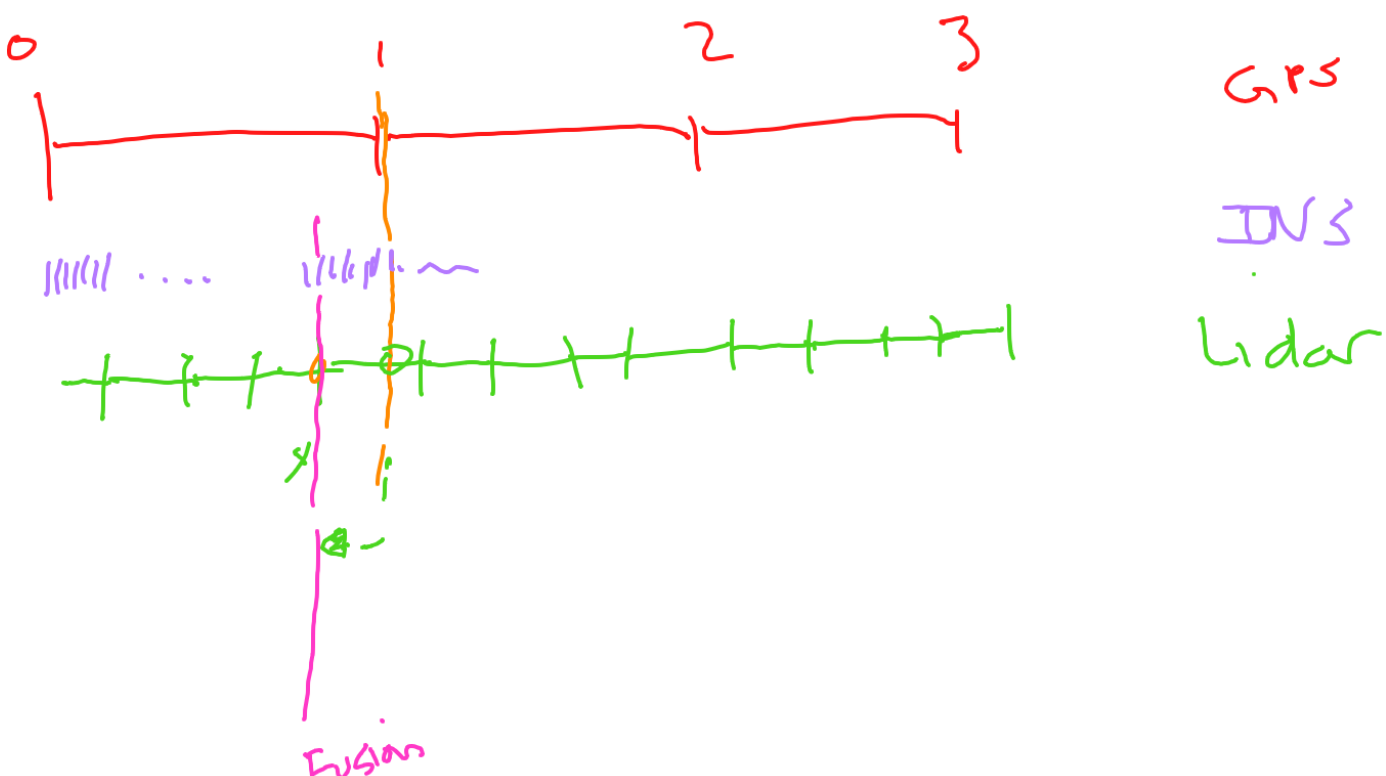
0
1
2
3
Gps
INS
Lidar
Fusion

re-Initialized @ 1 Hz

prediction $\dot{x} = f(x) + g(u)$ ← INS

$y = h(x)$

correction $x^+ = x^- + k\left(h^{-1}(y) - x^- \right)$

GPS sampled @ 1 Hz

↑ GPS

$W = \begin{bmatrix} P_{INS}^{-1} & 0 \\ 0 & P_{lidar}^{-1} \end{bmatrix}$

$y = Hx$

$x = x_{lidar}$

$x = x_{INS}$

$\begin{bmatrix} x_{lidar} \\ x_{INS} \end{bmatrix} = \begin{bmatrix} I \\ I \end{bmatrix} x$

H

---

lead following

$\dot{x} = f(x) + g(u)$ ← u is INS & Lidar

e.g. $\dot{x}_{INS} = f_{INS}(x) + g(u_{INS})$

$\dot{x}_{lidar} = f_{lidar}(x) + g(u_{lidar})$

$\dot{x} = (1-\alpha)\dot{x}_{INS} + \alpha \dot{x}_{lidar}$

actually weighted LSQ

while data in dataset
  while no new GPS
    store state
    while no lidar
      INS prediction
    end
    Lidar prediction
    Fuse Lidar/INS w/ WLS
  end
  kalman correction : WLS prediction (Lidar + INS) + GPS
end

prediction