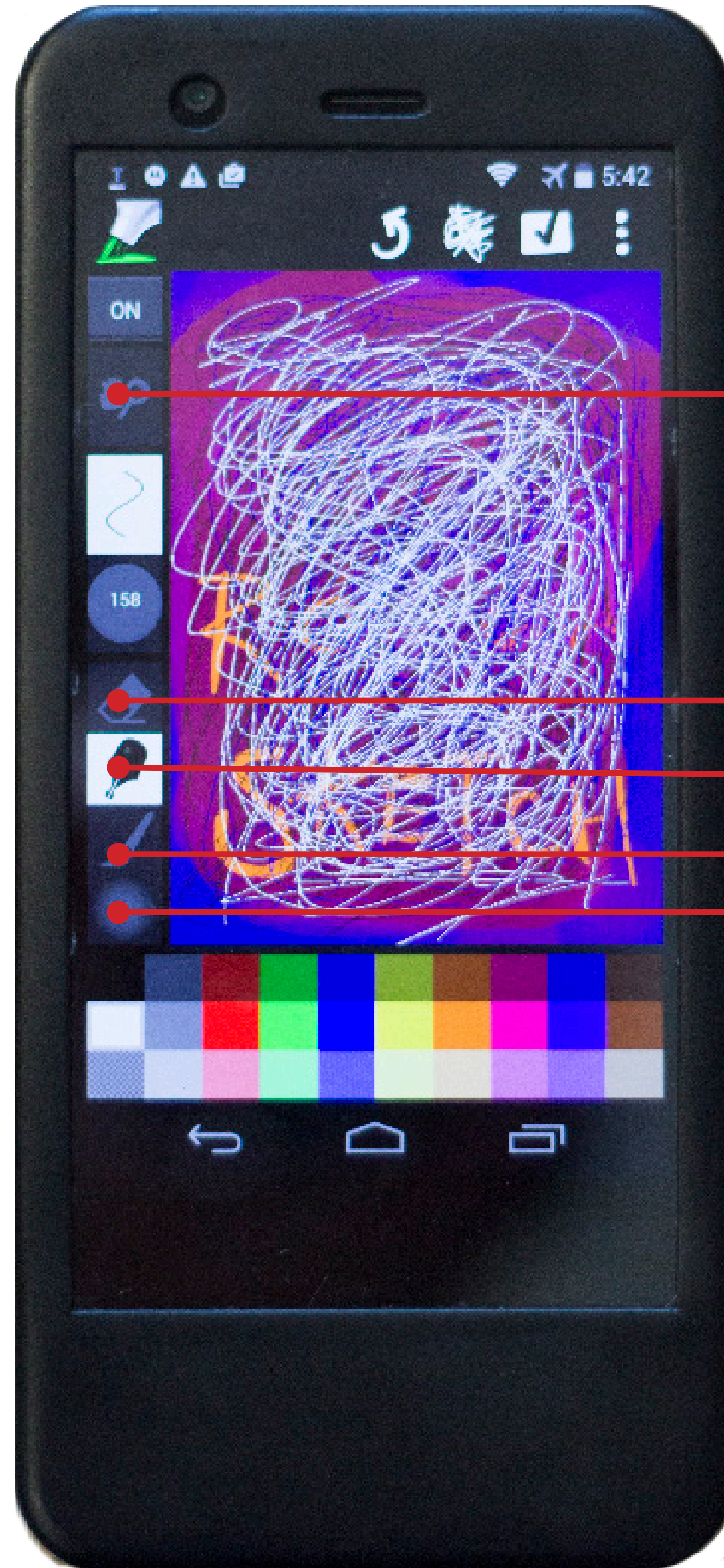


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The University of British Columbia

## Introduction

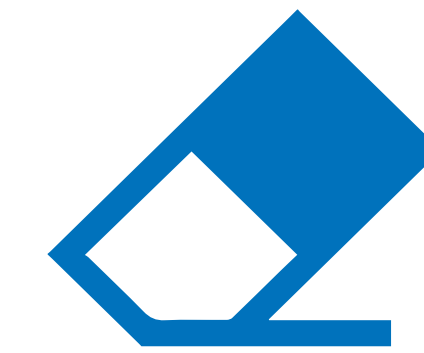
You're an artist painting on a canvas—you can feel the stroke of the brush, the texture changing as the paint fades. This feedback guides your stroke, giving you immediate, precise control.

