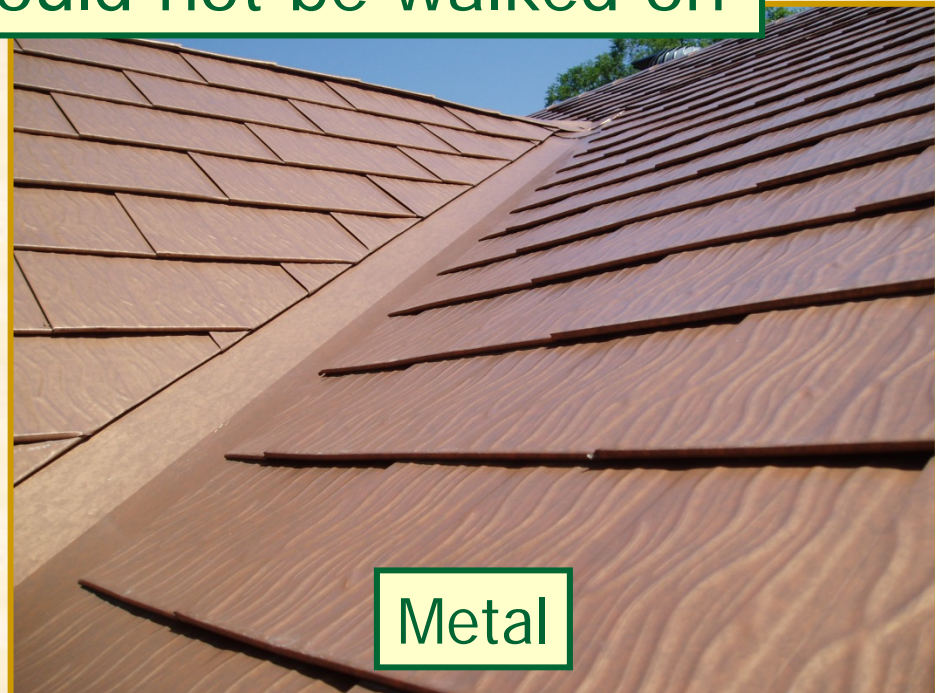


Fiber cement

These roof materials should not be walked on



Cedar shakes



Metal

Drones for Roof Inspections

- Some areas such as the Southwest have many tile roofs and inspectors do not walk them...
- ...and drones can be a **big marketing advantage**, because you will see what most inspectors cannot.
- In fact, **by using a drone you can guarantee that you will check every roof**, no matter how steep, how high, what material or if it is otherwise inaccessible.

Typical drone photo: most home inspectors
are not using drone technology - **yet**

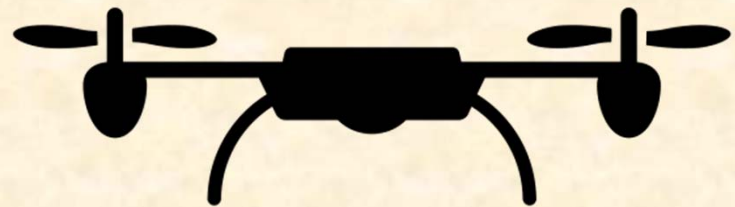


FAA Regulations in a Nutshell

- The **NEW** Federal Aviation Administration (FAA) “Small UAS Rule” (Part 107) was effective on August 29, 2016:
 - ❖ Your drone must weigh less than 55 pounds.
 - ❖ Your drone will have to be registered.
 - ❖ You must obtain a Remote Pilot Airman Certificate.
 - ❖ You must be cleared by the TSA.

Regulations: *Drone Registration*

- You need to register your aircraft if it weighs between **0.55 lbs.** (250 grams) and up to **55 lbs.**
- You can register online at registermyuas.faa.gov/
- Registrants must supply their name, address, and email address, in addition to the make, model, and serial number for each drone.
- Each registration costs \$5.





Federal Aviation
Administration

New Account

Login



Welcome to the Small Unmanned Aircraft System (sUAS) Registration Service

This site will allow you to register your small UAS
with the FAA and update your registration.

