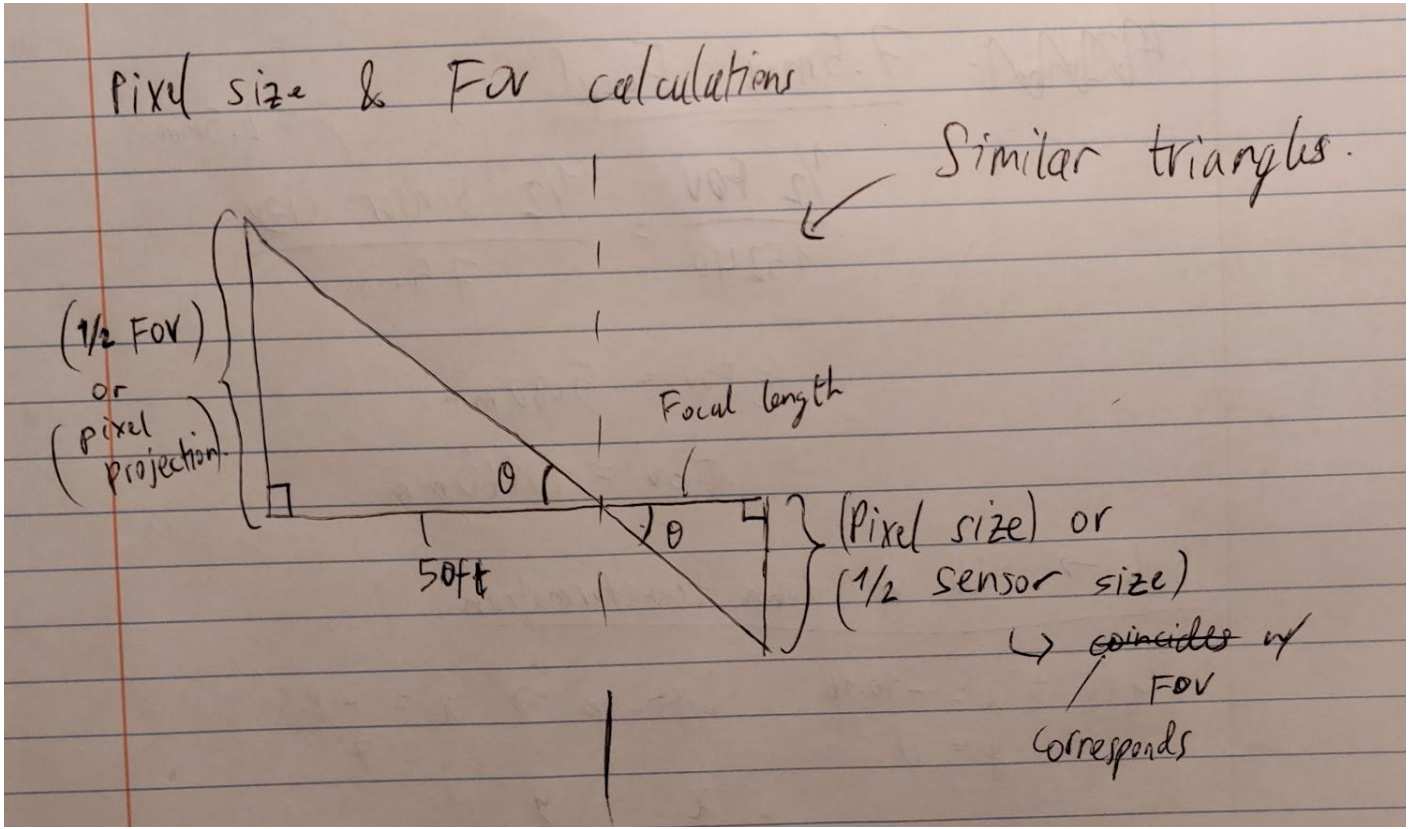
Pixel size & FOV calculations



So:

