

# Building Inspection: Camera Selection & Efficiency

Operational Efficiency

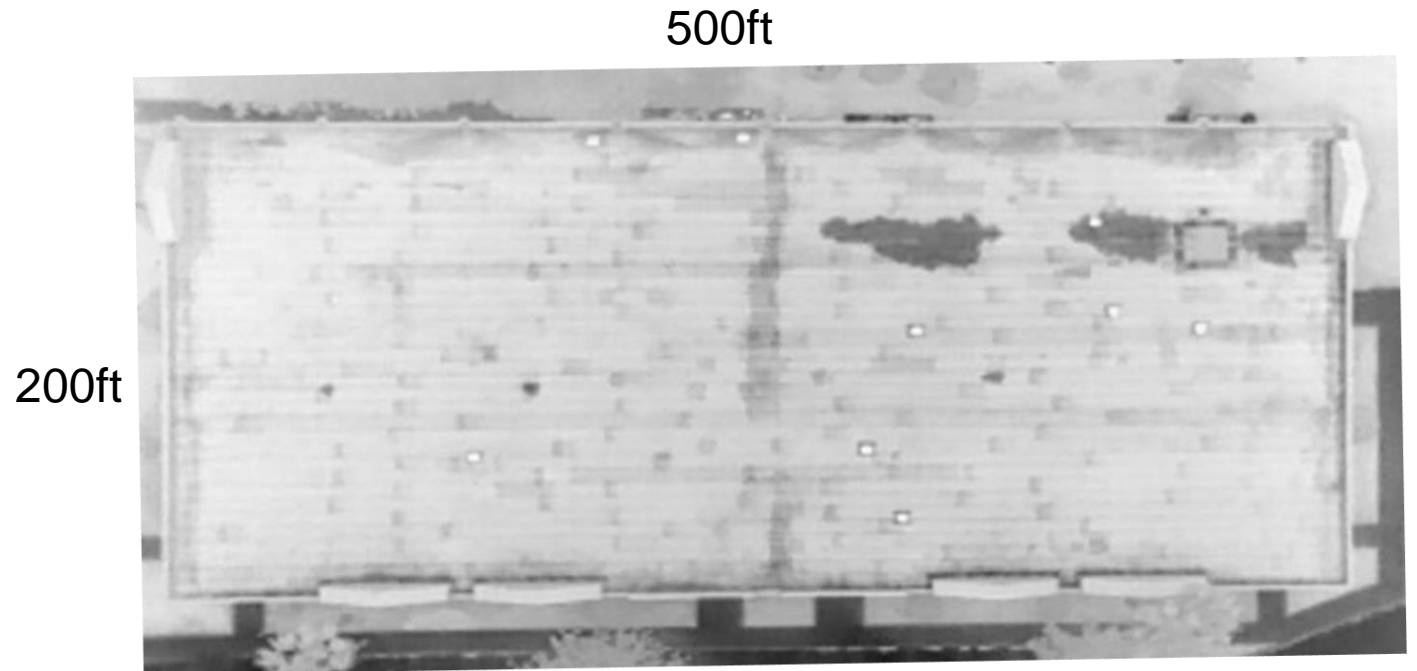
# UAS Advantages

- Safety- Not walking a roof in the dark
- Physical access- Building maintenance does not need to be on site to unlock doors or provide access to restricted areas
- Speed
  - “It takes longer to drive to the job than it does to perform the inspection”
- Better viewing angles from drone versus standing on a ladder with a hand held



# Roof Inspection for Moisture

- What is the best camera to effectively and efficiently map a 100,000 sq ft (9300m<sup>2</sup>) surface?
- Customer may want to create ortho mosaic from data
- You need to find anomalies larger than 6" x 6" (15 x 15cm)



