

AIRBORNE GEOSPATIAL TECHNOLOGIES – AERIAL SURVEY LOGISTICS

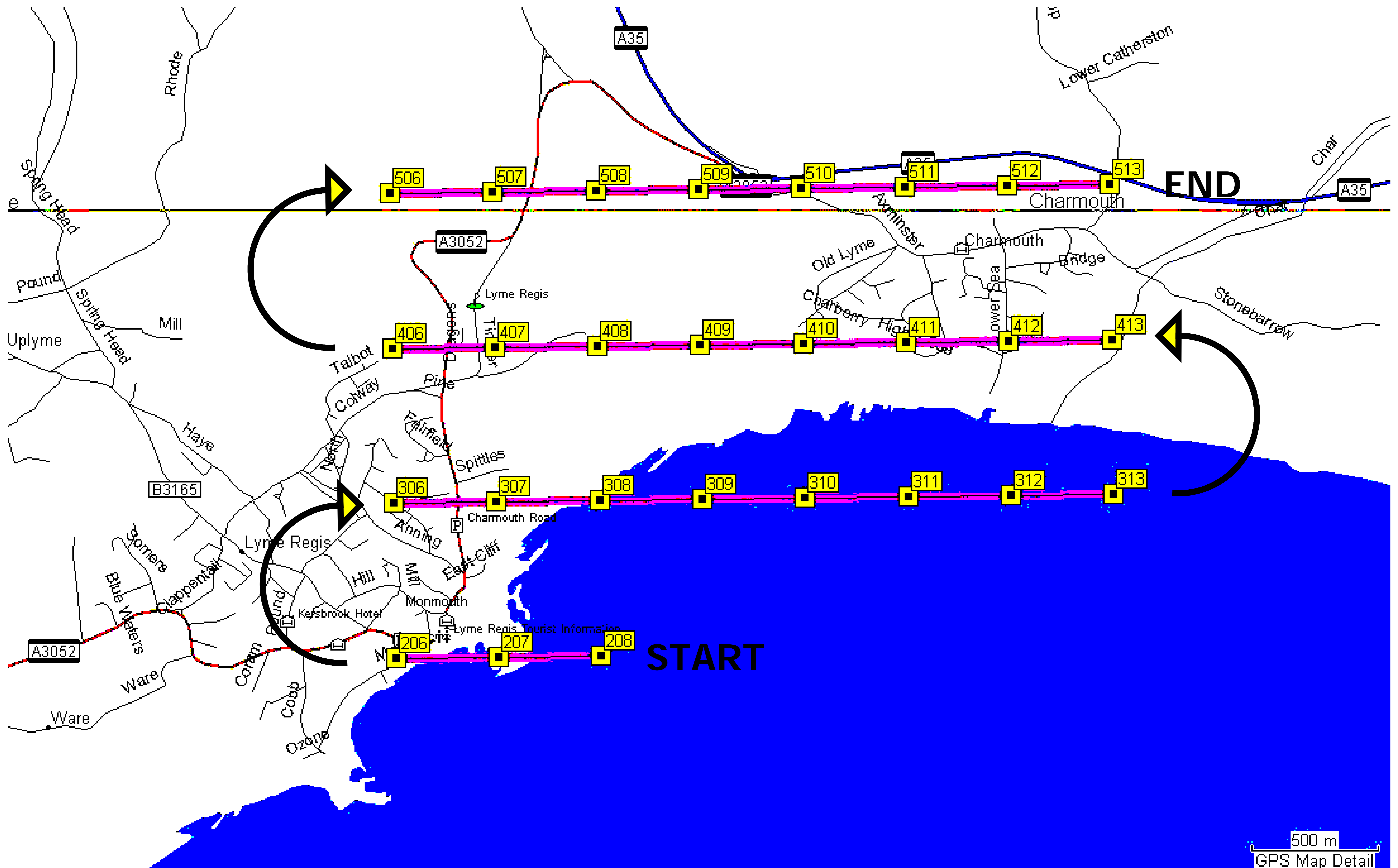
Alexander Koh, Geotechnologies, Bristol, United Kingdom

Supporting the airborne data acquisition and mapping industries

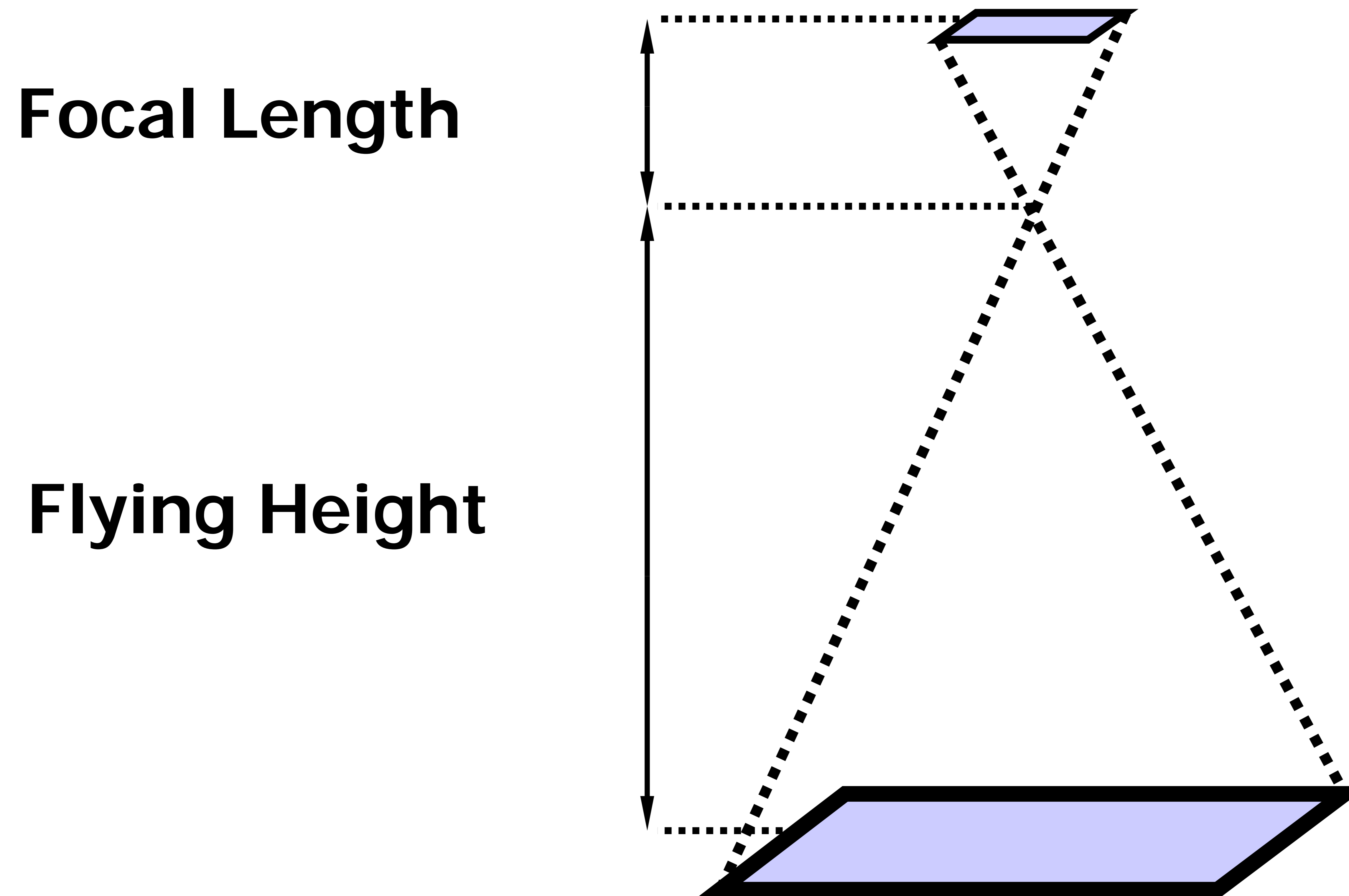


To view in full screen in Adobe Acrobat press the Ctrl + L key on your computer. Press Esc to return to normal view