Pixel size/Focal length
= Pixel projection/50ft

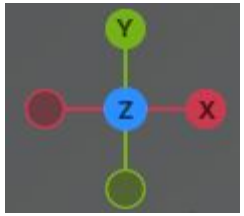
sensor size/Focal length
= FOV/50ft

Sensor chip sizes are taken from respective manufacturer websites

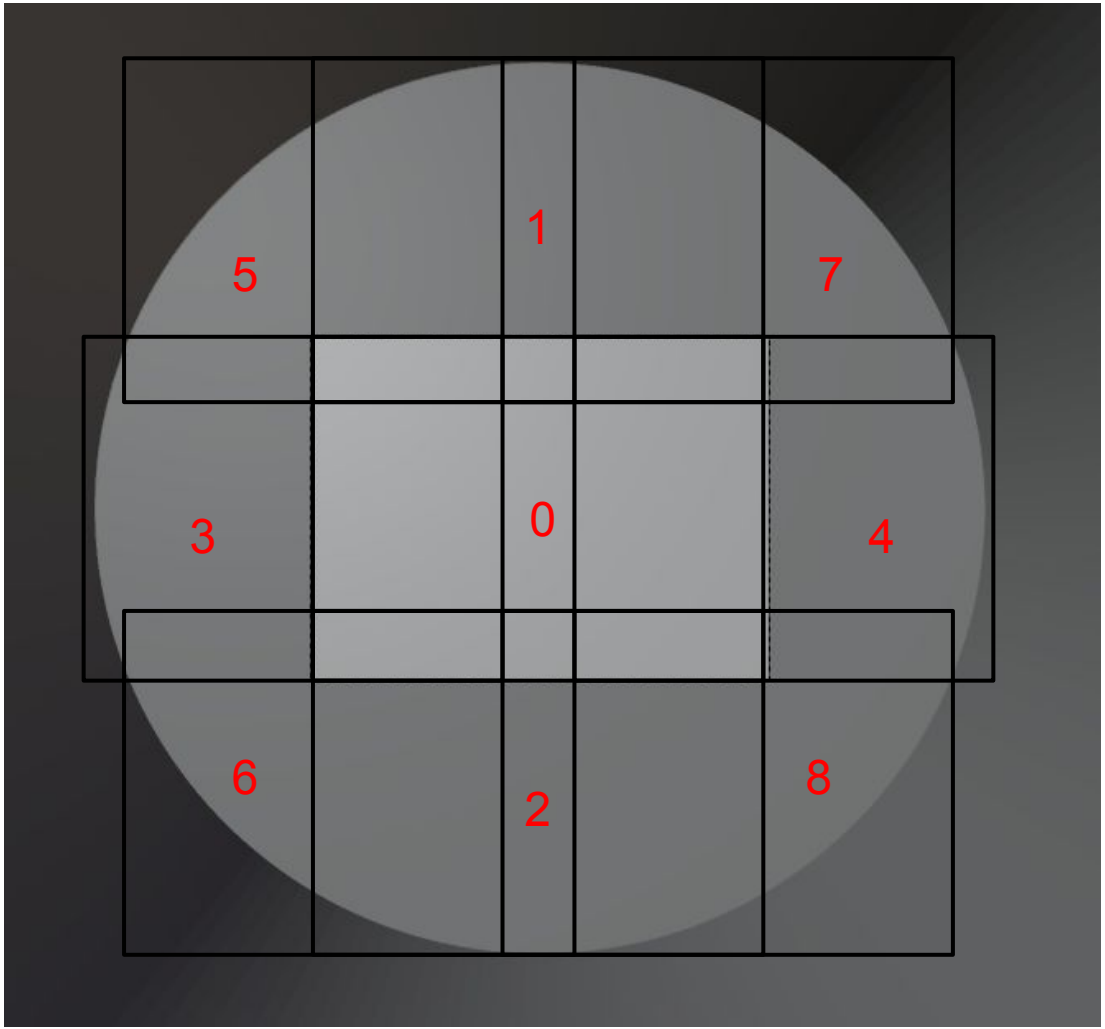
DVXplorer(640x480, 7.5mm focal) 9-camera layout calculations

