LPS_Project: Line Position System

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What?

We need to build a new system to get the line position

Why?

To automate the winch control, the flight control system needs to know permanently the line position

How?

Idea 1: Install an encoder on the winch and count the ticks to deduce the line position

- ➔ No good, because the winch sometimes stuck and doesn't spin always in same way

Idea 2: Measure the high of the line wrapped around the winch

- ➔ Sounds complex, because the line is so thin

Idea 3: Add another pulley and make sure that the line goes through it. And in this case, we can install an encoder to count the ticks so we can deduce the line position.

- ➔ Good, but the line could slip around the pulleys for some millimeters, so the system accumulates the small errors until it becomes a big difference between the real line position and the calculate position.

Idea 4: We can add a landmark in the line to get the correct position and correct the theoretical position.

- ➔ Good! How?
- ➔ wrapped a metal tape each 10 meters and use a magnetic sensor to detect the tape
- ➔ Good, and why not using a black tape and a photonic sensor?
- ➔ Could works also, we just need to make sure that the line is always clean and white.
- ➔ Yes, it is.
- ➔ What about the initial position?
- ➔ We can make many different landmarks for absolute position and incremental position.
  We can take an inspiration from a barcode: we combine black and white to make a unique landmark.
  So we can make a unique absolute landmark for example for the position 0m , 100m and 200m and an incremental landmark each 10m.

Conclusion:

The system is made up of:

- ➔ Pulley + encoder: Measure the theatrical line position
- ➔ Landmarks + IR Sensor: Get the exact line position
- ➔ The landmarks are built up of a black tape as a barcode.
- ➔ Arduino: Compute the line position & send data to the flight control.