Aerial Survey Block

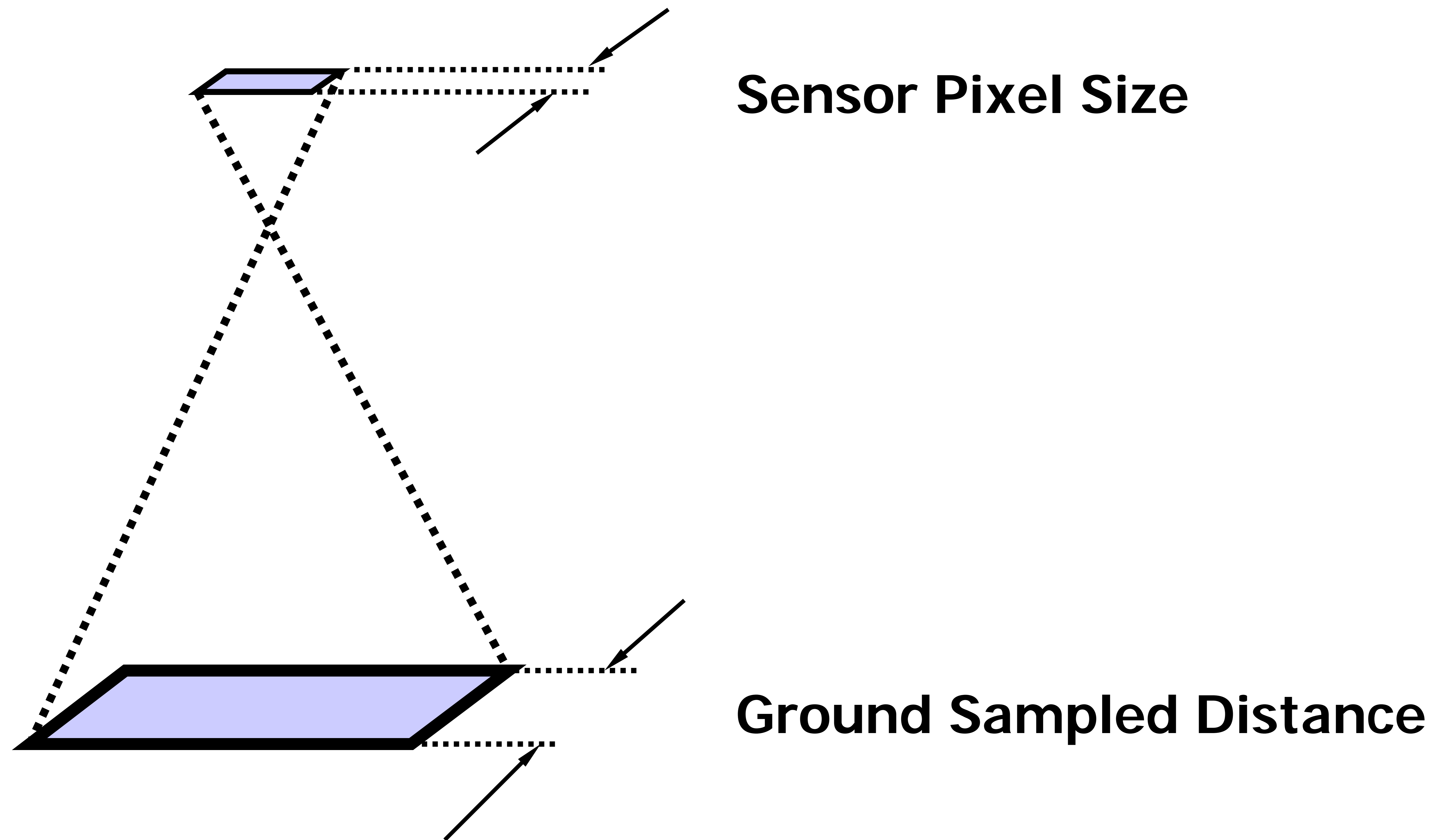


Relationship between Scale of Imaging, Focal Length and Flying Height



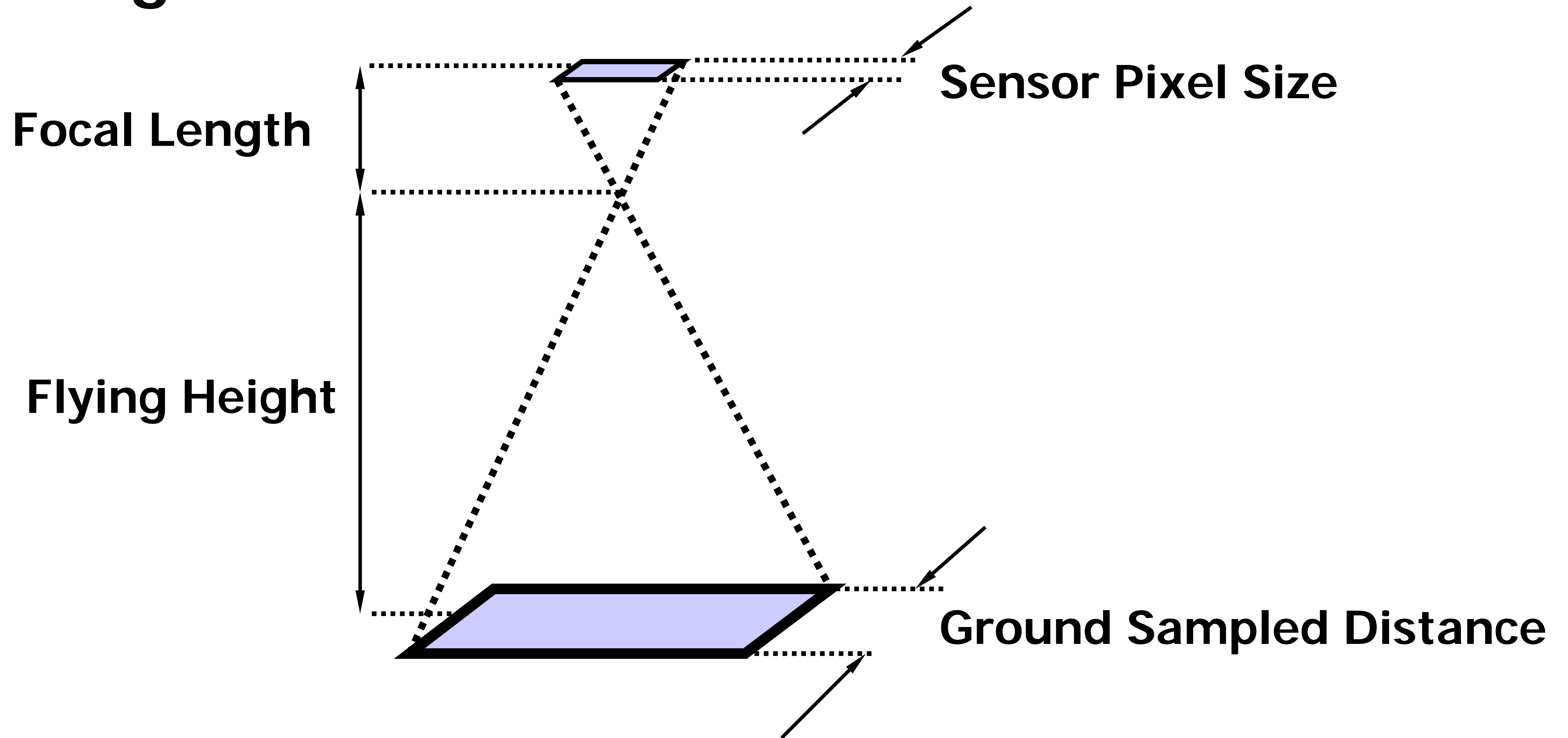
scale of imaging = focal length : flying height

Relationship between Scale of Imaging, Sensor Pixel Size and Ground Sampled Distance



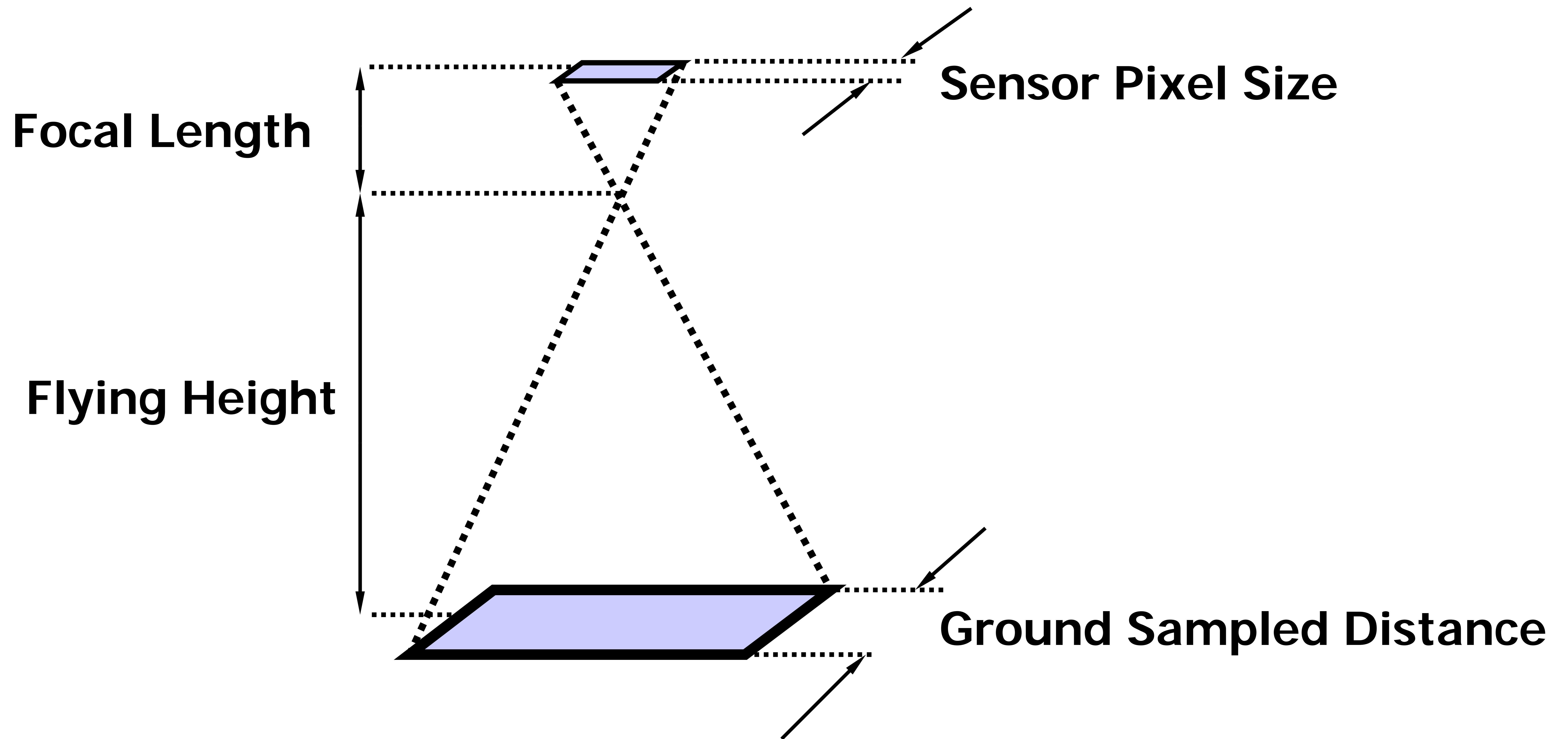
scale of imaging = sensor pixel size : ground sampled distance

Relationship between Flying Height, Ground Sample Distance, Sensor Pixel Size and Focal Length



$$\text{flying height} = (\text{ground sampled distance} / \text{sensor pixel size}) \times \text{focal length}$$

