Remote-X

Proposal for an alternative Motion System

1. Introduction

There are different motion systems for manufacturing and especially 3D-printing right now. Classic cartesian, moving bed, Core XY, h-bot, scara, polar and a few more. All of them have there pros and cons.

The cartesian approach is straight forward directly driving the x and y axis with the downside that the weight of the stepper motor for the X-axis has to be moved around by the y- stepper. Even with a very stiff double belt mechanism there is likely to be some artefacts in the final print.

Core-XY is claimed by many to be the best solution in regard of achievable speed and print quality. The downside might be the long belts and or the asymmetric attachment points of the belts. This can be compensated by using quality belts that stretch less so that the summed up hysteresis is reduced.

2. Combining two motion systems

The hereby newly introduced "remote-X" motionsystem combines the advantages of core-XY and the classic cartesian approach.

2.1 Y- axis



Illustration 1: Y-axis on top with directly driven x-axis bridge





2.2 X-axis

Driven by a belt through two idler pulleys similar to a core xy system but only for one axis.





2.3 Motion equation

When using this configuration the x-axis carriage would move when the y- axis changes position so we have to compensate for that in firmware. The equation would be in pseudo python:

def comp(y): if y c = -yelse: c = 0return c x = x + comp(y)y = y



https://raise-uav.com



3. Discussion

The main goal of remote-X is to improve on coreXY, delivering high speeds with minimal artefacts and increase rigidity of the moving components.

The short dedicated y axis belts should minimize artefacts while the remotely driven x axis carriage makes the weight that needs to be accelerated as minimal as possible.

In case of fast combined movements the downside is that the x axis stepper has to move twice the speed of the y axis to compensate for its movement.