REGISTER

LEARN MORE



Do I need to register my Unmanned Aircraft?

You need to register your aircraft if it weighs between **0.55 lbs.**
(250 grams) and up to **55 lbs.** (25 kg)



You will be subject to civil and criminal penalties if you meet
the criteria to register an unmanned aircraft and do not register.

REGISTER

To register your
drone, go to:
registermyuas.faa.gov/
and click on "register"

The **Parrot *Bebop***:
most drones weigh
less than a pound



Regulations: *Remote Pilot Certificate*

- *You must obtain a Remote Pilot Airman Certificate.*
- To become a pilot you must:
 - ❖ Be at least 16 years old
 - ❖ Be able to read, speak, write, & understand English
 - ❖ Be in a physical and mental condition to safely operate a drone (*but no medical exam is required*)
 - ❖ Pass the Initial Aeronautical Knowledge exam at an FAA-approved knowledge testing center

Regulations: *Remote Pilot Certificate*

- The Exam areas include:
 - ❖ Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
 - ❖ Airspace classification and operating requirements, and flight restrictions affecting small unmanned aircraft operation
 - ❖ Aviation weather sources and effects of weather on small unmanned aircraft performance
 - ❖ Small unmanned aircraft loading and performance
 - ❖ Emergency procedures

Regulations: *Remote Pilot Certificate*

- The Exam areas include (continued):
 - ❖ Crew resource management
 - ❖ Radio communication procedures
 - ❖ Determining the performance of small unmanned aircraft
 - ❖ Physiological effects of drugs and alcohol
 - ❖ Aeronautical decision-making and judgment
 - ❖ Airport operations
 - ❖ Maintenance and preflight inspection procedures

UAS Topics	Percentage of Items on Test
I. Regulations	15 – 25%
II. Airspace & Requirements	15 - 25%
III. Weather	11 – 16%
IV. Loading and Performance	7 – 11%
V. Operations	35 – 45%
Total Number of Questions	60

Breakdown of exam questions by topic

Regulations: *Remote Pilot Certificate*

- The 60 exam questions are all multiple choice.
- The minimum passing score is 70%.
- You have two hours to complete the exam.
- If you fail, you can retake the exam after 14 days.
- **The FAA recommended exam preparation documents are available *free* from ICA.**
- You can also purchase an online prep course – search for “*Initial Aeronautical Knowledge exam preparation*”.

Regulations: *Remote Pilot Certificate*

- *When you are ready to take the exam:*
- You must go to an FAA registered Knowledge Testing Center – there are hundreds throughout the U.S.A...
- ...most people are within an hour of a test center...
- **...a list is available from ICA.**
- The exam fee is \$150.00.
- All applicants must bring a valid and current form of identification that includes their photo, date of birth, signature, and physical residential address.

Regulations: *Remote Pilot Certificate*

- *When you have passed the exam:*
- You must apply through the electronic FAA Integrated Airman Certificate and/or Rating Application system (IACRA)...
- ...go to iacra.faa.gov/IACRA/Default.aspx to complete online FAA Form 8710-13 for a remote pilot certificate.

Regulations: *Remote Pilot Certificate*

- A confirmation email will be sent when you have passed the TSA security background check.
- This email will provide instructions for printing a copy of the temporary remote pilot certificate from IACRA.
- A permanent remote pilot certificate will be sent via regular mail once all other FAA-internal processing is complete.



Federal Aviation
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For more info, go to:
registermyuas.faa.gov/
and click "Learn More"



You will be subject to civil and criminal penalties if you meet
the criteria to register an unmanned aircraft and do not register.

REGISTER

Learning to Fly Your Drone

- Receiving your remote pilot certificate is a great accomplishment, but it only means that you understand the rules.
- Learning to actually fly a drone takes patience and practice.
- A drone suitable for a roof inspection is costly...
- ...so some folks purchase a cheaper “toy” drone to practice with and not be so afraid of crashing it.

Learning to Fly Your Drone

- **The only way to learn how to fly is to do it.**
- Practicing in a large, grassy area away from buildings, streets and power lines is best.
- Some local park or forest preserve districts have designated “model airplane” flying fields...
- ...but any large, open area can work as long as you are well away from other people.