Relationship between Scale Number and Focal Length

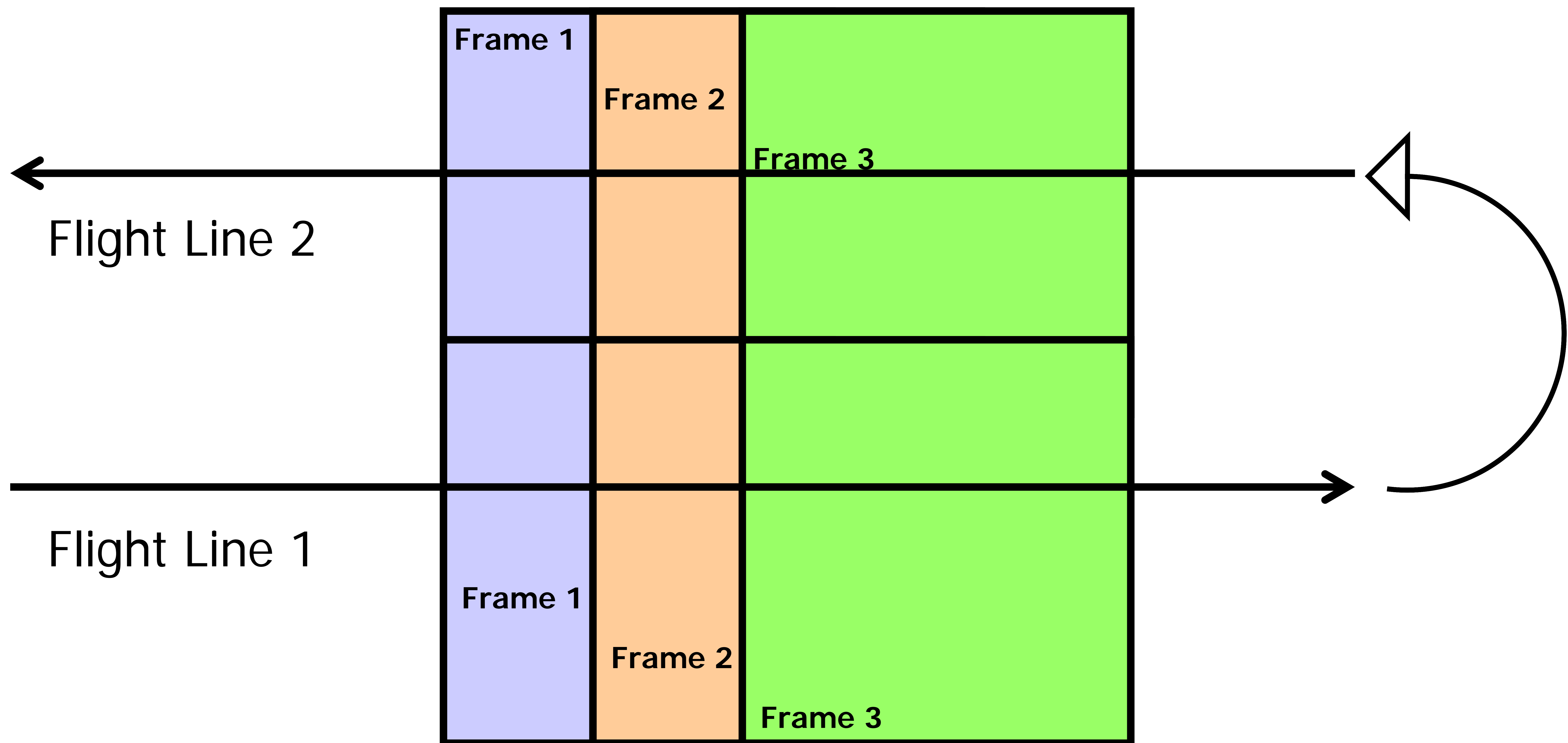


$$\text{flying height} = \text{scale number} \times \text{focal length}$$

Aerial Survey Block

Parallel flight lines in an E-W-E or N-S-N direction

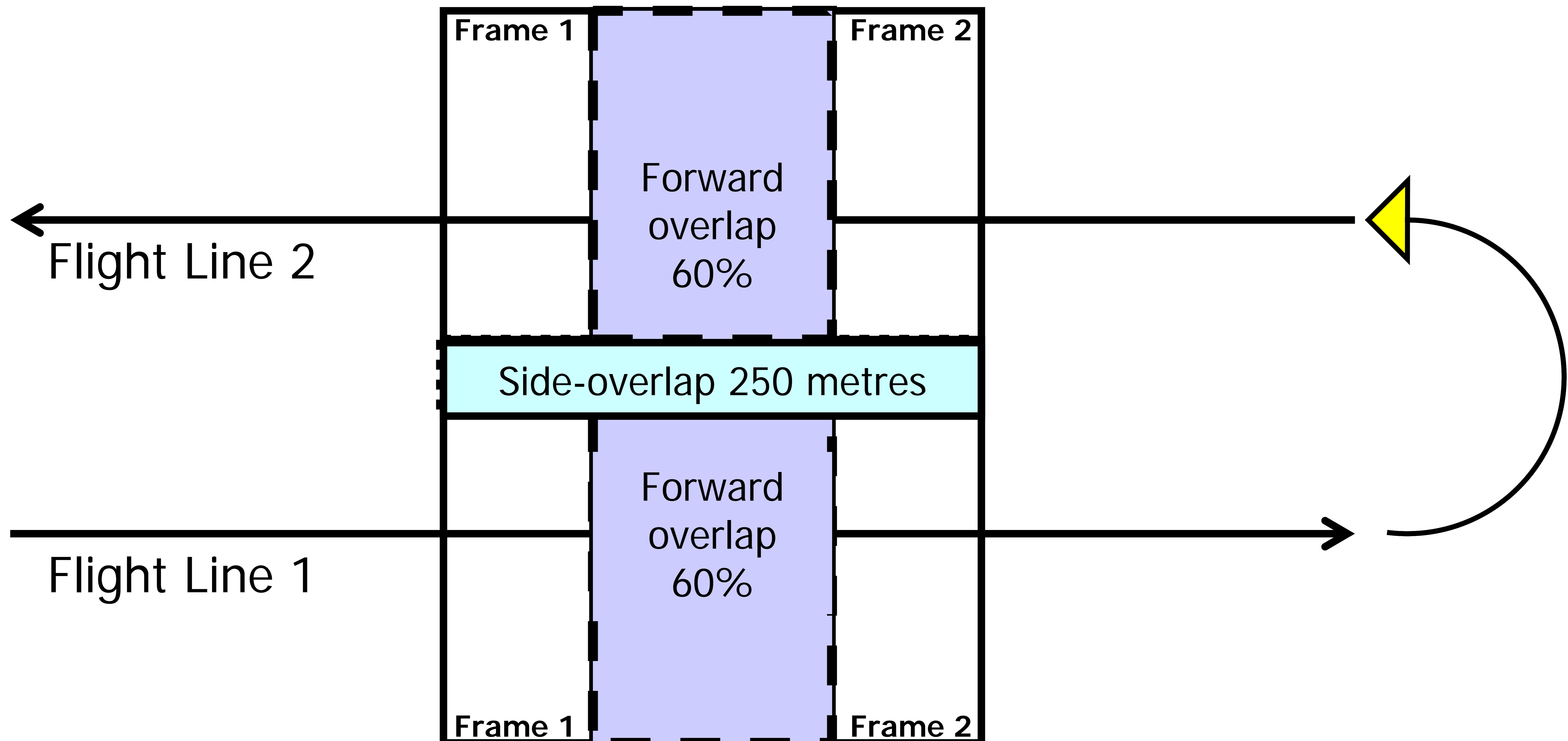
Overlapping image frames make up the lines



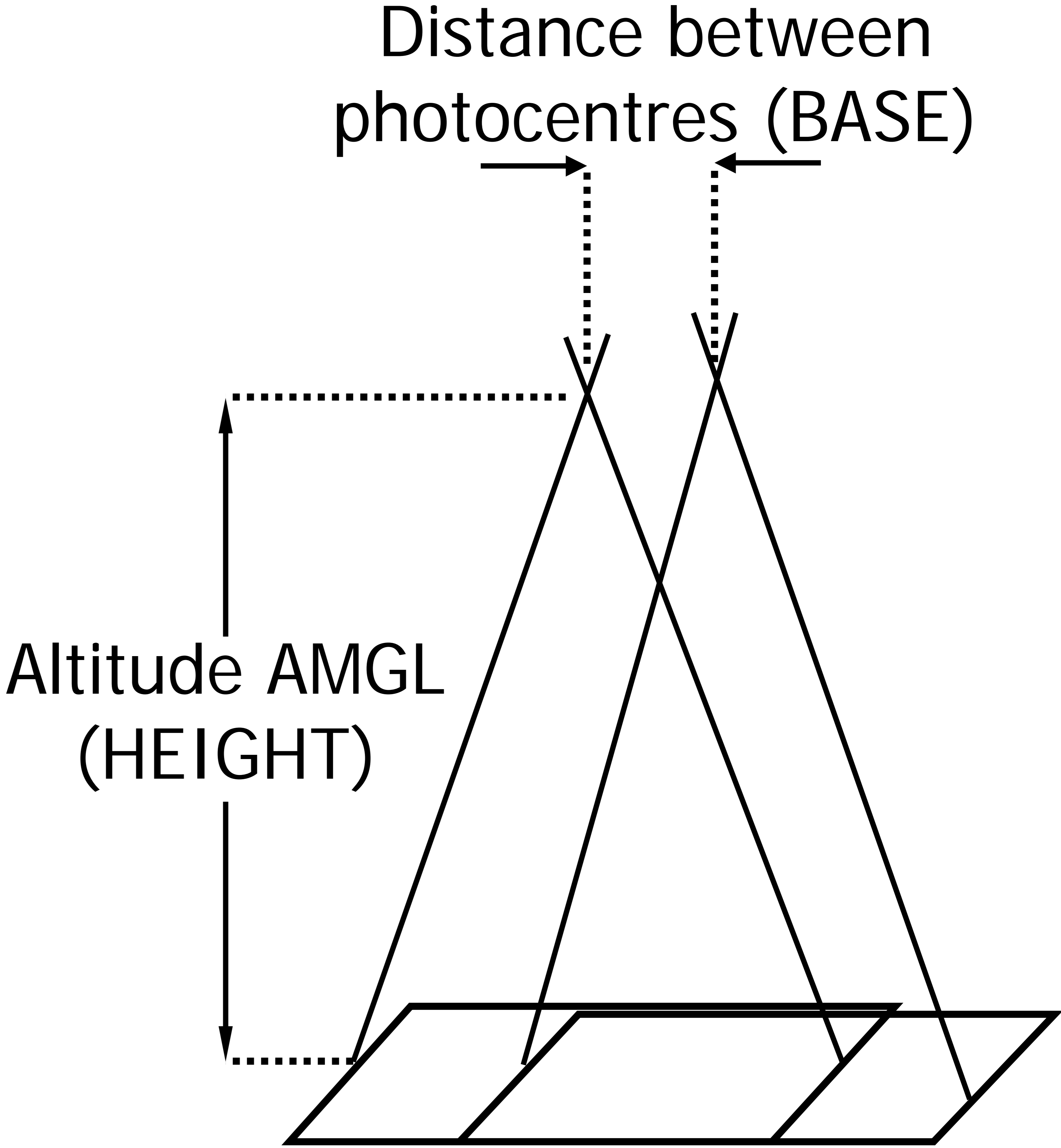
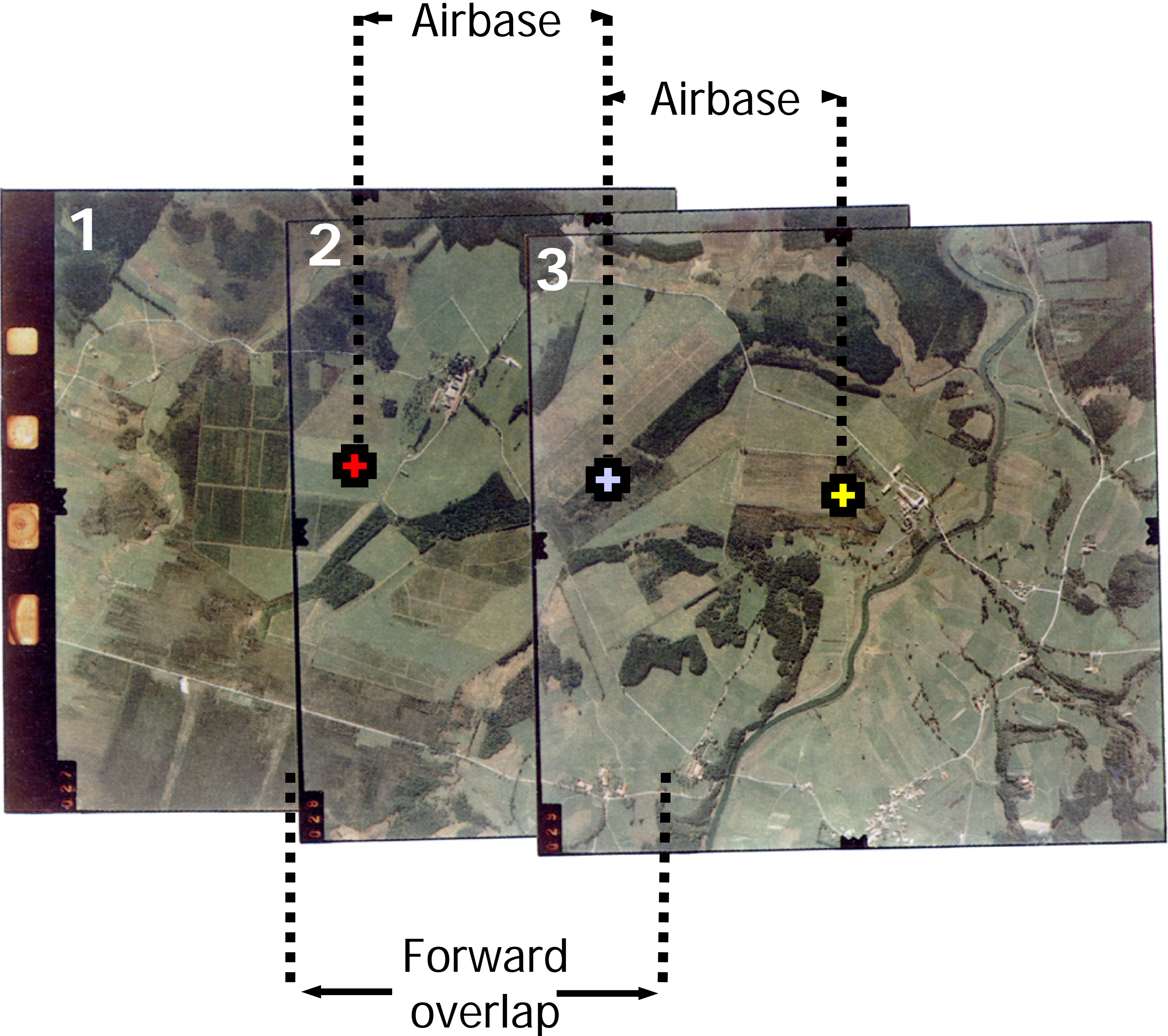
Aerial Survey Block

