

Optical Flow On Arducopter

- Optical Flow Demo
 - www.youtube.com/watch?v=9kBg0jEmhzM

Optical Flow Data Processing

Raw Gyro Data (400Hz)

Raw Flow Data (400Hz)

Reject if bad flow data

Reject Bad Frames

Integrate to obtain
delta angles

Convert pixels/sec to rad/sec

Integrate to obtain
delta angles

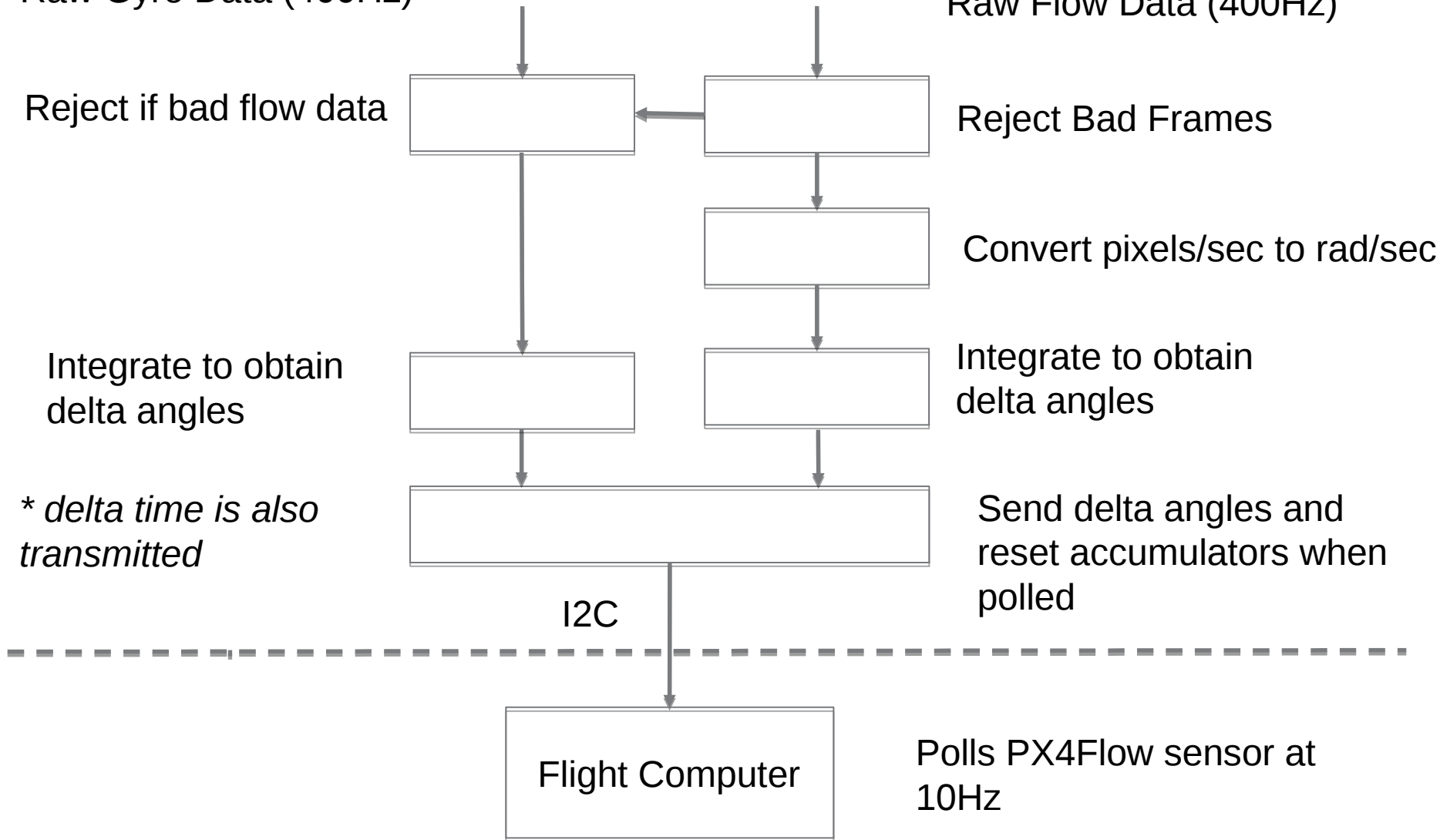
** delta time is also
transmitted*

Send delta angles and
reset accumulators when
polled

I2C

Flight Computer

Polls PX4Flow sensor at
10Hz



Optical Flow Data Fusion

- Accurate time alignment of gyro and flow measurements required
 - Misalignment causes coupling between body angular motion and LOS rates which destabilizes velocity control loop.
 - Effect of misalignment worsens with height
- Focal length uncertainty and lens distortion
 - Causes coupling between body angular motion and LOS rates which destabilizes velocity control loop.
 - Can vary 10% from manufacturers stated value
 - Sensors must allow for storage of calibration coefficients
 - Can be estimated in flight given time
- Assumption of flat level terrain
- Scale errors due to poor focus, contrast
 - Innovation consistency checks
- Moving background