It's difficult to replicate this experience on a touchscreen device. We used the TPad Phone's variable friction display to enhance these experiences on a touchscreen for digital artists, writers, notetakers, and painters alike. We've explored what mark-making tools should feel like through the lens of a drawing application: Roughsketch.



PAN/ZOOM

The zoom tool uses a 'pinching rubber' metaphor; pan is like moving a page.



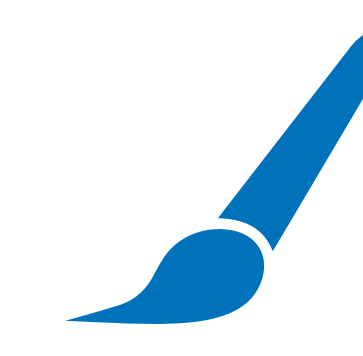
ERASER

The eraser mimics real life, little bits rubbing off as you use it.



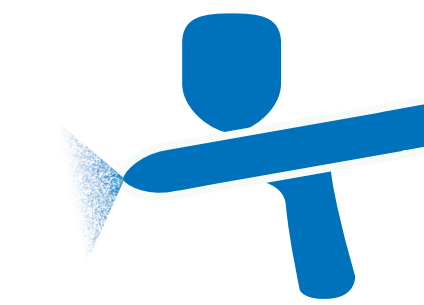
PEN

The pen texture is constant but slightly grainy, as if rolling across paper.



PAINT

The paintbrush starts slippery and gains texture as you 'lose paint'.



AIRBRUSH

The airbrush feels like the mark it is making.

## Should the feeling reflect real life, or be unique to the TPad?

Many of our tools were inspired by reality, but realism isn't always possible. For example, the pen tool reflects the feeling of writing on paper, but we couldn't identify a tangible 'pan/zoom' tool in real life.

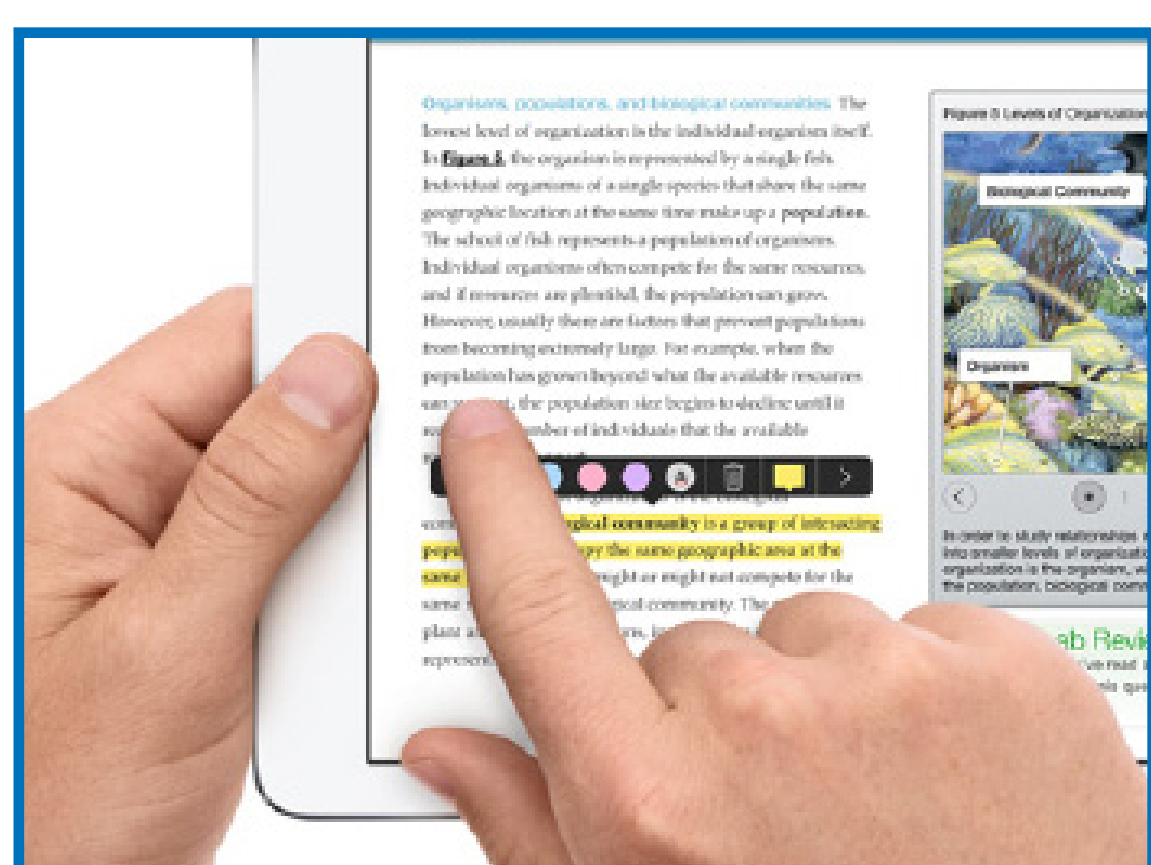
## Should feeling represent the drawing process, or the product?