Image frames have minimum forward overlap of 60%

Flight lines have minimum side overlap of 250 metres

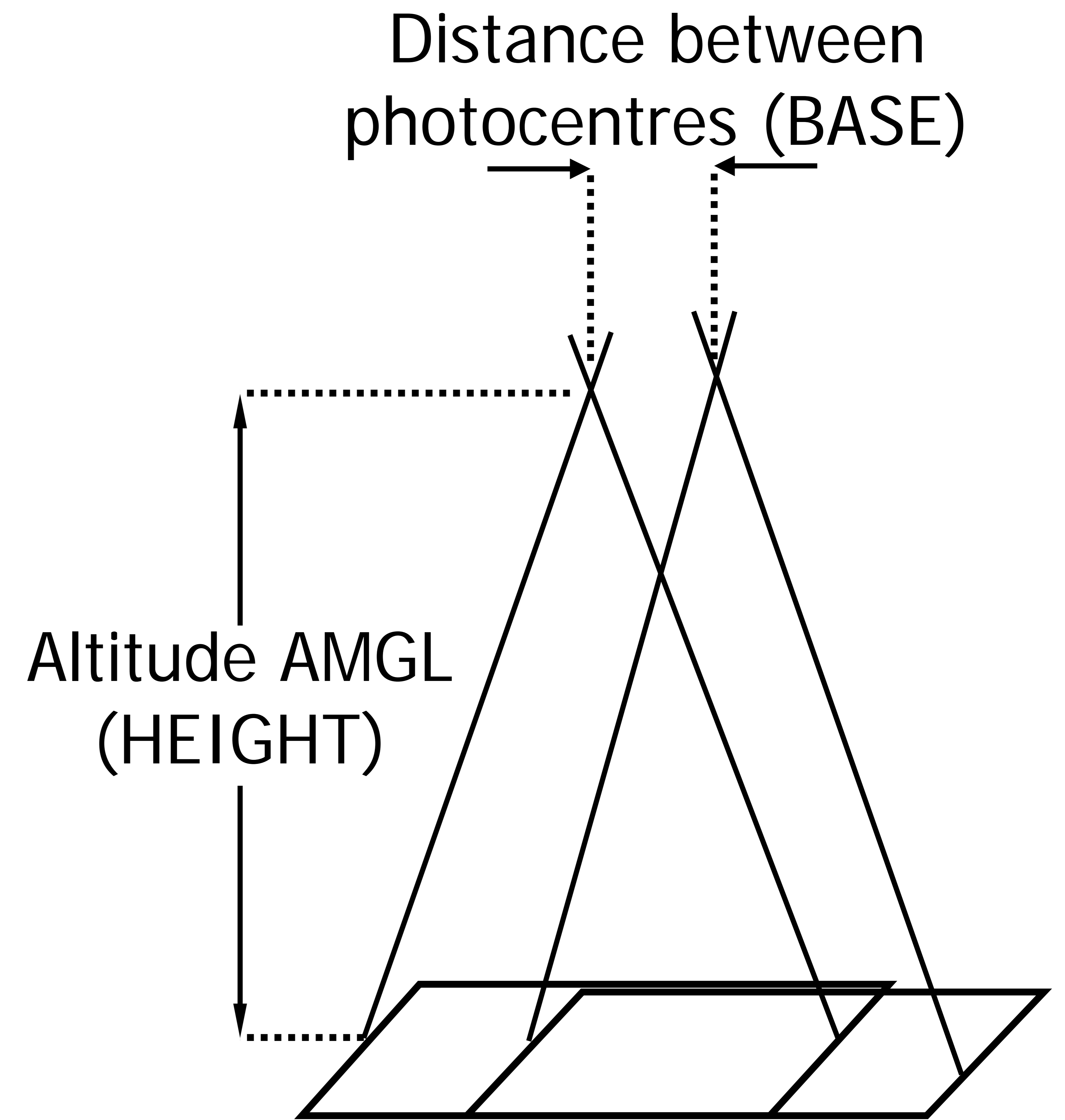
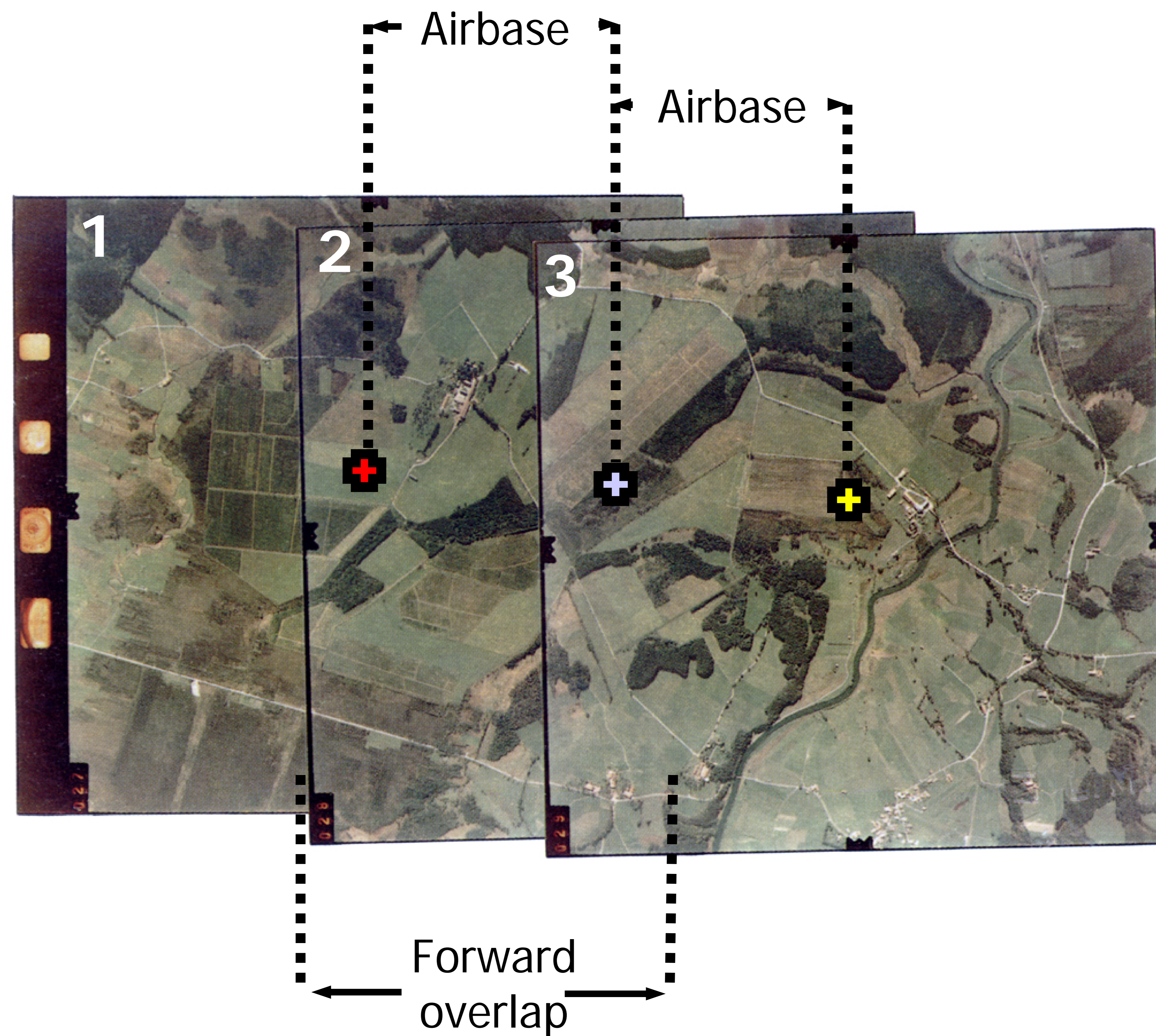