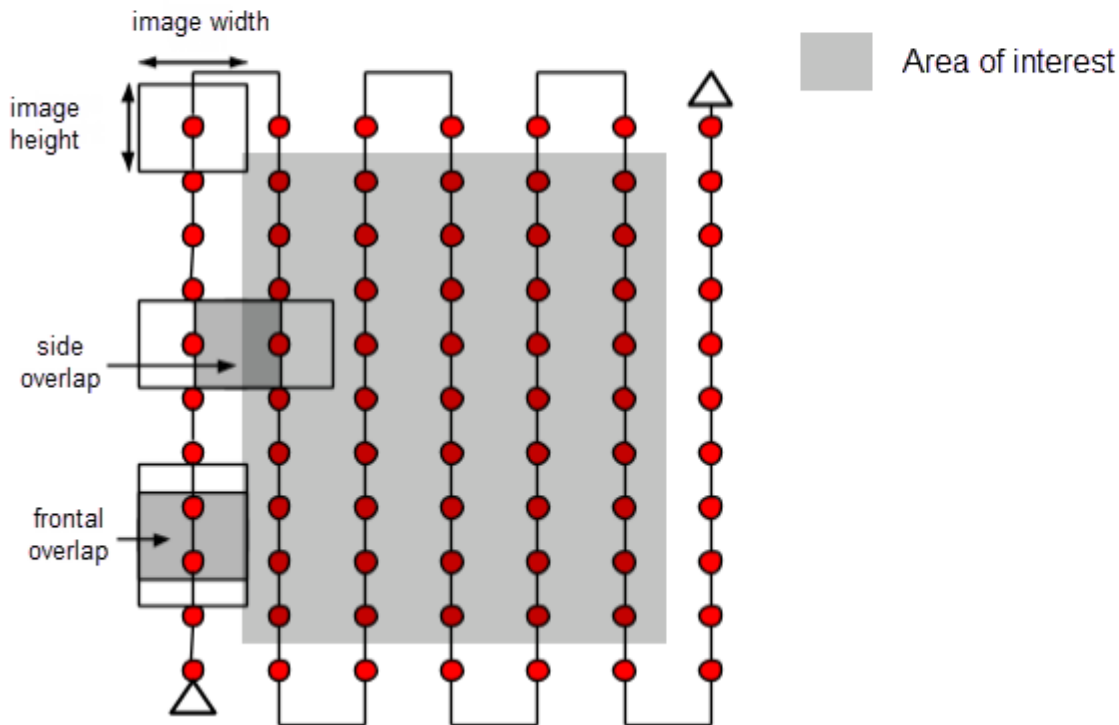
# How to process Thermal Datasets in Pix4Dmapper

Updated: December 15, 2016 10:22

With all thermal dataset, we recommend a high overlap (90%) because of the sensor's low resolution.

## General case

The recommended overlap for most cases is at least **75% frontal overlap** (with respect to the flight direction) and at least **60% side overlap** (between flying tracks). It is recommended to take the images with a regular grid pattern (Figure 1). The camera should be maintained as much possible at a **constant height** over the terrain / object to ensure the desired GSD.



# Data Worksheet

FLIR Camera	# of Pixels Horizontal	# of Pixels Vertical	Pixels	Horizontal FOV (deg)	Vertical FOV (deg)	IFOV (mrad)	Elevation Over Roof	Spot Size (in) (single spot)	Horizontal FOV (ft)	Vertical FOV (ft)	# Images to achieve 80% overlap	Distance between Images Horz (ft)	Distance Between Images Vert (ft)
640 9mm	640	512	327680	69	56	1.889	69.000	1.56	83.5	67		17	13
640 13mm	640	512	327680	45	37	1.308	100.00	1.57	83.5	67	447	17	13
640 19mm	640	512	327680	32	26	0.895	145.000	1.56	83.5	67	447	17	13
336 6.8mm	336	256	86016	49.1	37.4	2.519	52.000	1.57	44	33.5		9	7
336 9mm	336	256	86016	35	27	1.889	69.250	1.57	44	33.5		9	7
336 13mm	336	256	86016	25	19	1.308	100.000	1.57	44	33.5	1696	9	7
336 19mm	336	256	86016	17	13	0.895	146.000	1.57	44	33.5	1696	9	7
FLIR Duo	160	120	19200	57	44	6.22	21.00	1.57	20.9	15.67	7634	4	3