Some fields require you to register,
and for others you just show up

Schiller Model Airplane Flying Field



Board of Commissioners
Forest Preserve District of Cook County
Information: 1-800-870-3666 www.fpdcc.com

CLOSED AT SUNSET



Learning to Fly Your Drone

- ICA has two instructional documents to help get you started.
- There are many instructional videos on YouTube.
- You might consider joining a local model aircraft club or drone club, where members are usually happy to help you learn to fly...
- ...some clubs even have instructors and formal training programs.



Another option: *drone flight training school*

Buying a Drone

- Drones come in a seemingly infinite variety of variations and prices.
- A “practice” drone should be less than \$100.00.
- A drone and camera that will provide the control, precision and photo resolution needed for a roof inspection will cost \$500.00 to \$1500.00.
- The more you spend, the easier it will be to fly...
- ...but prices are coming down.

Buying a Drone

- You'll need a drone, camera, gimbal (mounts the camera to the drone), controller, and battery charger.
- Experienced users often buy these components separately, but if you are a drone “rookie”...
- ...it might be better to purchase a Ready-to-Fly (RTF) drone that has the camera already set up.
- You'll want to spend some time researching the options and price points (and check the reviews!).

Buying a Drone

- Some better known and trusted retailers include:
 - ❖ DJI: <http://www.dji.com>
 - ❖ Quadrocopter.com (high end photography drones).
 - ❖ Amazon.com
 - ❖ DroneFly.com (financing available)
- There are many other online and local sources.
- Check eBay for deals on both new and used equipment.

Bebop by Parrot



DJI Phantom 3 Professional



Drones popular with
home inspectors:
remember, *models and
prices change quickly*



Blade 350 QX3

Buying a Drone: Insurance

- While not usually required by law, you might considering buying drone insurance...
- ...even an experienced drone pilot will have some occasional mishaps.
- On the other hand, a drone weighing a pound or less cannot do much damage if you crash it on a roof.
- You can search for “drone insurance” – don’t be surprised if the annual premium is about the same as the cost of the drone.

Buying a Drone: Insurance

- However, if you decide to purchase home inspector errors and omissions (E & O) insurance, *you might be able to add drone coverage affordably.*
- Target Professional Programs, a leading provider of home inspector E & O coverage, offers a drone inspection endorsement (for damage or injury):
 - ❖ Limits: \$25,000 per occurrence / \$50,000 per policy term
 - ❖ Premium: \$100
 - ❖ No minimum deductible
- Go to targetproins.com/ for details.