Base to Height Ratio



Expressed as a Ratio
Base : Height

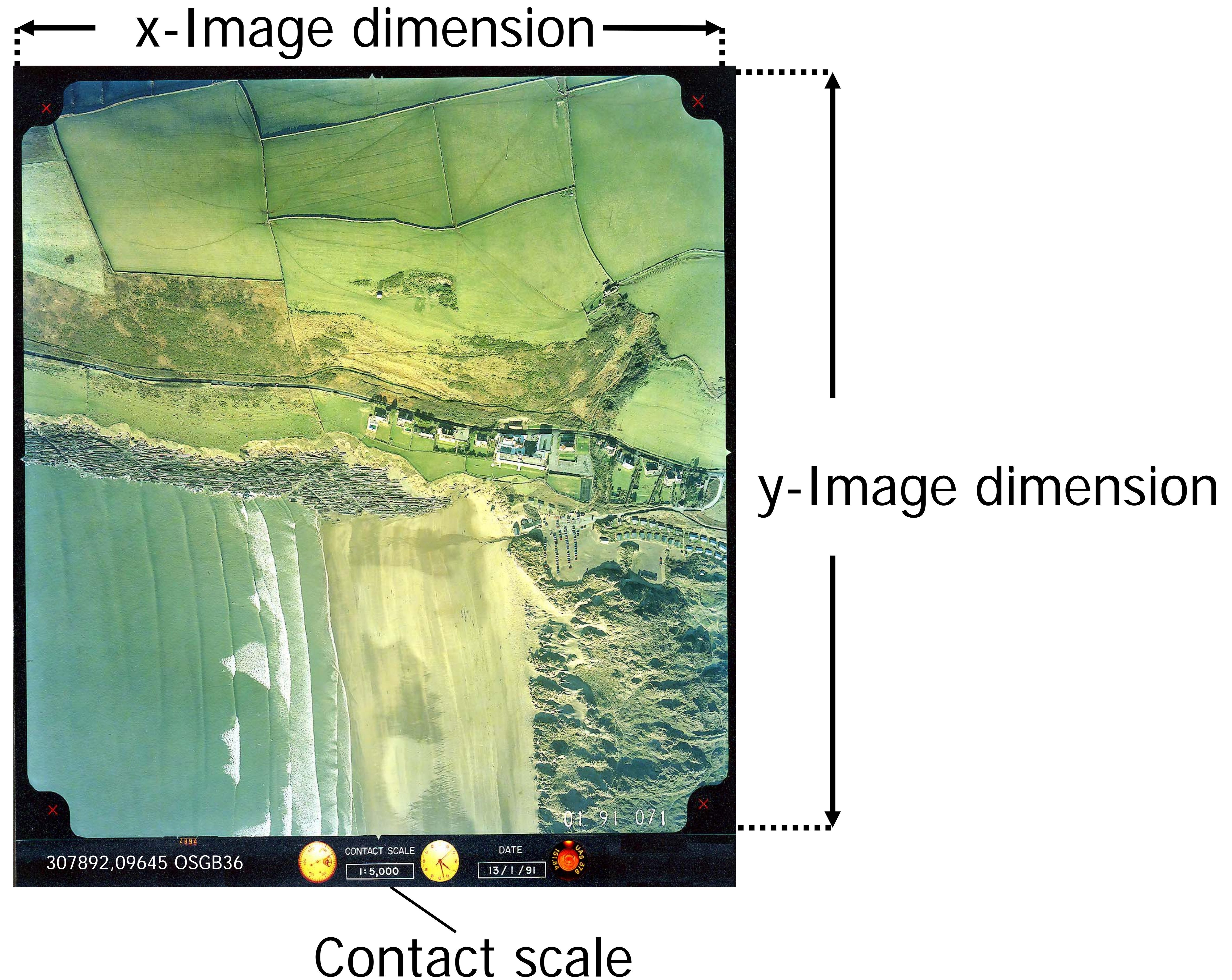
Base to Height Ratio



Base : Height Ratio

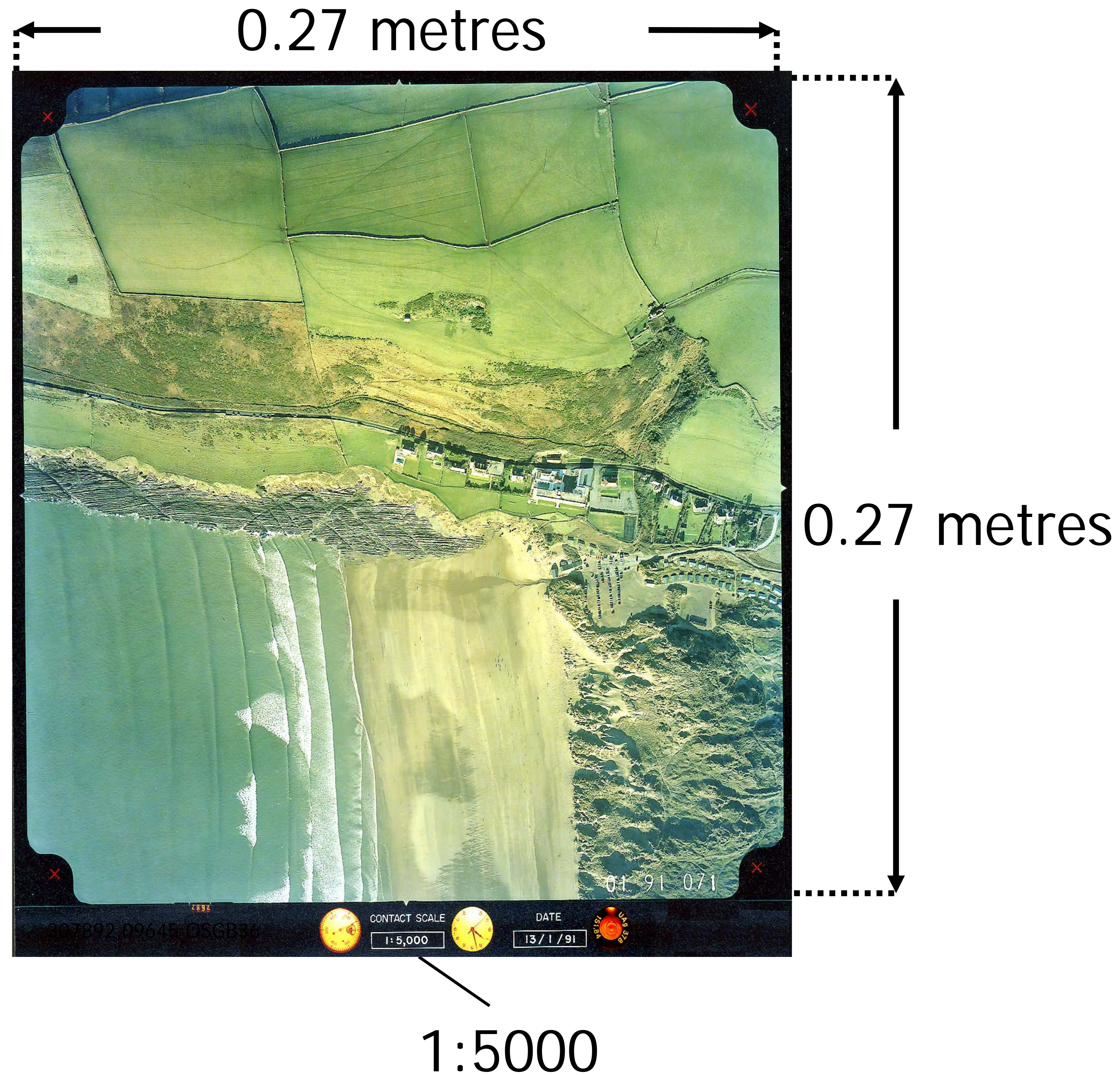
Large B/H ratios required for height discrimination of flat areas

Calculating Photocoverage for Analogue Imagery



$$\begin{aligned} \text{x-Photocoverage} &= \text{x-Image dimension} \times \text{Contact scale number} \\ \text{y-Photocoverage} &= \text{y-Image dimension} \times \text{Contact scale number} \end{aligned}$$

Calculating Photocoverage for Analogue Imagery



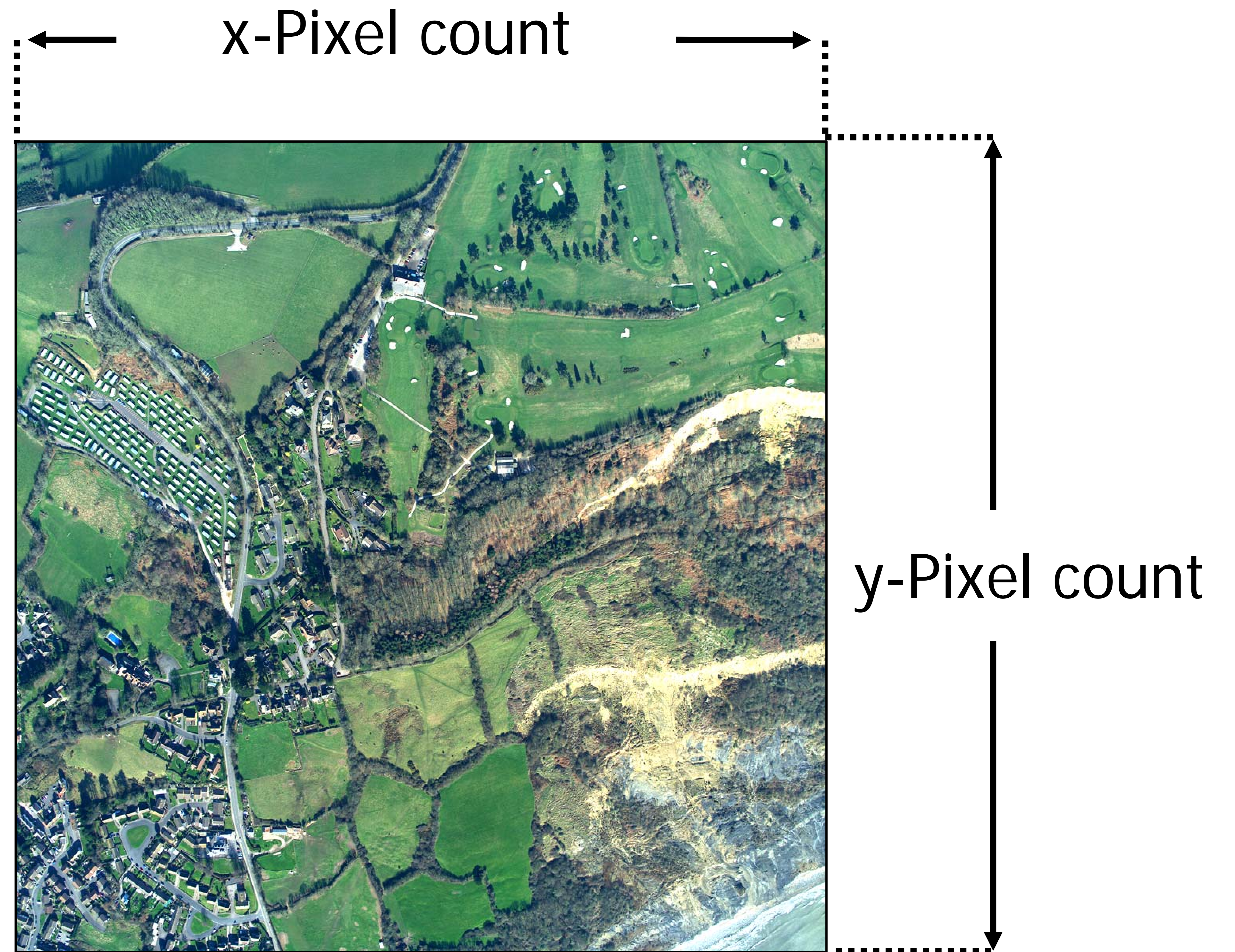
1350 metres in x-direction = 0.27 metres x 5000

1350 metres in y-direction = 0.27 metres x 5000

Calculating Photocoverage for Digital Imagery



Pixel: a picture element capable of 16777216 colour variations. Each pixel represents a specified distance on the ground (ground sampled distance)



$$\begin{aligned} \text{x-Photocoverage} &= \text{x-Pixel count} \times \text{Ground sampled distance} \\ \text{y-Photocoverage} &= \text{y-Pixel count} \times \text{Ground sampled distance} \end{aligned}$$

Calculating Photoscale for Analogue Imagery



Altitude AMGL Focal length

Scale number = Altitude AMGL / Focal length

Scale is expressed as a ratio 1 : Scale number

Calculating Photoscale for Analogue Imagery



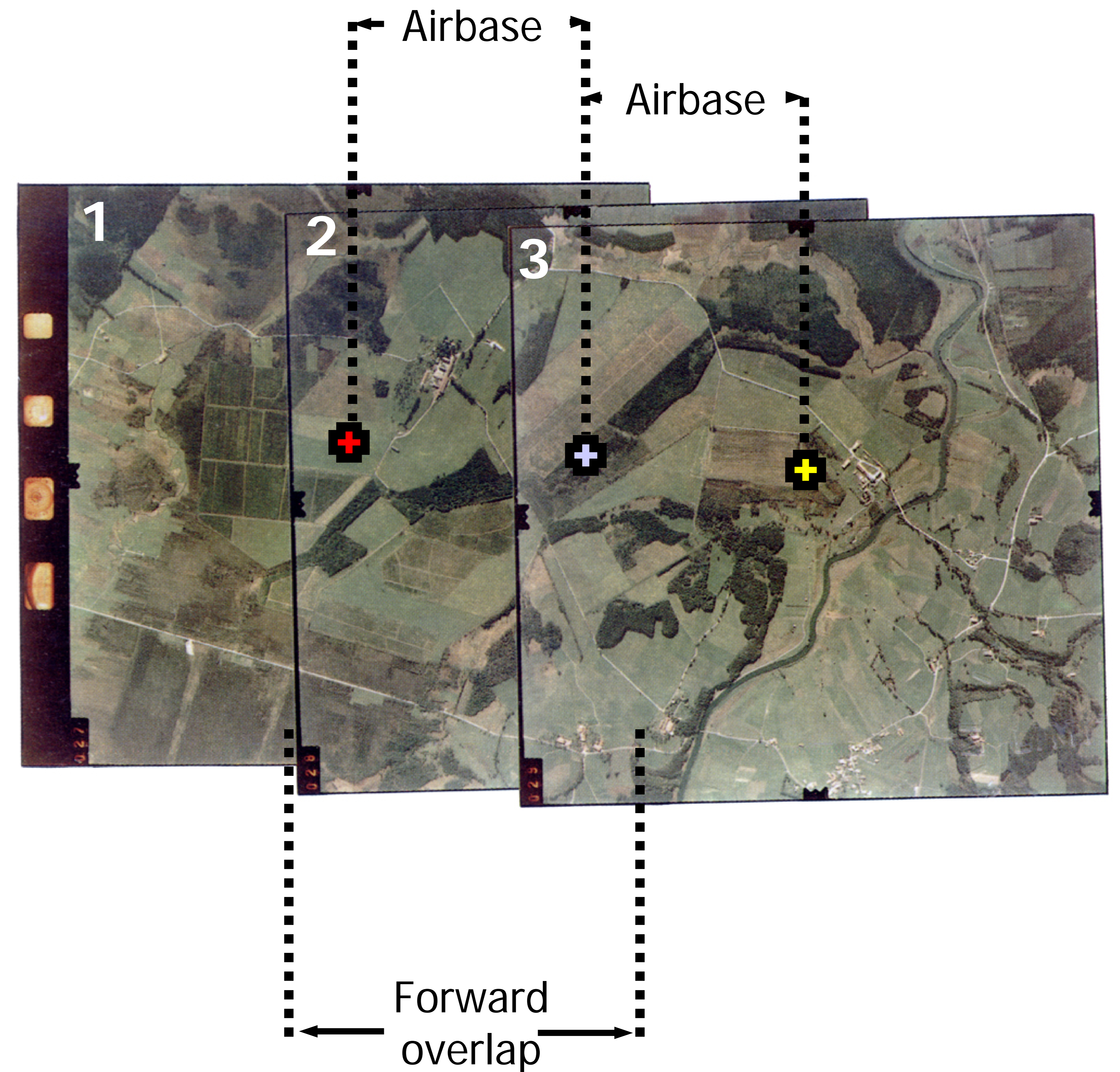
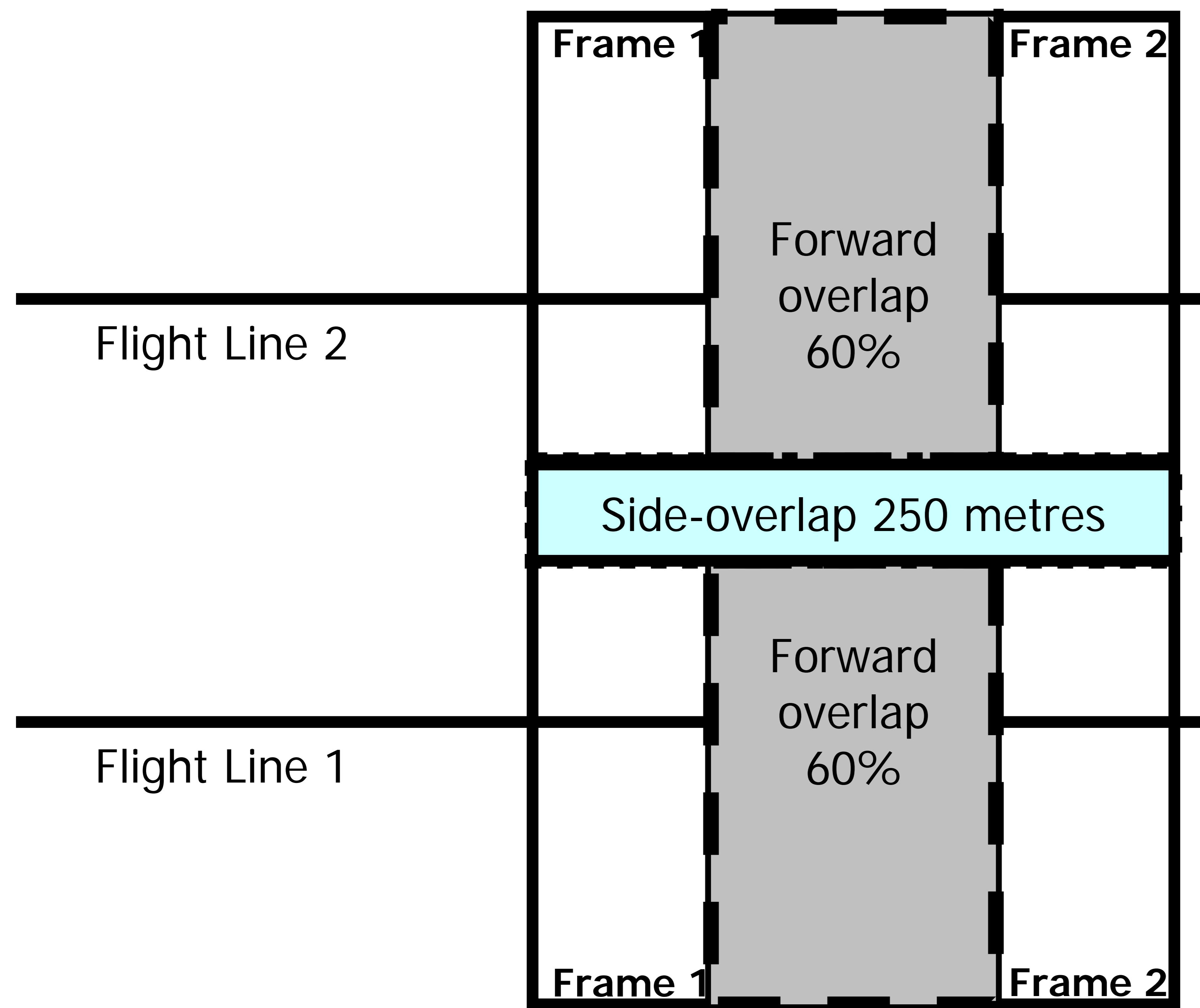
760 metres

