



## SIMOC:

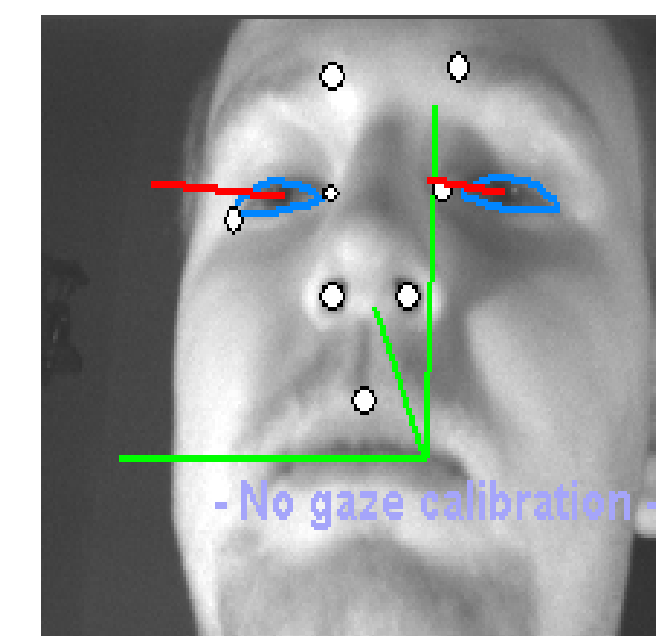
# Simulation/Oculometer Integration for Two-Crew Operations – Determining Indices of Workload, & Crew Performance

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### Objective

Unobtrusively obtain pilots' point-of-gaze (POG) data during realistic simulation tests.

Determine indices of pilot and crew workload, and crew performance based on this POG data.