Drones for Home Inspections

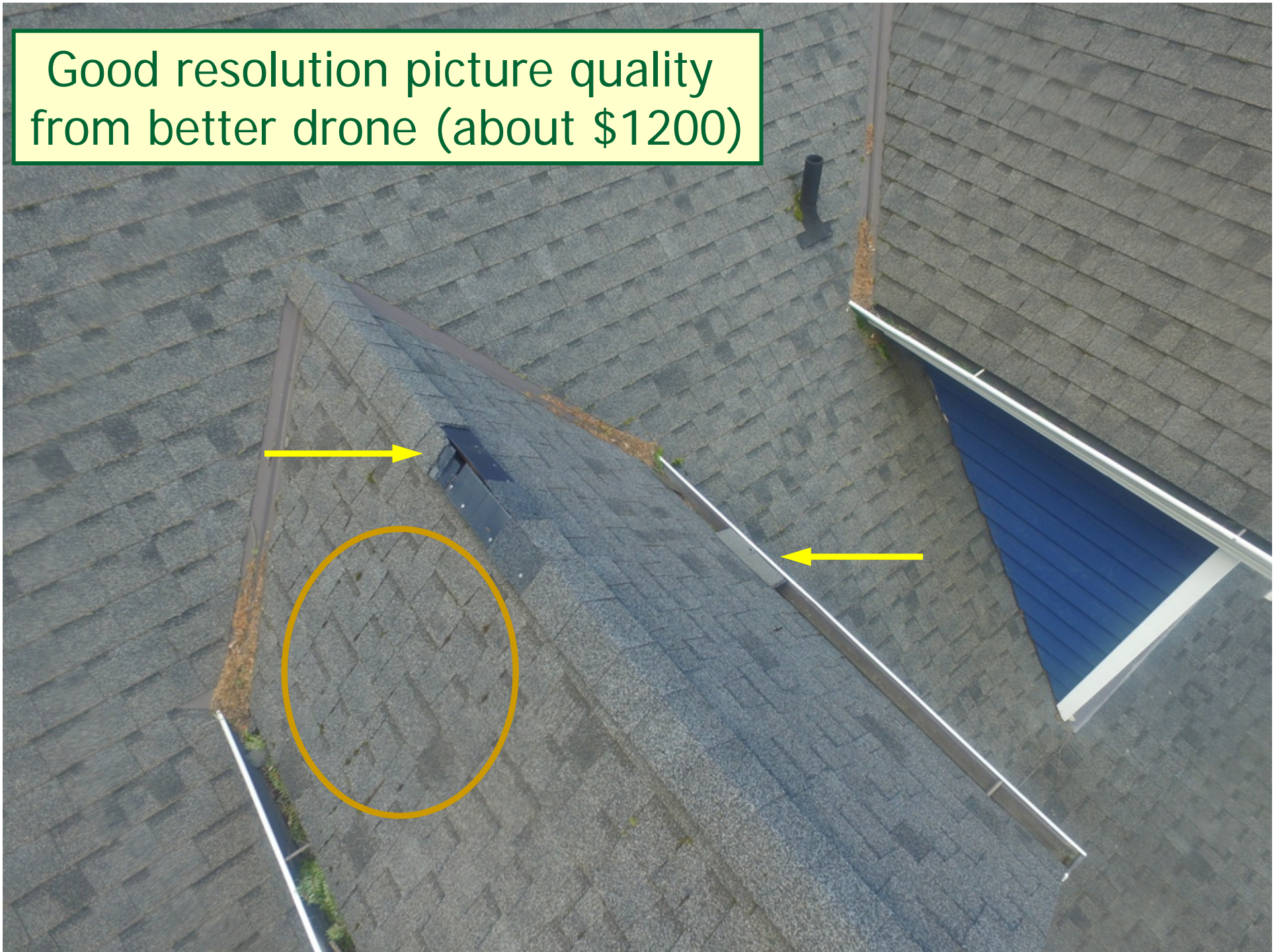
- Drones are primarily used for roof inspections.
- Some inspectors use a drone for every roof, while others still use a ladder and walk the roof whenever possible.
- Better quality drones and cameras allow you to fly closer and get higher resolution pictures than cheaper drones...
- ...but you might start “cheap” and upgrade later.

Bad flashing at chimney
is still clearly visible



Low resolution picture quality
from cheap drone (less than \$200)

Good resolution picture quality
from better drone (about \$1200)





Good resolution picture quality
from better drone (about \$1200)

High resolution picture quality
from costlier drone (about \$1700)



