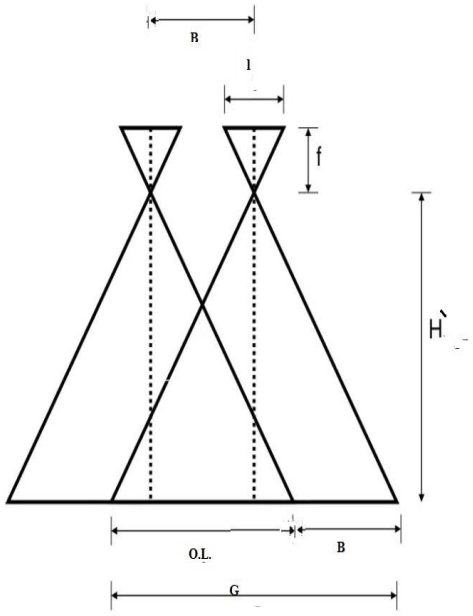
Flight Planning

Factors Affecting Flight process:

Ground coverage
Purpose of the survey
Overlap and sidelap requirements
Scale requirements
Weather conditions and Wind effects.

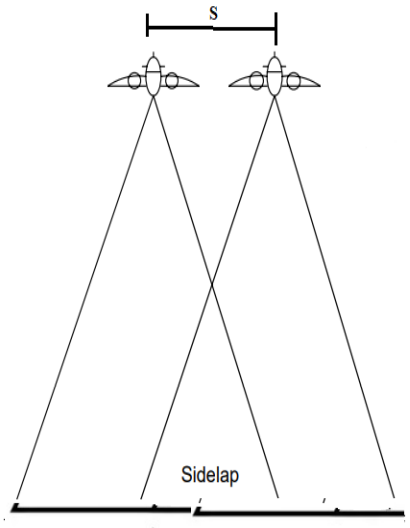
Flight Planning

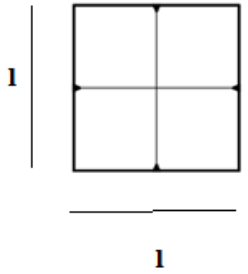
Image Scale = l / G = f/(H-h_{av})



(G-B)

O.L. = -------- *100



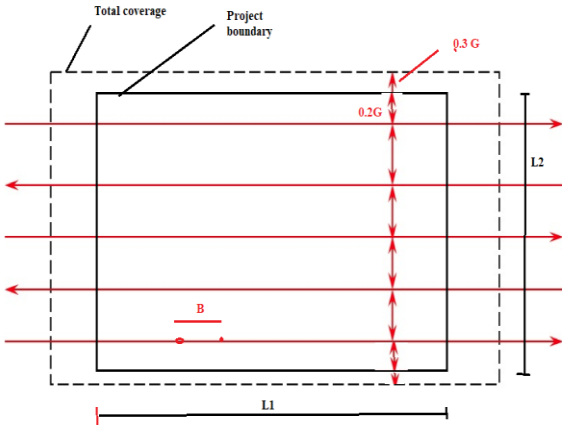


S.L. = (G-S)

-------- *100

G

Flight Planning



$$S = (1 - (S.L.)/100)*G$$

$$B = (1 - (O.L.)/100)*G$$

$$n_1 = (L_2 - 0.4\ G)/S + 1$$

$$n_2 = (L_1/B) + 4$$

$$n = n1 * n2$$

Flight Planning

Design of Flight Map

Given: Length of Project Area L_1 , Width of Project Area L_2

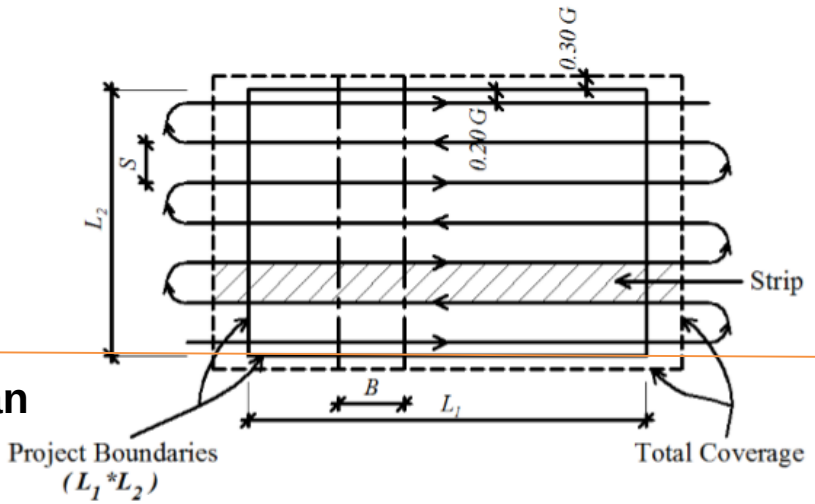
$$\text{Lateral advance per strip} = S = \left(1 - \frac{S.L.}{100}\right) * G ,$$

$$\text{Linear advance per photo} = B = \left(1 - \frac{O.L.}{100}\right) * G ,$$

$$\text{Number of Strips} = n_1 = \frac{L_2 - 0.4G}{S} + 1 ,$$

$$\text{Number of Photos per strip} = n_2 = \frac{L_1}{B} + 4$$

Total Number of Photos = $n_1 * n_2$



Example : A rectangular area of miles 13 in the north-south direction by miles 8 in the east-west direction is to be covered with aerial photography having a scale of 8000 :1 . Endlap and sidelap are % 60 and % 20 , respectively. A camera having a (inches □9) square format is used. Compute the total number of photographs in the project, assuming that the flight strips are parallel to the east-west direction. Also, add two photographs at the end of each strip to ensure complete coverage.

$L_1 = 8\ miles \Rightarrow L_1 = 8*1760*3 = 42240\ feet,$

$L_2 = 14\ miles \Rightarrow L_2 = 13*1760*3 = 68640\ feet,$

$O.L. = 60\%,$

$S.L. = 20\%,$

$l = 9\ inches \Rightarrow l = 9/12 = 0.75\ feet,$

$Scale = 1/20000$

$G = l / Scale \Rightarrow G = 0.75/(1/8000) = 6000\ feet,$

$$O.L. = \frac{(G-B)}{G}*100 \Rightarrow 60 = \frac{(6000-B)}{6000}*100 \Rightarrow B = 2400\ feet,$$

$$S.L. = \frac{(G-S)}{G}*100 \Rightarrow 20 = \frac{(6000-S)}{6000}*100 \Rightarrow S = 4800\ feet,$$

$$\text{Number of Strips} = n_1 = \frac{L_2 - 0.4G}{S} + 1 \Rightarrow n_1 = \frac{68640 - 0.4*6000}{4800} + 1$$

$\therefore n_1 = 14.8 \Rightarrow n_1 \approx 15$ strips,

$$\text{Number of Photos } \underline{\text{per strip}} = n_2 = \frac{L_1}{B} + 4 \Rightarrow n_2 = \frac{42240}{2400} + 4$$

$\therefore n_2 = 21.6 \Rightarrow n_1 \approx 22$ photographs,

$$\text{Total Number of Photos} = n = n_1 * n_2 = 15*22 \Rightarrow \boxed{n = 330 \text{ photographs}}$$