- FOV(mm):
  Horizontal FOV/50ft = Horizontal sensor size/7.5mm
  50ft = 15240mm, Horiz. sensor size = 640 * 9um = 5.76mm
  Horiz. FOV = 15240*(5.76/7.5)[mm]
  = 11704mm = 11.70m = 38.39ft
  Vertical FOV/50ft = Vertical sensor size/7.5mm
  50ft = 15240mm, Vert. sensor size = 480 * 9um = 4.32mm
  Vert. FOV = 15240*(4.32/7.5)[mm]
  = 8778mm = 8.78m = 28.81ft

- Pixel projection(mm):
  Pixel proj/50ft = Pixel size/7.5mm
  For DVXplorer, Pixel size is 9um(from Inivation website specs)
  Pixel proj = 15240*(9e-3/7.5)[mm]
  = 18.29mm
  (The width of a single pixel projected 50ft to the bottom of the tank is 18.29mm)



DVXplorer
(640x480)
7.5mm focal
9-camera
layout



Coordinate layout(ft)

0: x = 0, y = 0

1: x = 0, y = 23.0

2: x = 0, y = -23.0

3: x = -18.37, y = 0

4: x = 18.37, y = 0

5: x = -18.37, y = 23

6: -18.37, y = -23

7: x = 18.37, y = 23

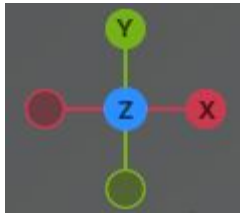
8: x = 18.37, y = -23

Note: Cameras 5 and 7, & 6 and 8 overlap; Cameras 3 and 4 do NOT overlap.

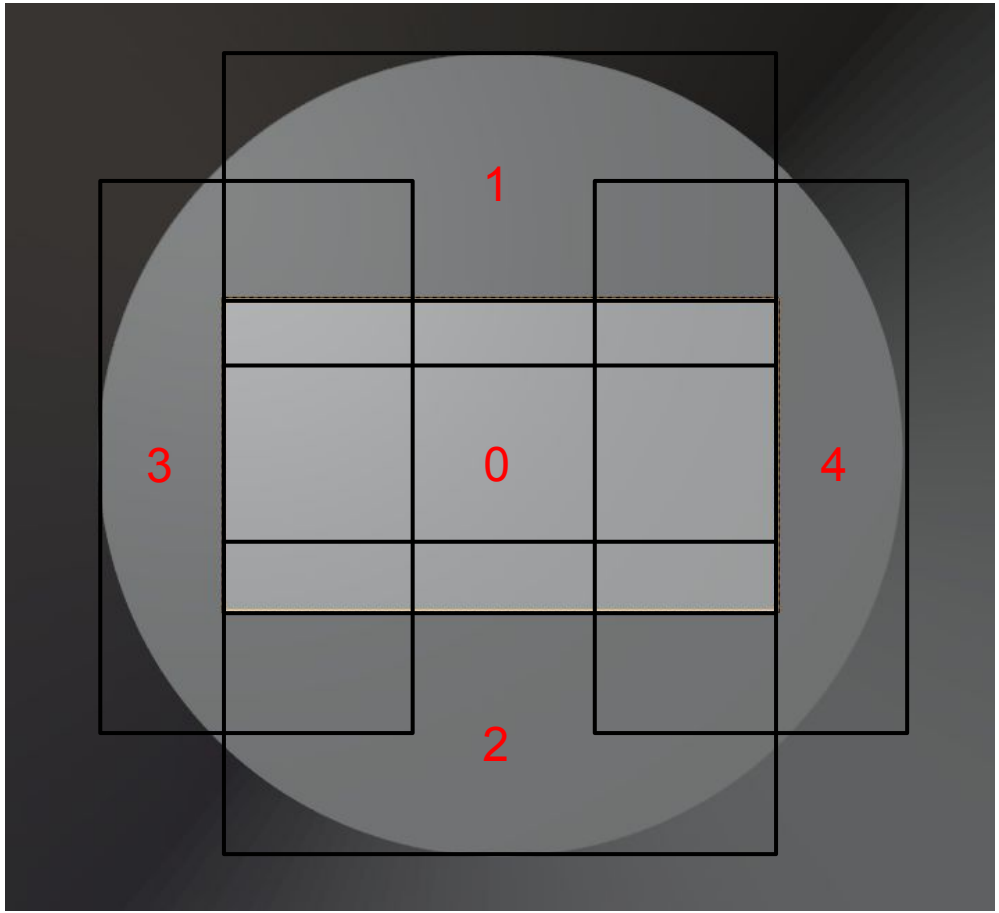
IMX636(1280x720, 6.0mm focal) 5-camera layout calculations