0.1518 metres

$$5005 = 760 \text{ metres} / 0.1518 \text{ metres}$$

Scale is expressed as ratio 1:5005

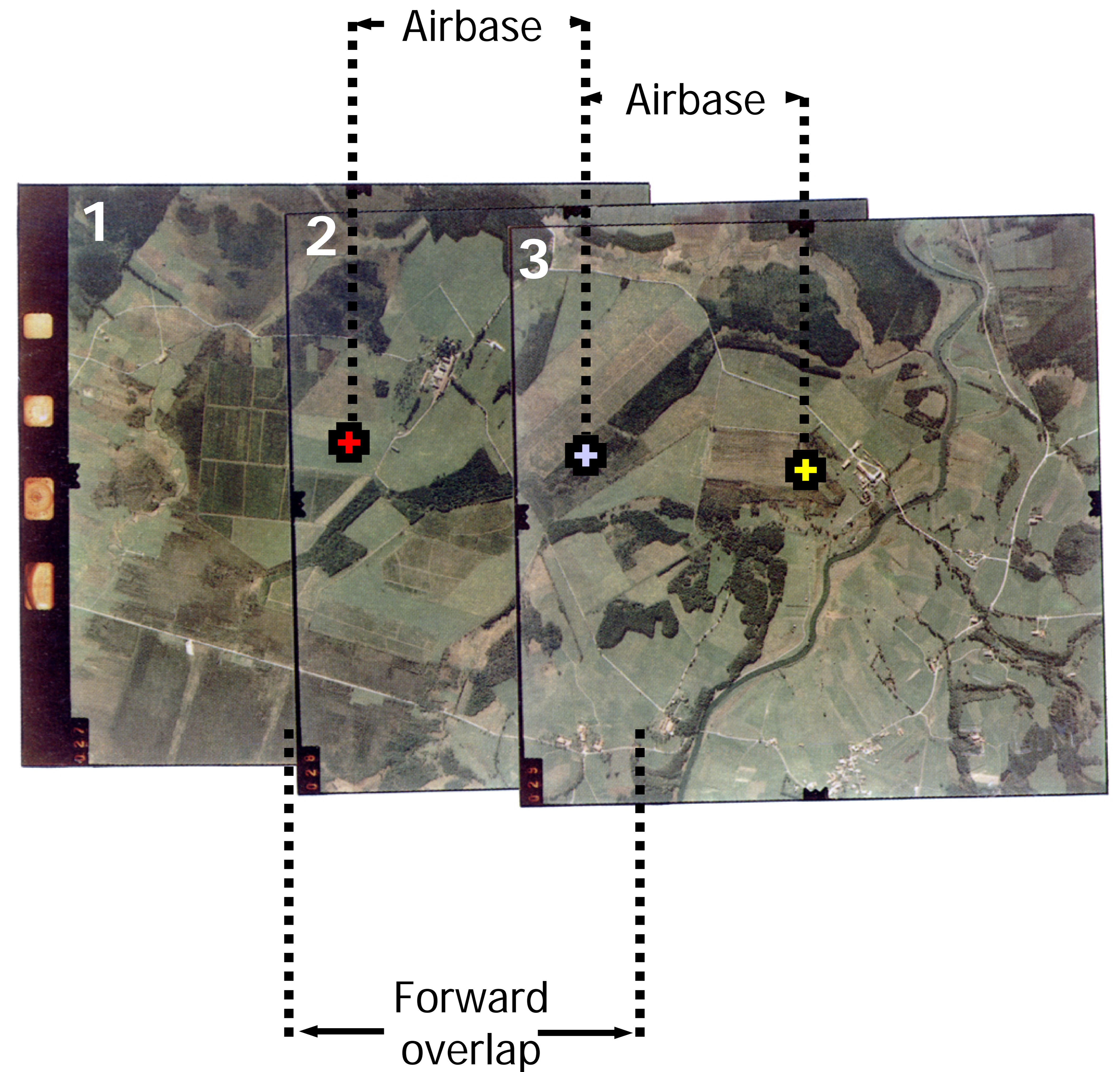
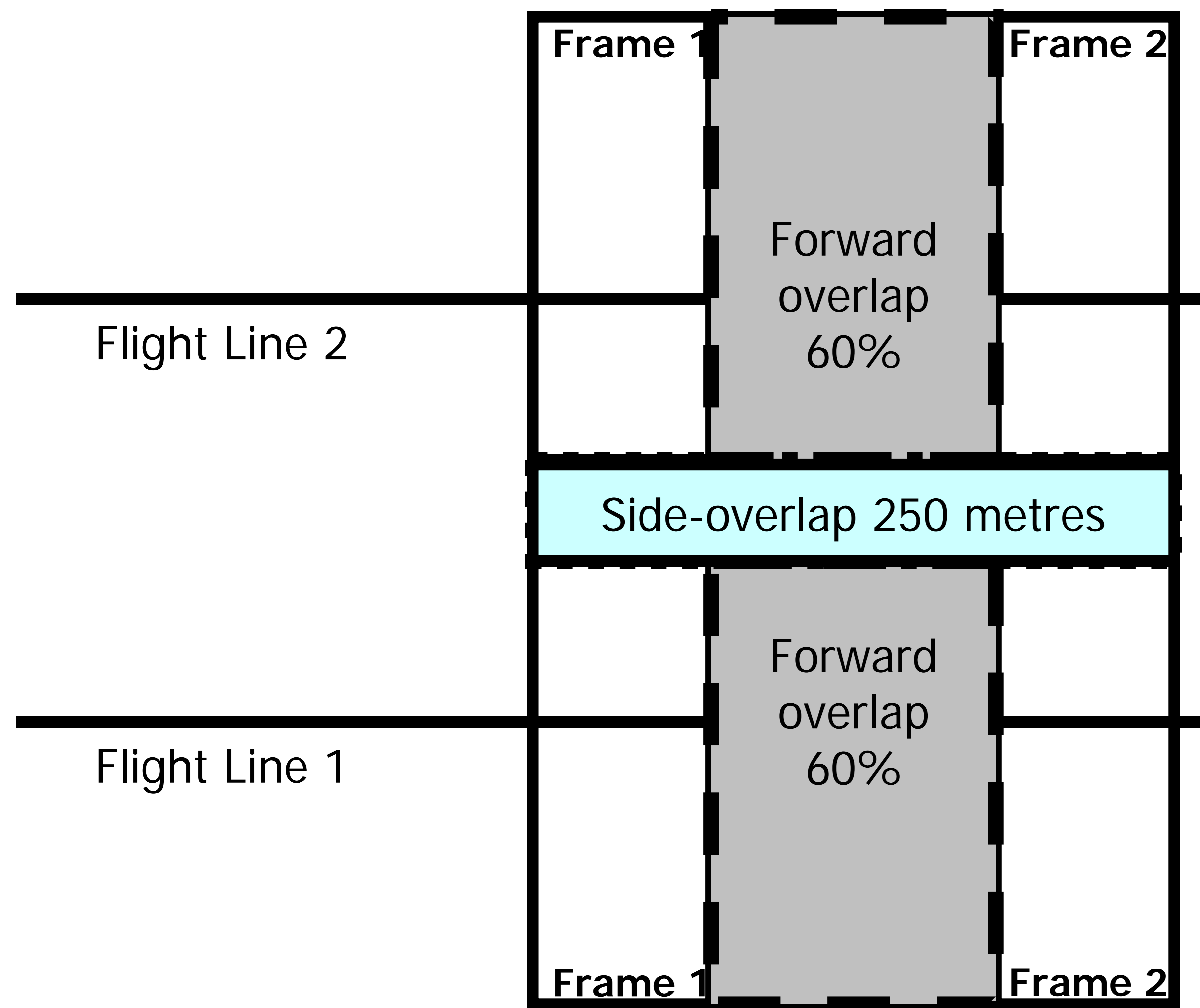
Calculating Number of Stereo Photographs in an Area of Interest



**Length & Width of Block
Needs to be Defined**

Number of photographs for stereo coverage along length =
 $4 + \text{INT} \left(\frac{\text{Length of Block}}{\left(\frac{(100\% - \% \text{ of Forward overlap})}{100} \right) \times \text{Photocoverage Along Track}} \right)$

