# Use of fNIRS to Assess Airmen's Trust in Automation

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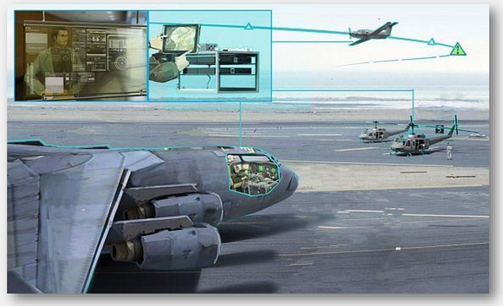
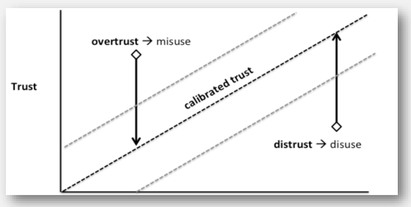
Using fNIRS to measure trust in human-automation teaming.

## MOTIVATION

- Automation is used and designed to improve airmen-machine performance, however automation is often not completely reliable.
- Supervisory control over automation is needed for optimal performance.



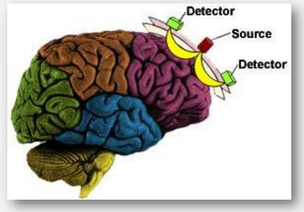
- Trust is a major factor that influences decisions of automation reliance.
  - Trust metrics are primarily self-report:
    - Might be susceptible to biases.
    - Might not capture real-time fluctuations of trust.

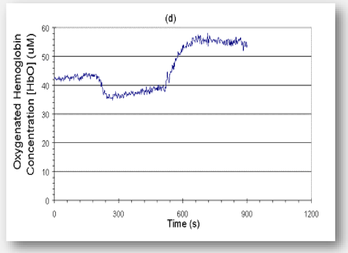



- Psychophysiological metrics (e.g. heart rate, EEG, etc.) can provide complimentary information to self-report metrics.
- Functional Near-Infrared Spectroscopy (fNIRS) is capable of measuring brain activation of specific areas and may be applied to measure trust (Hirshfield, et al., 2009; Sassaroli, et al., 2008).

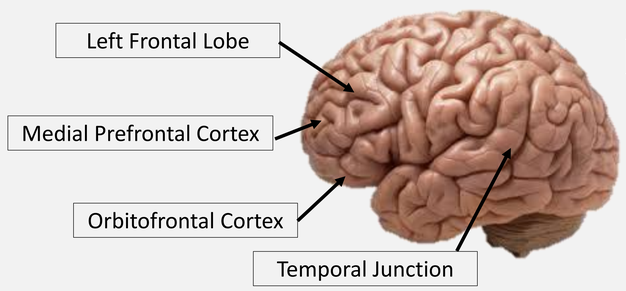
## OVERVIEW

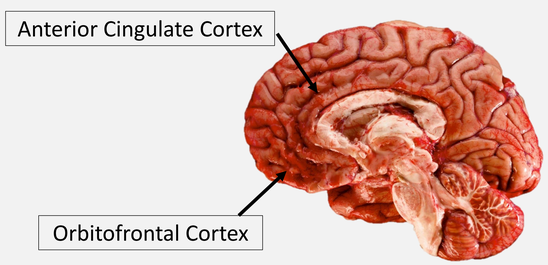
- fNIRS determines areas of brain activation.
  - Measures absorption of near-infrared light.
  - Assesses changes in blood flow volume.




- fNIRS is capable of measuring outer cortex regions.
- Specific outer cortex regions of the brain are linked to trust.
  - High trust is associated with:
    - Low activation in the orbitofrontal cortex and temporal junction.
    - High activation of the left and right frontal lobes, medial prefrontal cortex, and anterior cingulate cortex (Dimoka, 2010; Hirshfield, Bobko, & Barelka, under review).




**Disclosure Statement: I have no financial relationships to disclose.**