- FOV(mm):
  Horizontal FOV/50ft = Horizontal sensor size/6.0mm
  50ft = 15240mm, Horiz. sensor size = 1280 * 4.86um = 6.2mm
  Horiz. FOV = 15240*(6.2/6.0)[mm]
  = 15748mm = 15.75m = 51.67ft
  Vertical FOV/50ft = Vertical sensor size/6.0mm
  Vert. sensor size = 720 * 4.86um = 3.5mm
  Vert. FOV = 15240*(3.5/6.0)[mm]
  = 8890mm = 8.89m = 29.17ft

- Pixel projection(mm):
  Pixel proj/50ft = Pixel size/6.0mm
  For IMX636, Pixel size is 4.86um(from Prophesee website specs)
  Pixel proj = 15240*(4.86e-3/6.0)[mm]
  = 12.34mm



IMX636
(1280x720)
6mm focal
5-camera
layout



Coordinate layout(ft)

0: x = 0, y = 0

1: x = 0, y = 23.3

2: x = 0, y = -23.3

3: x = -23.3, y = 0

4: x = 23.3, y = 0

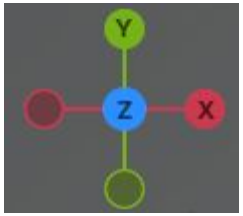
GENX320(320x320, 4mm focal) 9-camera layout calculations

- FOV(mm):

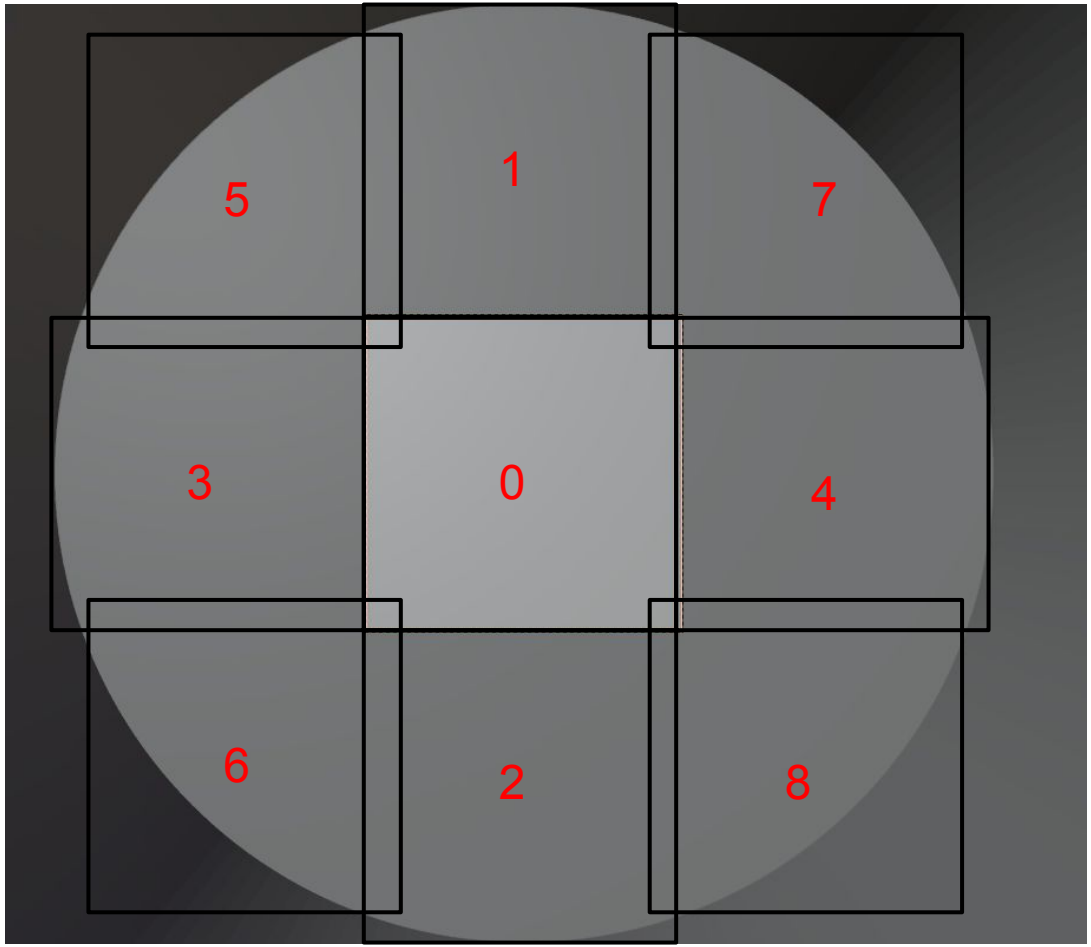
  FOV/50ft = Sensor size/4.0mm
  50ft = 15240mm, sensor size = 320 * 6.3um = 2.02mm
  FOV = 15240*(2.02/4.0)[mm]
  = 7696mm = 7.70m = 25.26ft