Let's go for min 4 x 4 pixels on our smallest target area

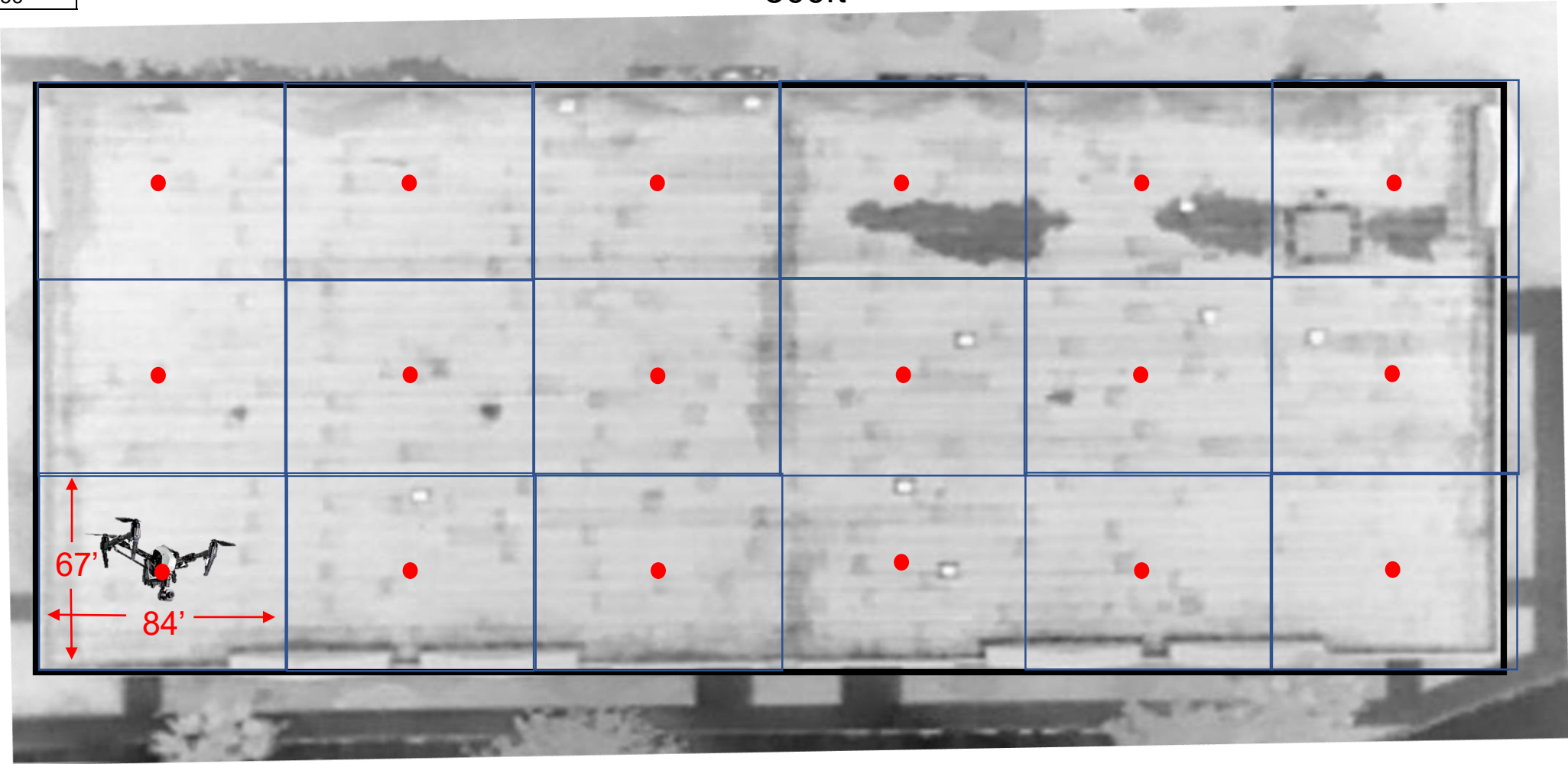
FLIR Camera	Elevation Over Roof	Spot Size (in) (single spot)
640 9mm	69.000	1.56
640 13mm	100.00	1.57
640 19mm	145.000	1.56