This is impossible to
see from the ground

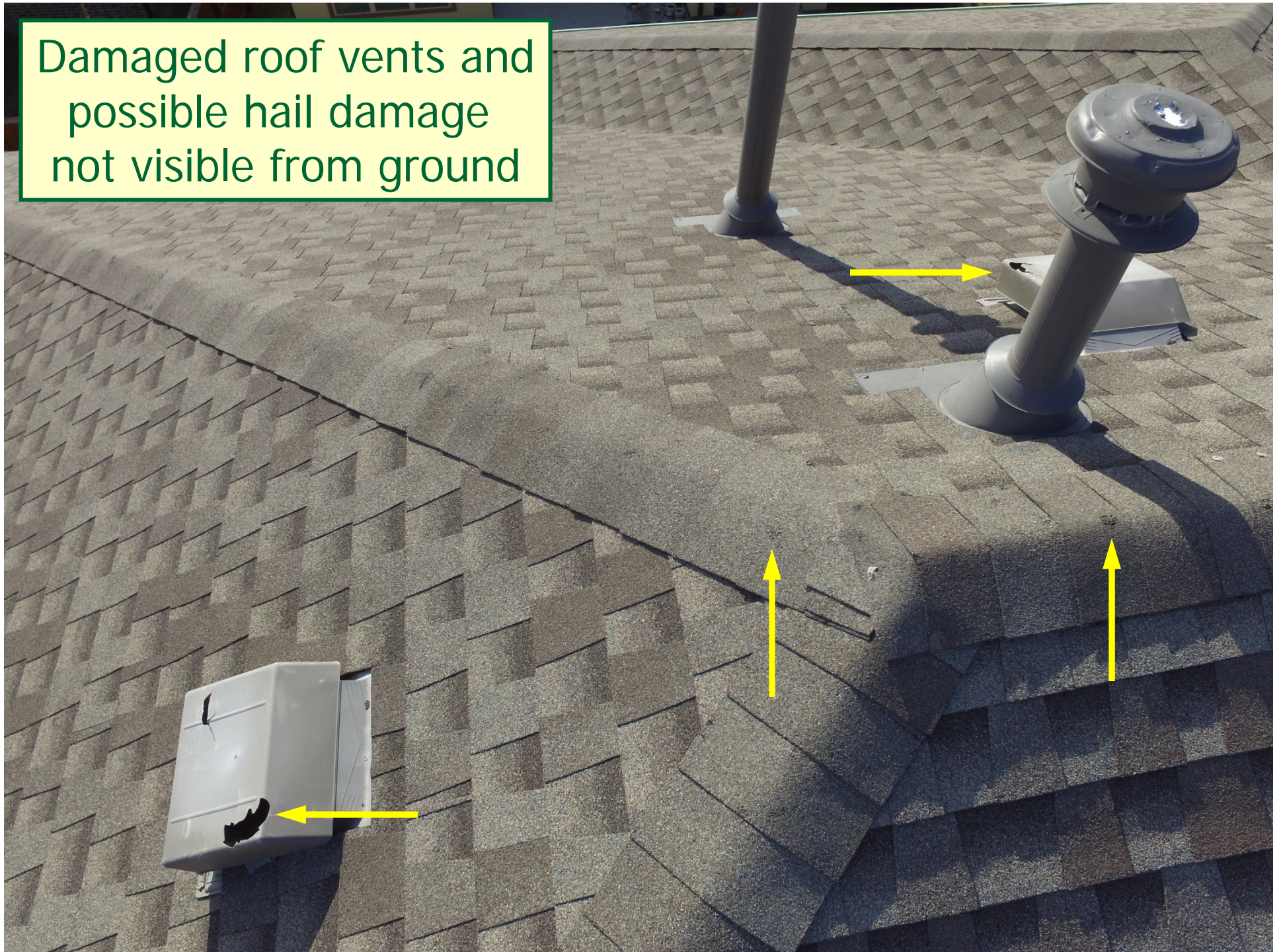
Very high resolution picture quality
from higher-end drone (about \$3500)





Broken, shifted and patched tiles not visible from ground

Damaged roof vents and
possible hail damage
not visible from ground



A higher quality camera
can get pictures like these



A photograph of a four-story brick apartment building. The building is constructed of red brick with light-colored mortar. There are several windows visible, some with white frames and others with dark frames. A green metal roofline runs along the top of the building. Four yellow arrows are pointing upwards towards specific areas: two on the left side of the building, one at the corner, and one on the right side. The background is a clear blue sky.

4 story apartment building

Drones are also useful on taller homes to see gutters, fascia, windows, parapets, siding, masonry and other details.

Drones for Home Inspections

- Inspecting a roof with a drone should take about the same time as inspecting it with a ladder.
- Quad units (4 motors) have longer run time (15 to 20 minutes) than Hexes and Octos (6 and 8 motors)...
- ...but Hexes and Octos provide better control in wind and have redundancy in case of motor failure.
- Quads are cheaper than Hexes and Octos.
- Practice and experience are the keys to successful drone inspections.



Good luck with your first drone roof inspection!