Calculating Number of Stereo Photographs in an Area of Interest

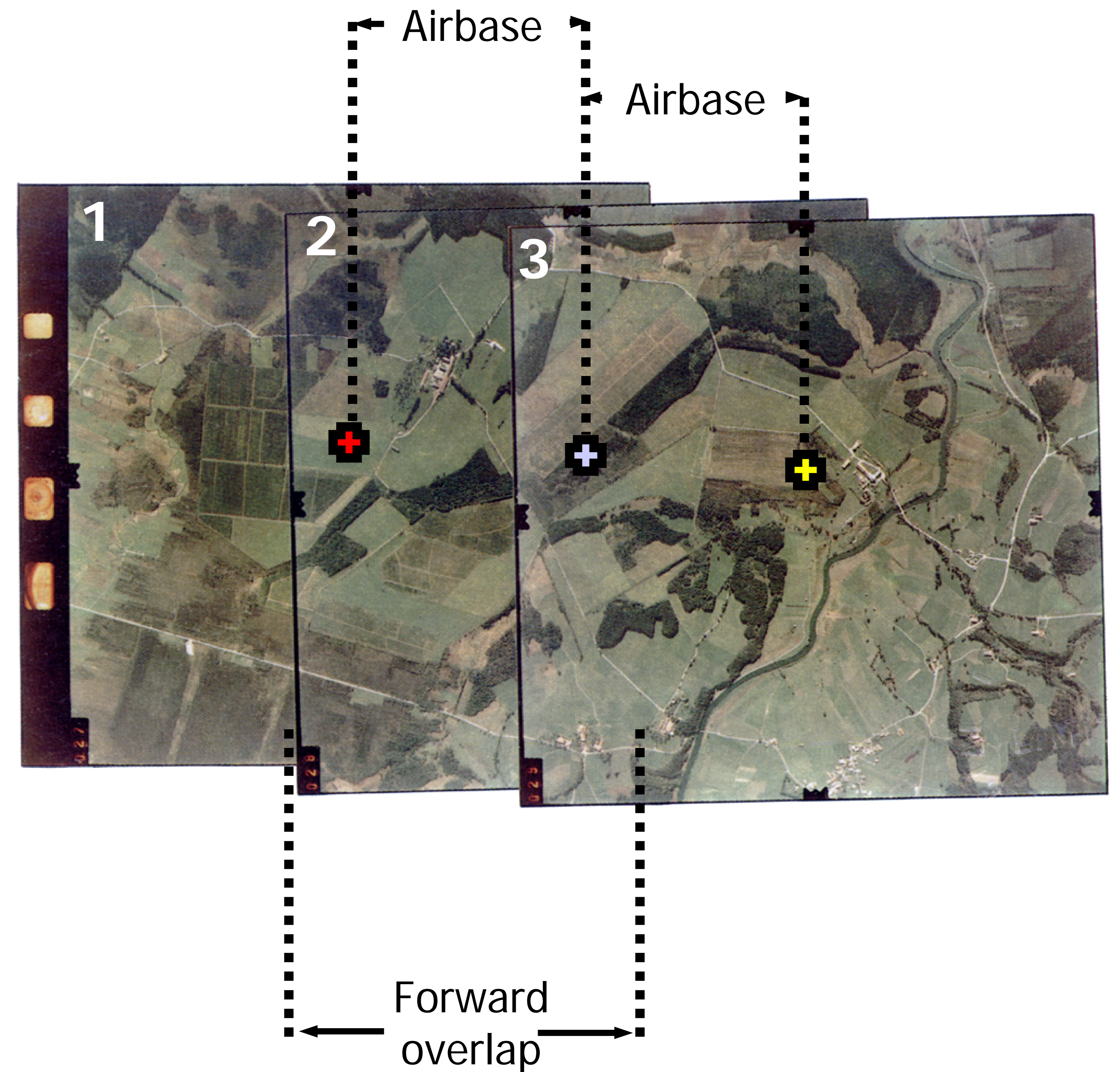
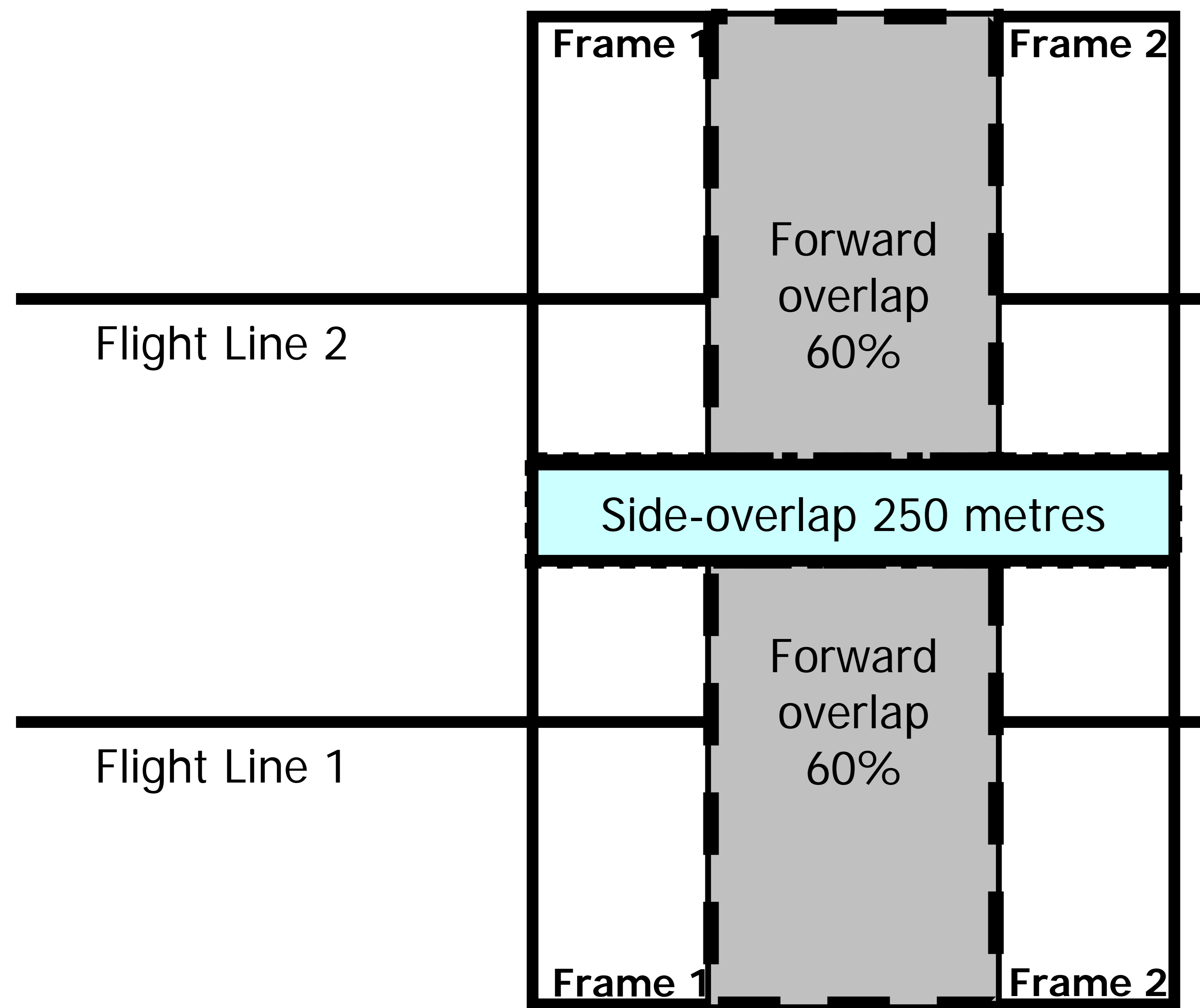


For an Area of Interest of 5000 metres in length

13 photographs for stereo coverage along length =

$$4 + \text{INT} (5000 \text{ metres} / (((100 - 60) / 100) \times 1350 \text{ metres}))$$

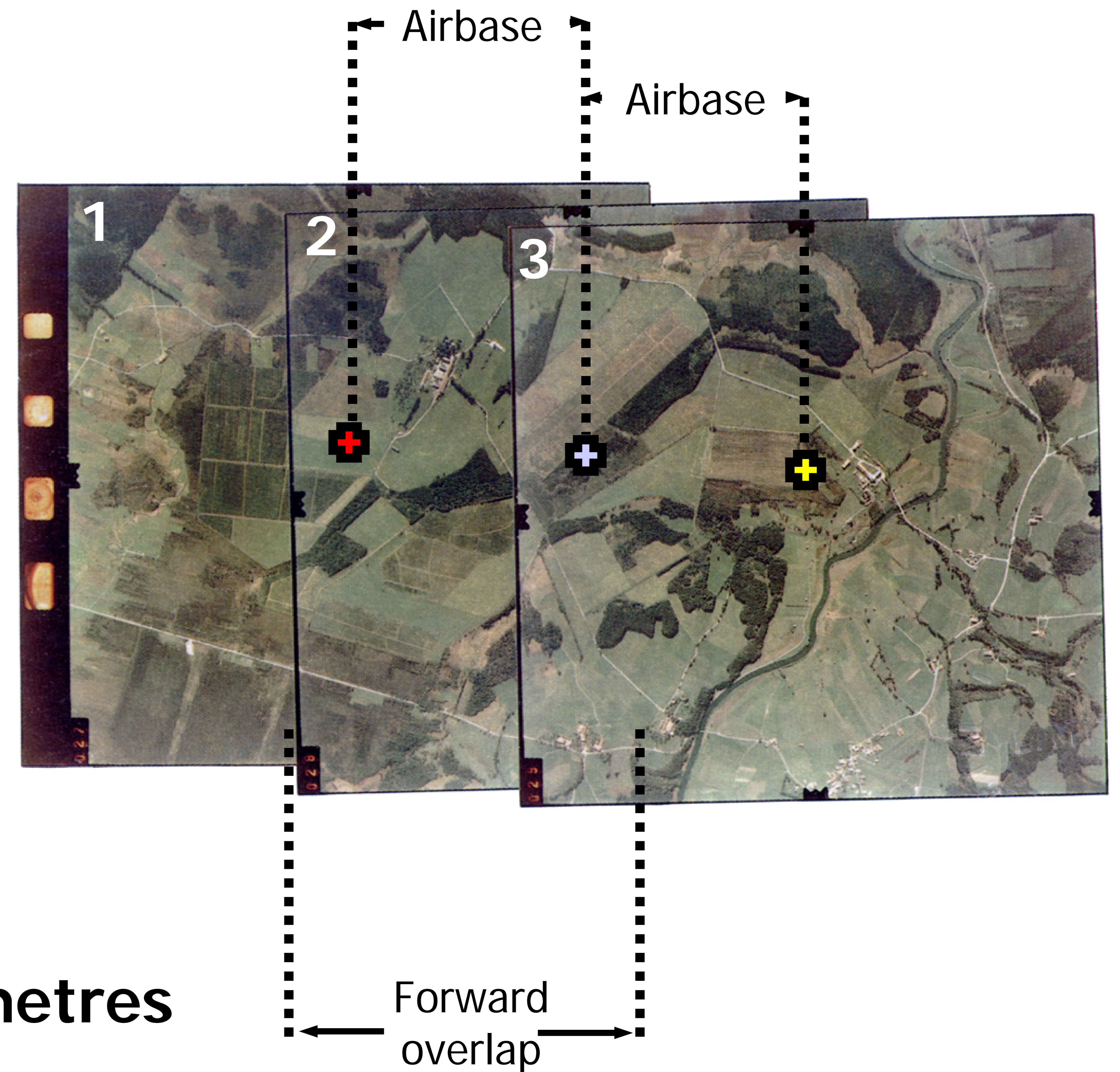
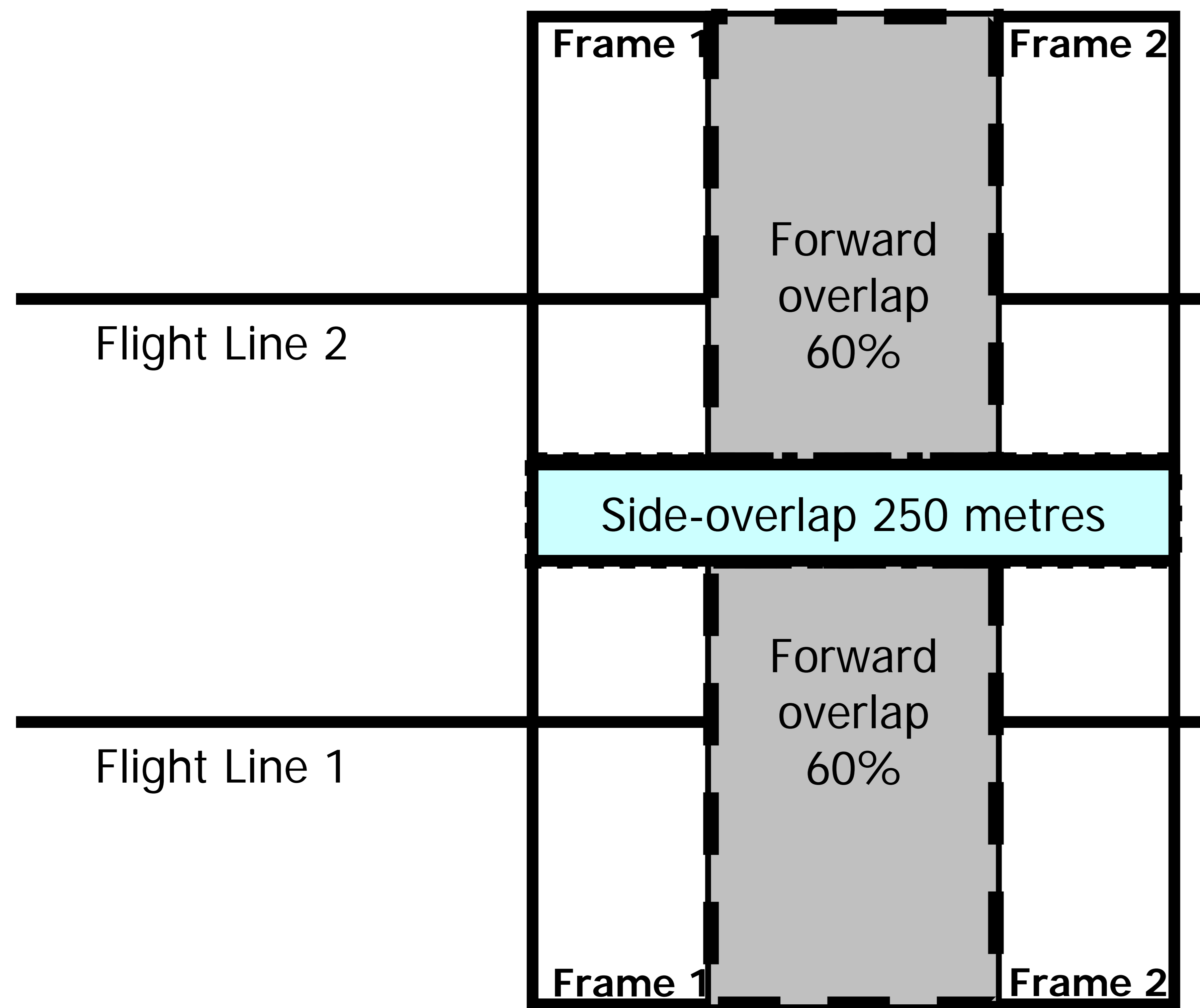
Calculating Number of Stereo Photographs in an Area of Interest