# No Overlap with a 640 Camera Looks like this

Note: Flight level is important to maintain recommended Spot Size

500ft

200ft



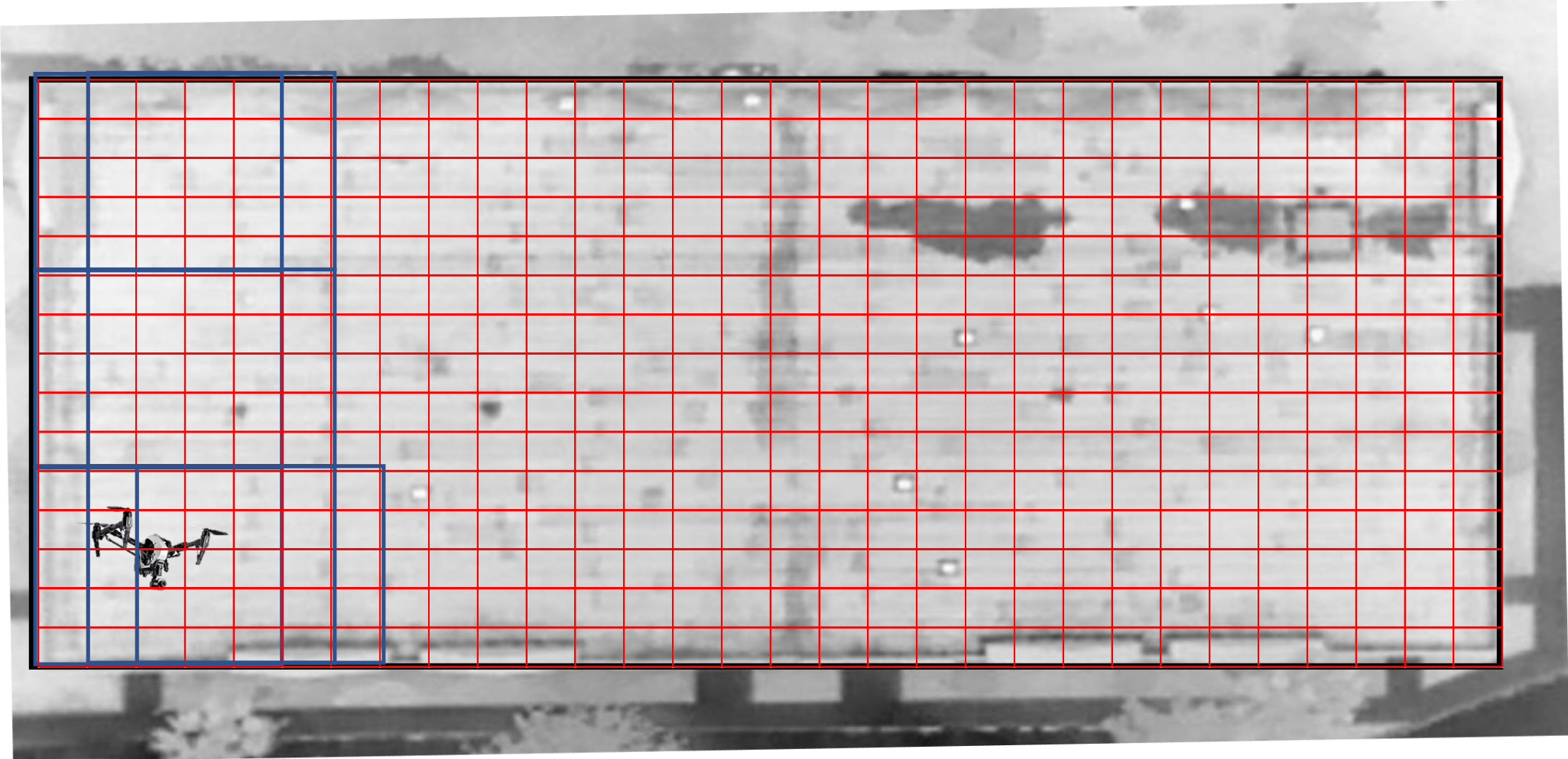
Resolution	Lens	Distance to Target	Horizontal FOV	Vertical FOV
640x512	13mm	100	84	67



With 640 x 512 13mm camera it will require ~450 images to achieve the 80% overlap

500ft

200ft



FLIR Camera	Elevation Over Roof	Spot Size (in) (single spot)
640 9mm	69.000	1.56
640 13mm	100.00	1.57
640 19mm	145.000	1.56

# Roof Inspection Summary

- Utilize IR best practices to find hidden moisture
- Plan your flight with recommended overlap and resolution based on deliverable requirements or 3<sup>rd</sup> party rendering software
- Be aware of FAA restrictions for the site location and time of day flight will occur