Some tools felt right when we captured the experience of making the mark: while painting, friction increases as your brush deposits paint, which we can directly represent. Others felt right when you felt the mark you made: the airbrush's character is in its paint splatter, represented by a bumpy, grainy texture.

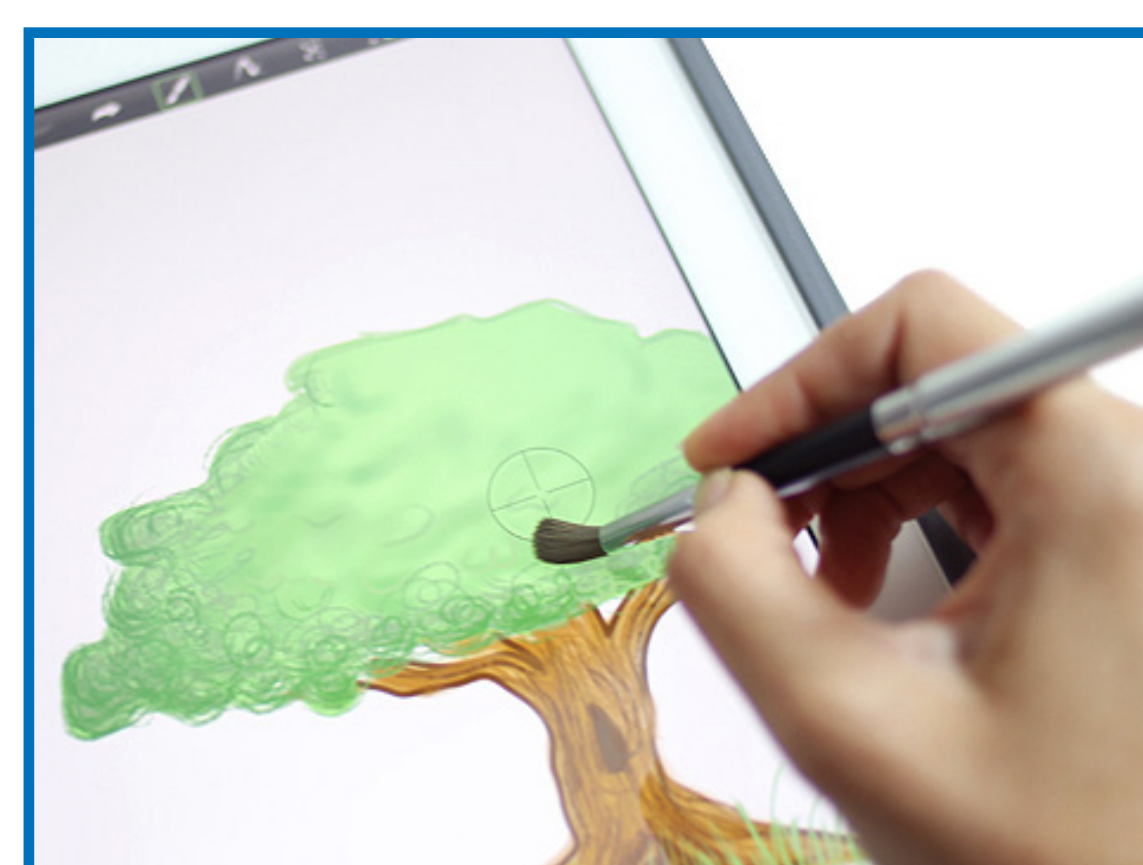
## Stylus Implementation" or "What about a stylus?