**Length & Width of Block
Needs to be Defined**

Number of lines of photographs across block width =
 $2 + \text{INT} (\text{Width of Block} / (\text{Photocoverage Across Track} - 250))$

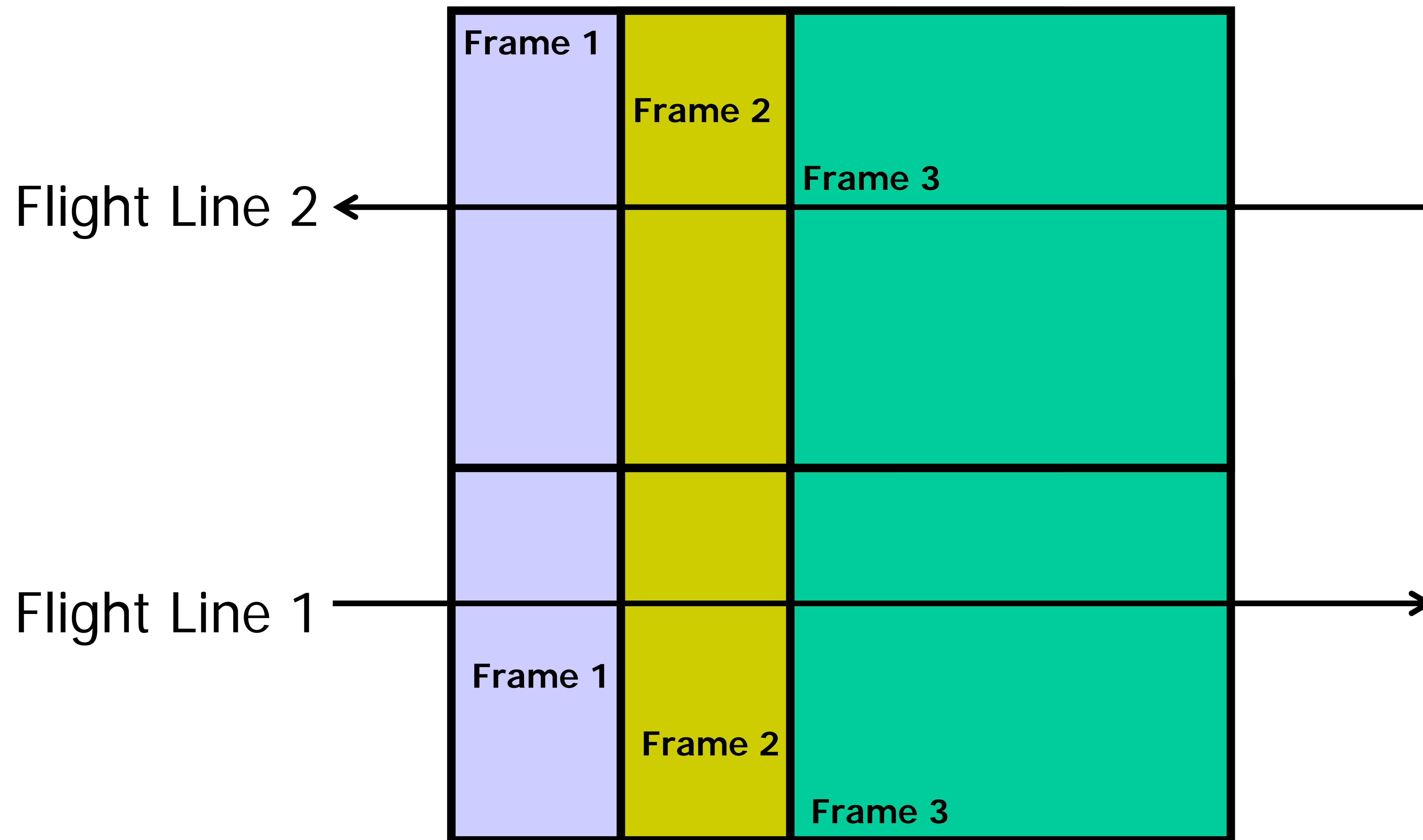
Calculating Number of Stereo Photographs in an Area of Interest



For an Area of Interest of 5000 metres across block width

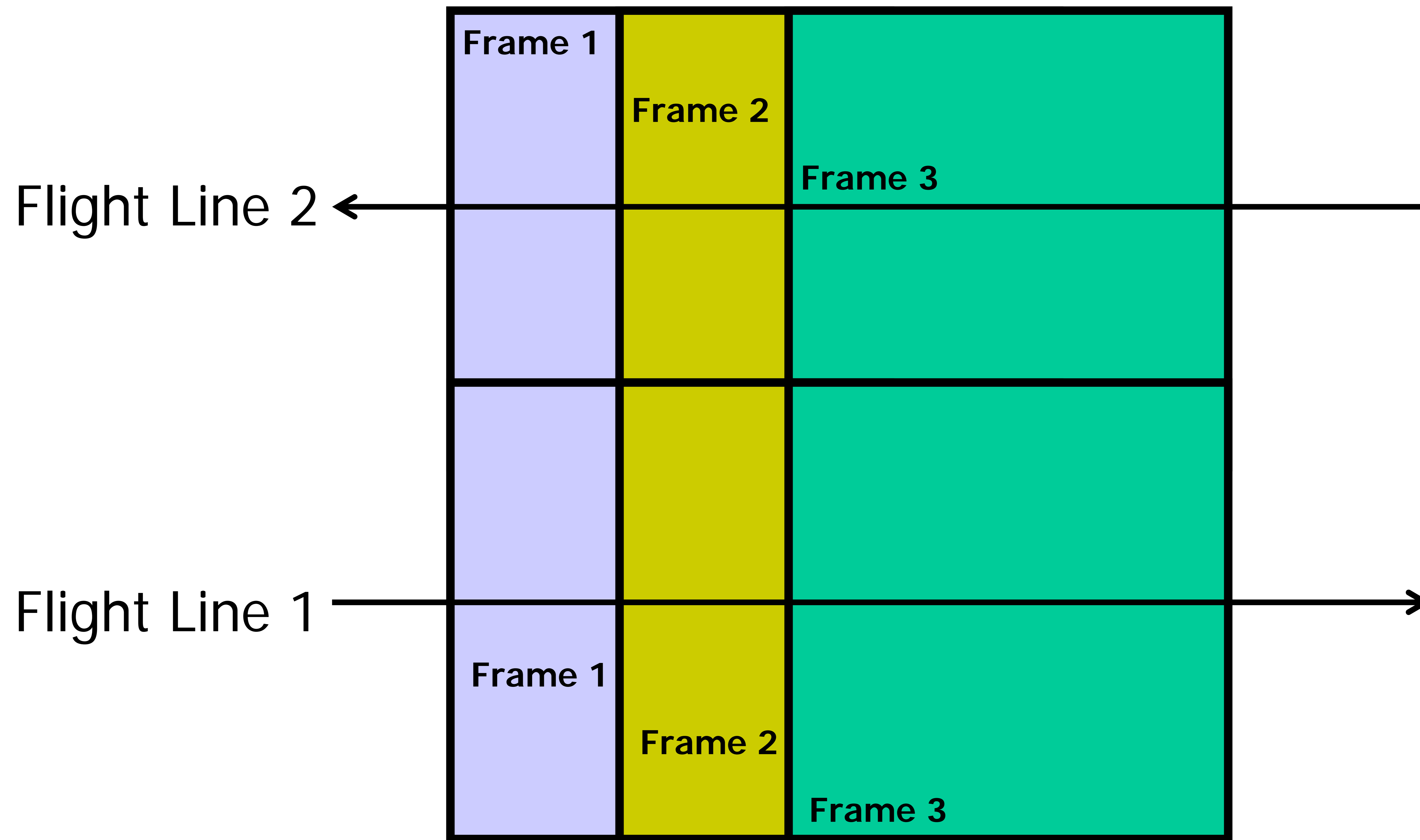
$$6 \text{ lines of photographs across block width} = 2 + \text{INT} (5000 \text{ metres} / (1350 \text{ metres} - 250))$$

Calculating Number of Stereo Photographs in an Area of Interest



Total Number of Photographs in Area of Interest =
Number of photographs for stereo coverage along length x
Number of lines of photographs across block width

Calculating Number of Stereo Photographs in an Area of Interest



78 Photographs in Area of Interest = 13×6