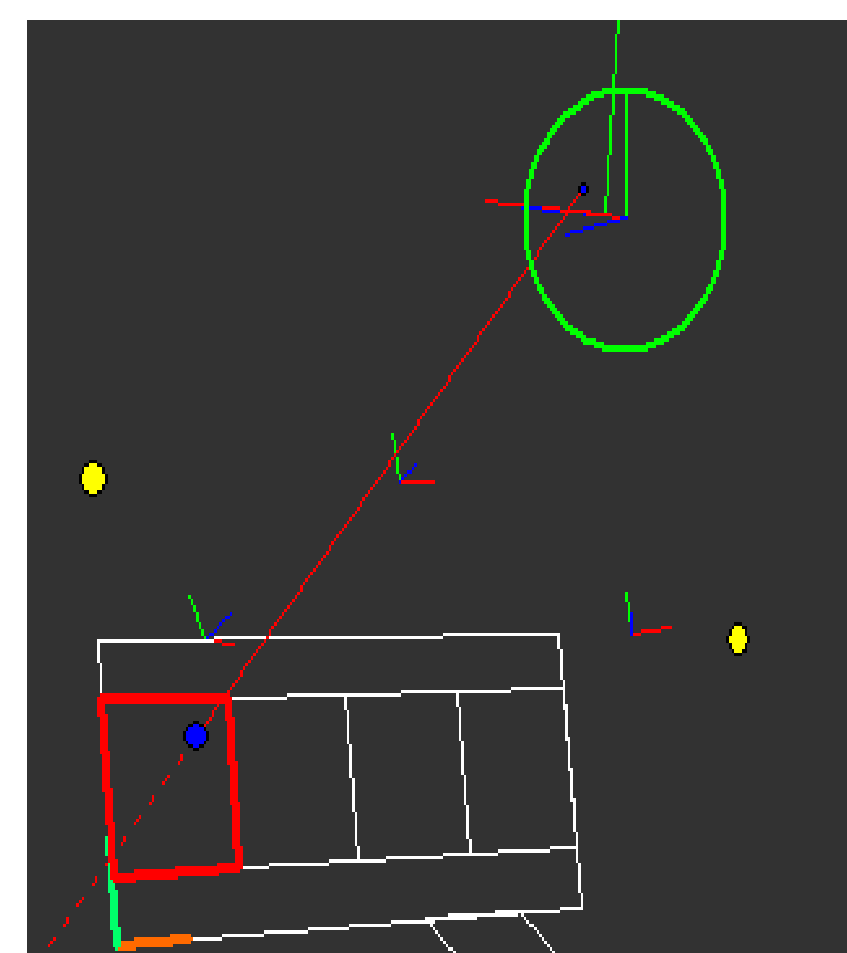
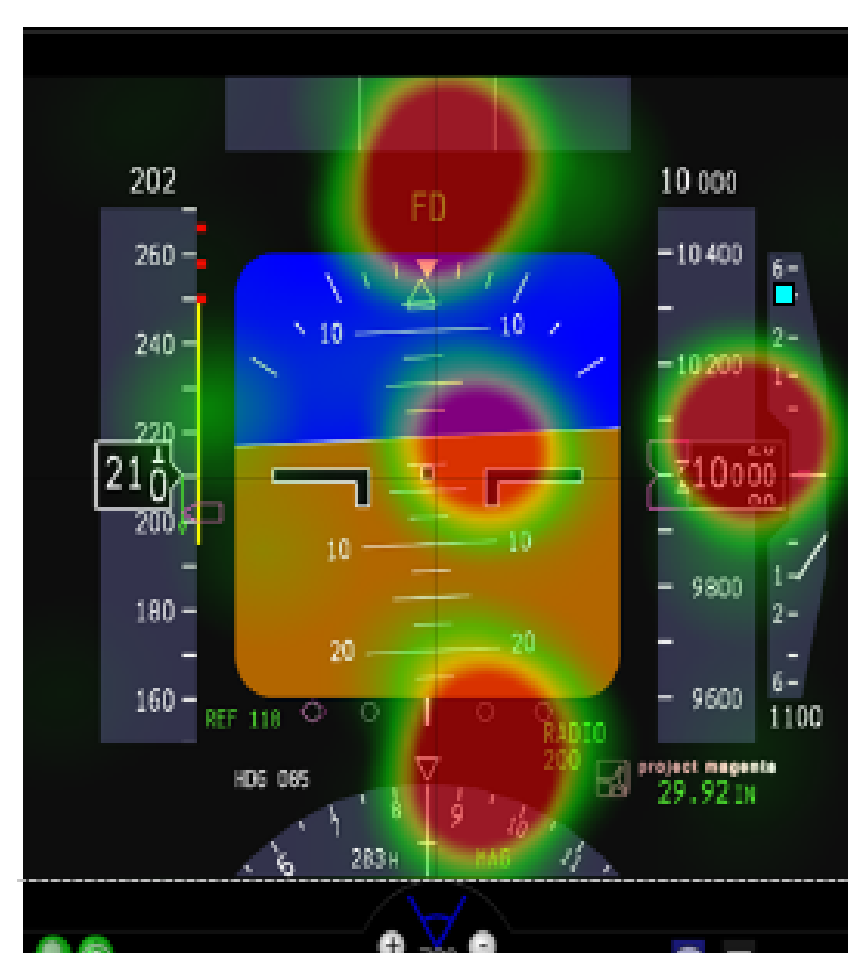
### Technical Challenges

- Unobtrusively embed oculometer equipment in simulation interface
- Develop data collection integration
- Data quality assessment
- Determine metrics for workload and crew-coordination
- Assess data collection in motion conditions