- Pixel projection(mm):

  Pixel proj/50ft = Pixel size/4.0mm
  For GENX320, Pixel size is 6.3um(from Prophesee website specs)
  Pixel proj = 15240*(6.3e-3/4.0)[mm]
  = 24.00mm



GENX320
(320x320)
4mm focal
9-camera
layout



Coordinate layout(ft)

0: x = 0, y = 0

1: x = 0, y = 25.3

2: x = 0, y = -25.3

3: x = -25.3, y = 0

4: x = 25.3, y = 0

5: x = -22.5, y = 23.0

6: -22.5, y = -23.0

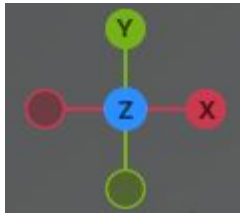
7: x = 22.5, y = 23.0

8: x = 22.5, y = -23.0

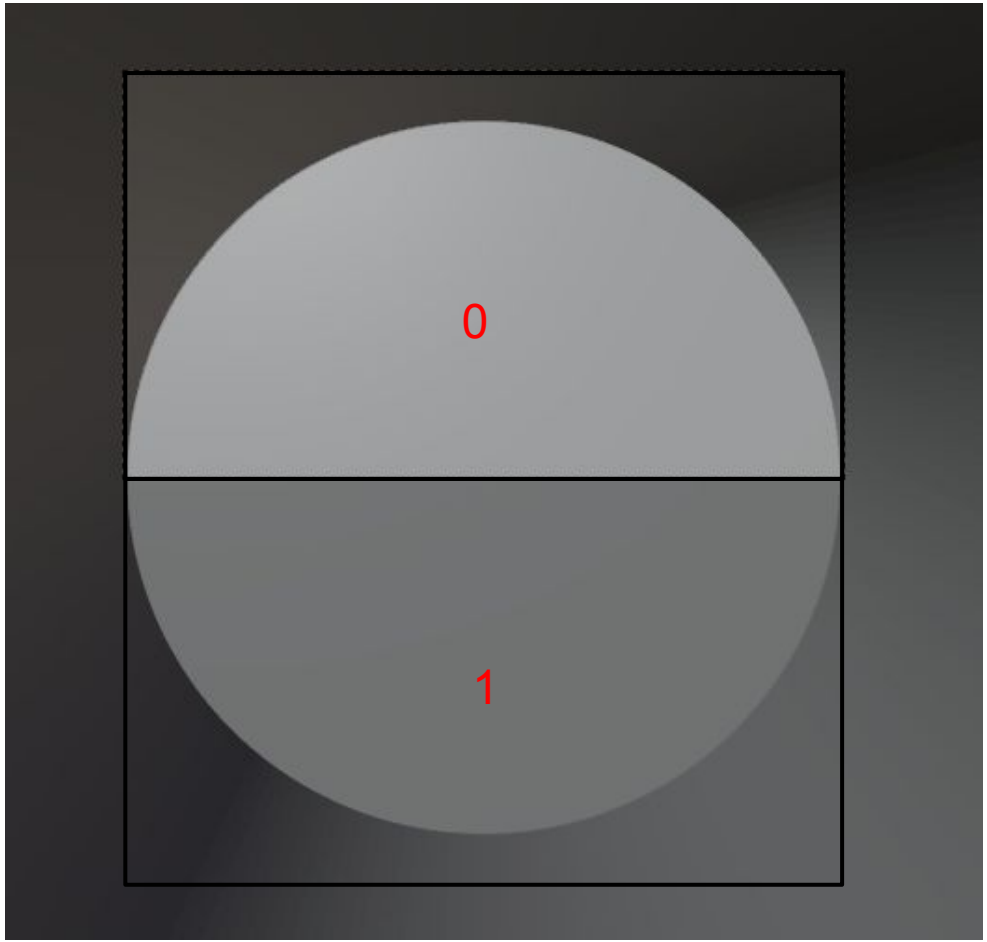
IMX636(1280x720, 4.1mm focal) 2-camera layout calculations

- FOV(mm):
  Horizontal FOV/50ft = Horizontal sensor size/4.1mm
  50ft = 15240mm, Horiz. sensor size = 1280 * 4.86um = 6.2mm
  Horiz. FOV = 15240*(6.2/4.1)[mm]
  = 23046mm = 23.05m = 75.62ft
  Vertical FOV/50ft = Vertical sensor size/4.1mm
  Vert. sensor size = 720 * 4.86um = 3.5mm
  Vert. FOV = 15240*(3.5/4.1)[mm]
  = 13009mm = 13.01m = 42.68ft

- Pixel projection(mm):
  Pixel proj/50ft = Pixel size/4.1mm
  For IMX636, Pixel size is 4.86um(from Prophesee website specs)
  Pixel proj = 15240*(4.86e-3/4.1)[mm]
  = 18.06mm



