



Dynamic Periphery Display: Enhancing Pilot Decision Making in Simulated Flight

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Motivation

High Cognitive Load for Training in Flight Simulators

- Heavy stream of aircraft data
- Inconsistent instrument layouts across different aircrafts
- Ineffective analog gauge design
- Complex tabletop simulator controls

FAA-Certified Table-Top Flight Simulator



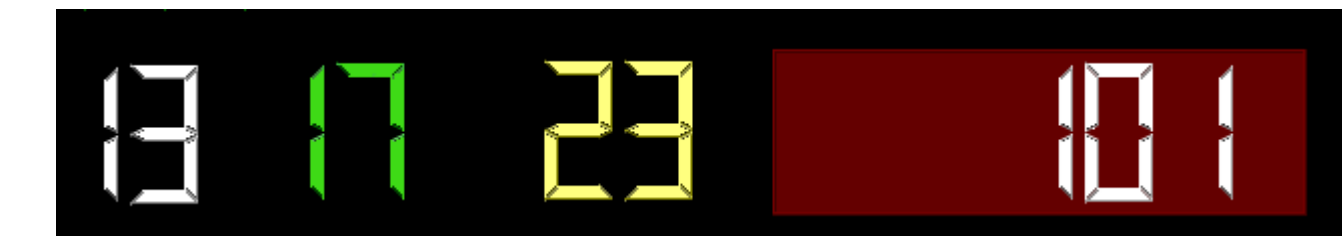
Simulated Cockpit of Beechcraft B58



Dynamic Engine Gauge Interface

MAN PRESS (HG)	29	MAN PRESS (HG)	29
RPM	2703	RPM	2703
FUEL FLOW (lb/h)	147	FUEL FLOW (lb/h)	147
OIL PRESS	58	OIL PRESS	58
OIL TEMP	90	OIL TEMP	90
TEMP CHT	151	TEMP CHT	151
TEMP EGT	271	TEMP EGT	271
FUEL	299	FUEL	299

Peripheral Warning Cues



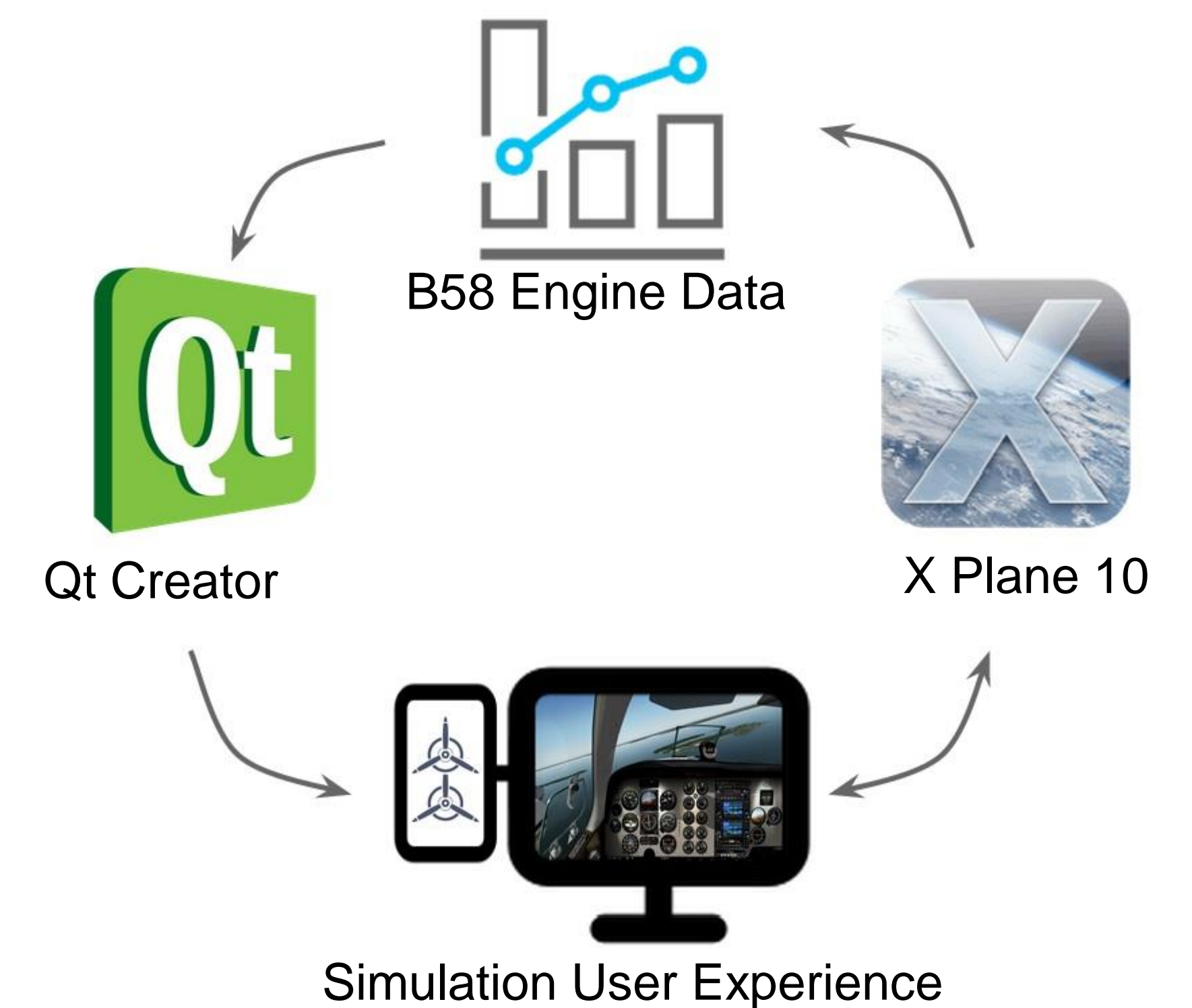
White = idle

Green = healthy engine state

Yellow = cautionary

Flashing Red = dangerous engine state, take action

Data Transfer Process



Development

Goal

Create a dynamic interface to enhance flight trainee's decision making during flight simulation

Design Framework for Enhancing Decision Making

- Gestalt Grouping
- Proximity Compatibility Principles
- Component Arrangement Guidelines
- Situation Awareness Design Heuristics

Application Features

- Digital readings for accurate state access
- Account for failure of system components
- Color emergence for status reporting
- User-centered and task-sensitive layout
- 8 fundamental engine gauges for B58 aircraft

Future Work

Research

- Perform user experimentation in Aerospace classroom
- Evaluate system with computational models

Expansion

- Commercialize for classroom environments, if found effective
- Adapt for physical aircrafts to improve pilot Situation Awareness
- Incorporate heads-up flight instruments