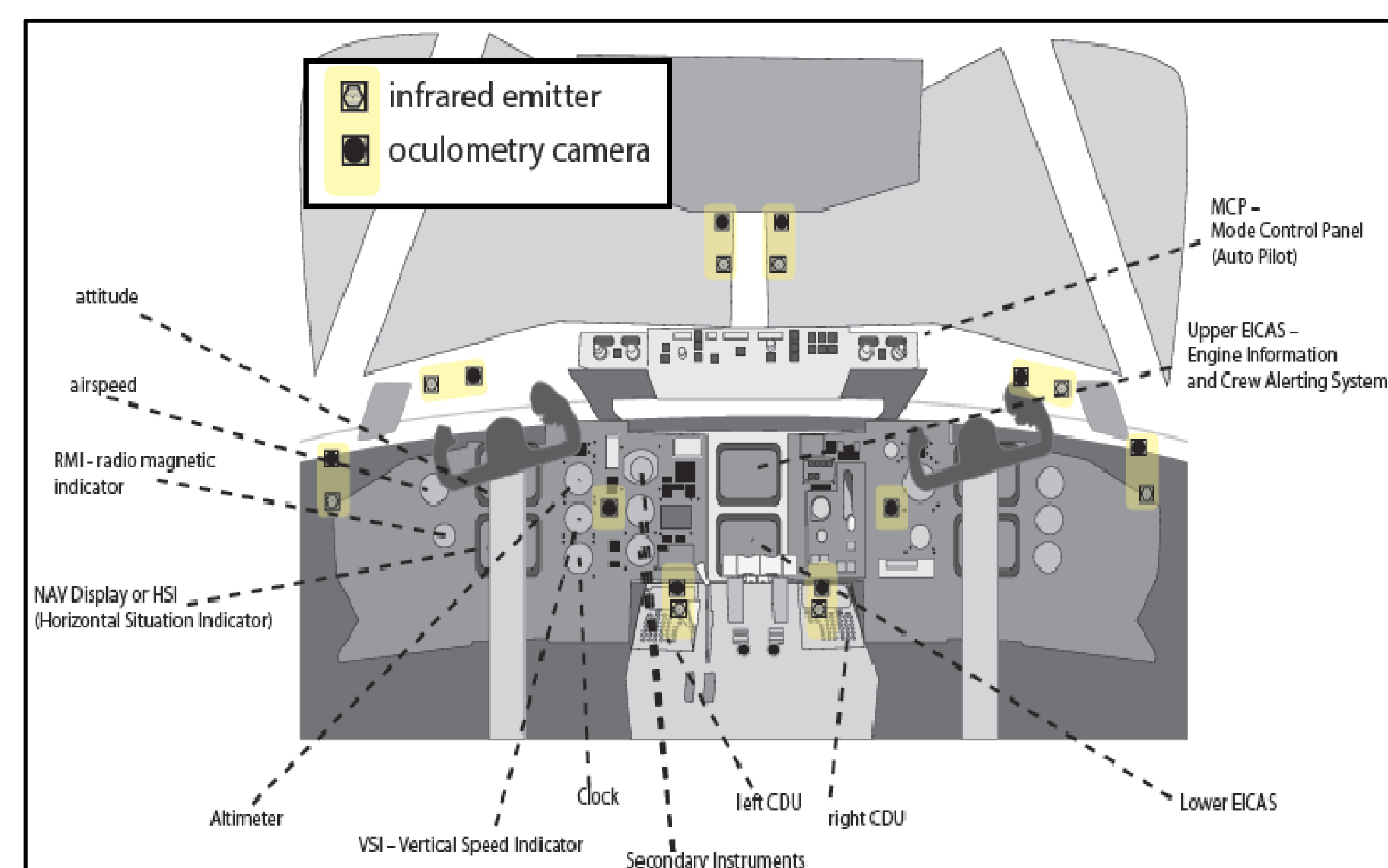
### Standard Oculometer Metrics

- Head position and orientation
- Point of Gaze
- Eyelid closure & Pupil size
- Intersection of gaze with defined areas
- Gaze quality & diagnostic information
- Fixation counts & durations
- Burn maps (histograms)
- Saccades & transition probabilities
- Blinks, blink rate



### Metrics Under Development

- Pilot Workload
- Crew Coordination
- Crew Monitoring Coverage
- Crew Cross-Checking



### Current SIMOC Capability

NASA Langley's Integrated Flight Deck (IFD) Simulator. Advanced current day commercial transport, similar to B737.

Smarteye oculometer components: 10 camera & 4 flashes installed and tested.

*\* This configuration supported FAA-sponsored investigation of Datacom acceptability on arrivals and departures.*

*\* A reduced version of SIMOC was installed in NASA Langley's Research Flight Deck (RFD) to support NEXTGEN*

### Future Installation Work

- Cover side-mounted Electronic Flightbags
- Test when simulator is on motion-base
- Improved Area of Interests for external view
- Automated data quality assessment
- Fused POG on rectified, single scene image

### Impact

More sensitive, unobtrusive, objective, and continuous measurements of workload and crew performance during evaluations of NEXTGEN display & operational concepts.

### Sponsoring Projects

System-Wide Safety & Assurance Technologies  
&  
Vehicle Systems Safety Technologies