IMX636
(1280x720)
4.1mm focal
2-camera
layout



Coordinate layout(ft)
0: x = 0, y = 21.34

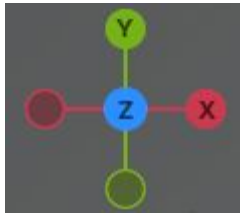
1: x = 0, y = -21.34

DVXplorer Lite(320x240, 7.5mm focal) 9-camera layout calculations

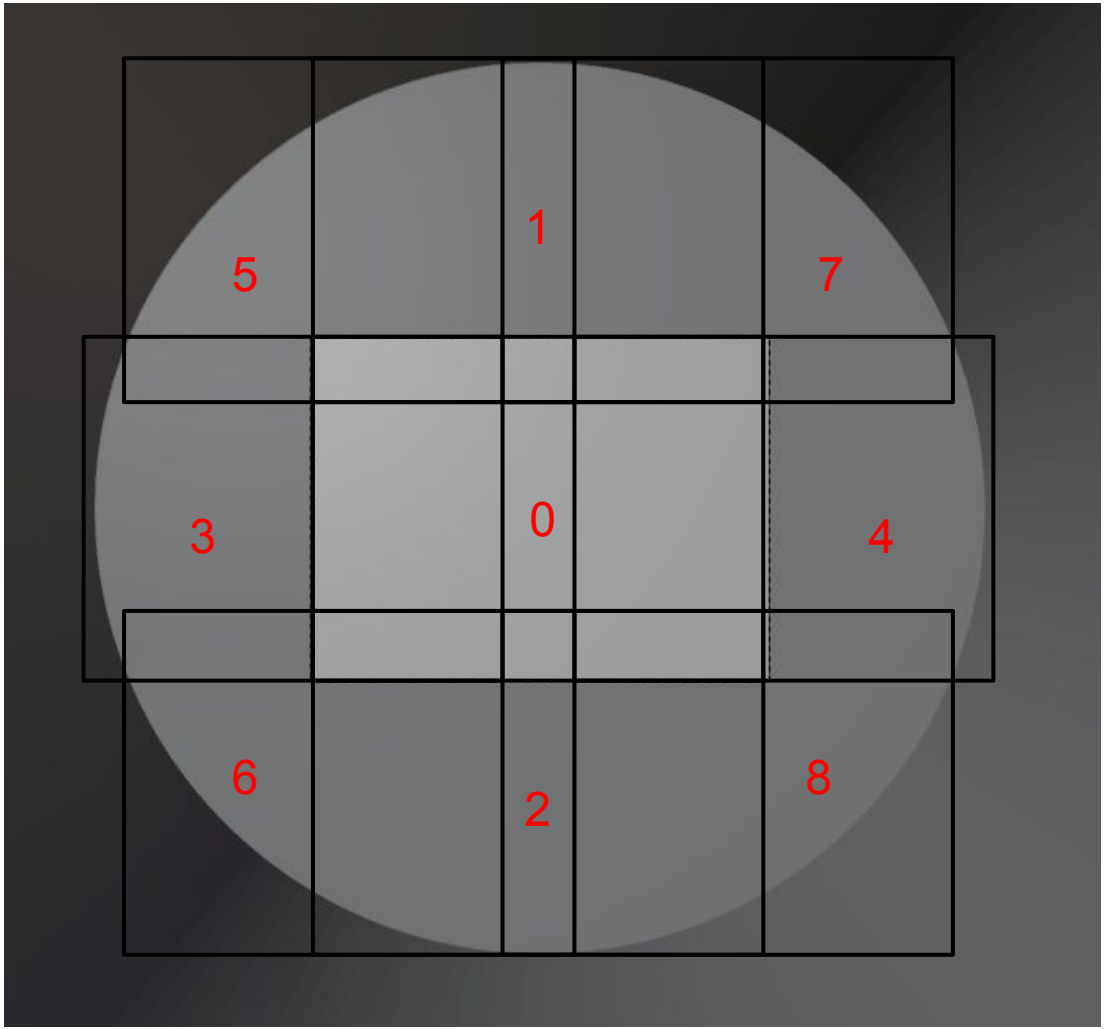
- FOV(mm):
  Horizontal FOV/50ft = Horizontal sensor size/7.5mm
  50ft = 15240mm, Horiz. sensor size = 320 * 18um = 5.76mm
  Horiz. FOV = 15240*(5.76/7.5)[mm]
  = 11704mm = 11.70m = 38.39ft
  Vertical FOV/50ft = Vertical sensor size/7.5mm
  50ft = 15240mm, Vert. sensor size = 240 * 18um = 4.32mm
  Horiz. FOV = 15240*(4.32/7.5)[mm]
  = 8778mm = 8.78m = 28.81ft

- Pixel projection(mm):
  Pixel proj/50ft = Pixel size/7.5mm
  For DVXplorer, Pixel size is 18um(from Inivation website specs)
  Pixel proj = 15240*(18e-3/7.5)[mm]
  = 36.58mm

(Same FOV as Regular DVXplorer, 2x pixel projection size)



DVXplorer Lite
(320x240)
7.5mm focal
9-camera
layout



Coordinate layout(ft)

0: x = 0, y = 0

1: x = 0, y = 23.0

2: x = 0, y = -23.0

3: x = -18.37, y = 0

4: x = 18.37, y = 0

5: x = -18.37, y = 23

6: -18.37, y = -23

7: x = 18.37, y = 23

8: x = 18.37, y = -23

Note: Cameras 5 and 7, & 6 and 8 overlap; Cameras 3 and 4 do NOT overlap.