



# Automated Dive System Controller



Felix Abraham, Mario Aquino, Chris Daugherty, Sean Moore, & Phong Tran  
Dr. David Gross, FAMU-FSU School of Engineering, Florida State University, Panama City, Florida

## Abstract

Diving safety is impacted by the environment, training and human factors from physical and cognitive. The safety of diving operations can be improved by reducing the human error; therefore, this team is designing an Automated Dive System Controller that reduces the operator workload by using automation and digital transformation to maximize safety, improve performance and satisfaction. The overall objective is to use human factors to design the system's human-machine interface.

## Introduction



Figure 1 - Potential system (left) compared to current setup (right)

## Hypotheses

- A digital transformation has the ability to effectively and efficiently control a diver's environment than an operator alone.
- A digital transform could assist in the retention of knowledge and the efficacy of training.

## Methods

- Develop GUI for dive system
- Test GUI using random people/ divers/ life support techs.
- Gather feedback from test subjects and improve system interface.
- Dry run diving systems with new system to see if it performs within expected measures.

Participants

≅20

## Results

- Preliminary results

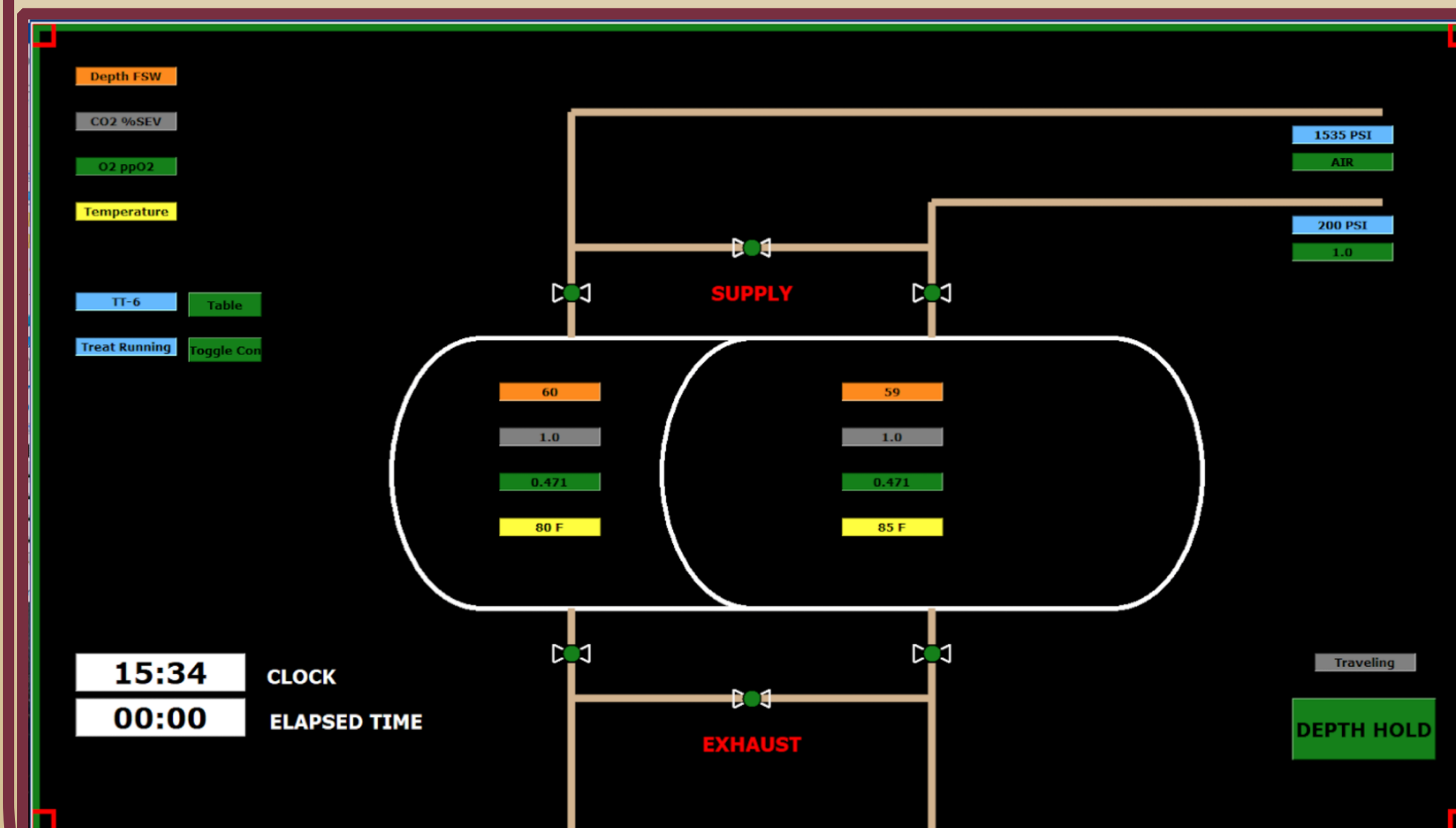


Figure 2 - Preliminary GUI

## Discussion

For a diving system such as this, there is substantial knowledge needed before operating. Knowledge and competency in fields like dive physics, dive medicine, gas laws and general equipment knowledge is required before being able to operate a system that is responsible for human life.

The GUI and associated automatic controls help reduce the error rate of system operators and increases knowledge retention and situation awareness of the system by reducing information cost.

Figure 3 - A typical DDC setup



## Conclusions

- A digital transformation of critical system information and controls improves operator performance.
- A digital transformation assists trainees in the understanding of the system.

## References

Amron International. (n.d.). Diving Air Control Systems | Amron Amcommand. Retrieved January 15, 2022, from <https://www.amronintl.com/commercial-diving-equipment/air-systems/air-control-systems.html?dir=desc&order=price>

Blumenberg, M. A. (1996). Human factors in diving. Available from National Technical Information Service.

Sieber, A. S., Koss, B. K., Bedini, R. B., Houston, K. H., L'Abbate, A. L., & Dario, P. D. (2008). NOVEL CONTROLLER FOR REBREATHING DIVING SYSTEMS: True Sensor Signal Validation and Safe Oxygen Injection.