Many users use a stylus for handwriting, drawing, or other interactions with touch screens. We designed all our tools to work with a stylus; some required no modification, but others needed an explicit stylus mode. We found rubber-tipped styluses did not transfer friction very well, but rigid styluses did.

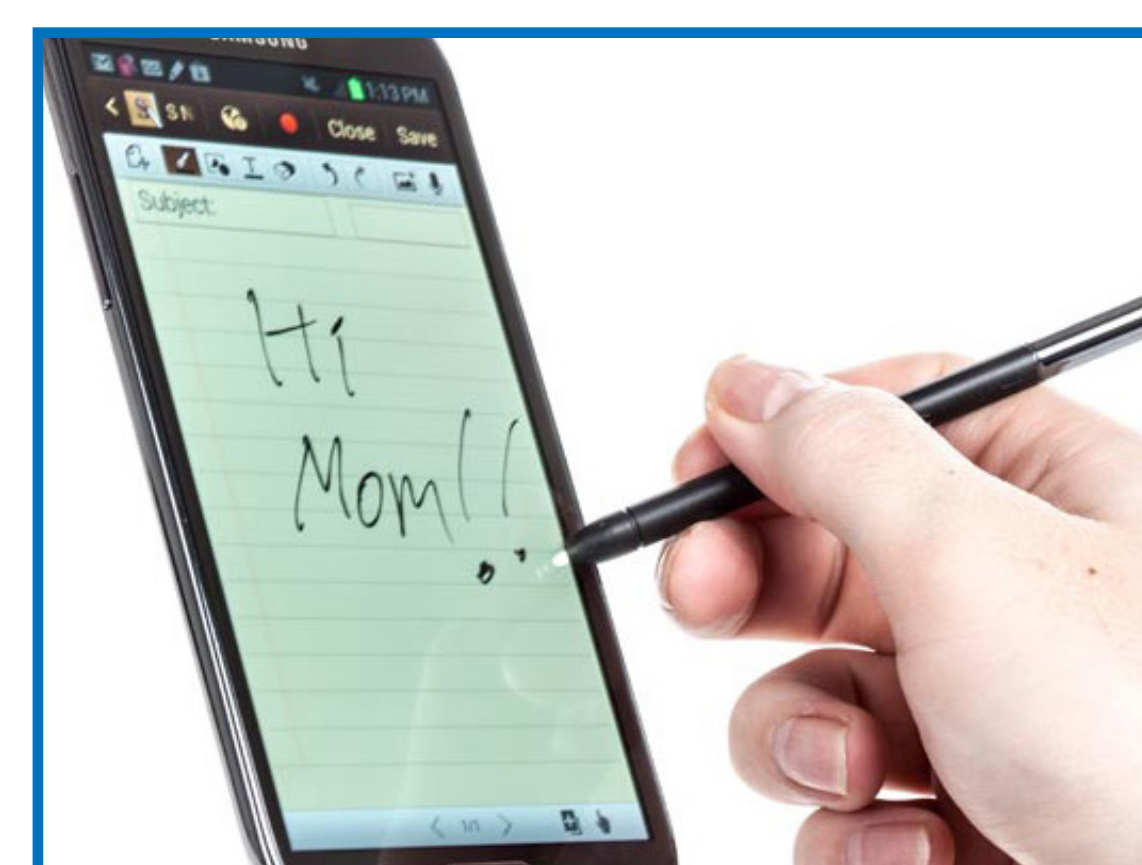
## Possible Applications



Annotating



Painting



Writing



Drawing