

# Smart and Safe Prescribed Burning for Rangeland and Farmland Communities

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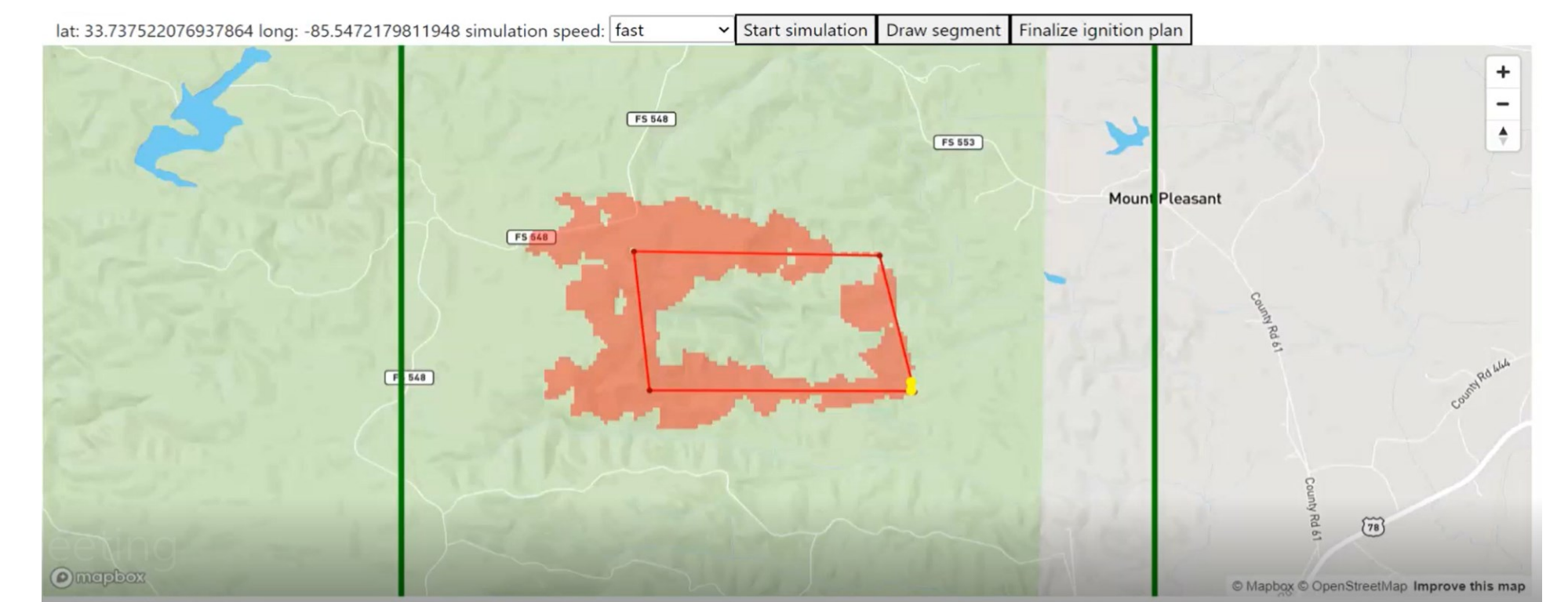
Prescribed fires have long been used by ranchers and farmers in the Great Plains of the United States as a land management tool. They help farming and grazing by replenishing the soil, increasing forage production, controlling harmful parasites and protecting prairies from invasive overgrowth. They are also increasingly used by land managers to reduce the risk of wildfires.

**The community-identified problem** – There are safety and environmental concerns for prescribed burn events. On the safety aspect, an escaped fire or a fire reignited from smoldering fuels can become uncontrollable and result in severe damages of properties and injury of people. On the environment aspect, smoke from prescribed fires causes elevated particulate matter (PM) and ozone (O3) in ambient air. To manage these concerns, optimal planning and execution of prescribed fires are crucial.

**Intellectual Merit** – The purpose of this project is to develop an innovative community sensing, planning, & learning infrastructure to support smart and safe prescribed burning for communities that use prescribed fires for land management. The developed infrastructure will be integrated into a cloud-based tool to serve communities as a smart cyber connection for landowners to optimally plan their prescribed fires, collect and share data about burning, and train fire operators to learn the most effective burn.

## Project Activities to date

- A *UAS Integration for Fire Operation Workshop* was organized in November 2021 with 30+ participants.
- Strengthened the project team by adding Prof. Joslin from KSU to cover the social science aspect of the research.
- Developed a prototype map-based simulation tool.
- Visited a prescribed burn event in the Eastern Kansas community.
- The Eastern Kansas PBA visited Co-PI Chao's flight test.
- Co-PI Fick participated the field day of prescribed burns together with the Gypsum Hills PBA.
- Organized meetings with the two PBAs to learn current prescribed burn practices of the two communities.



**Broader Impact (immediate impact)** – the project will directly support the planning and monitoring of prescribed fires for the two communities in Kansas: 1) The rangeland community of Gypsum Hills; 2) the suburban Wildland Urban Interface (WUI) community of Eastern Kansas.

**Broader Impact (sustainability)** – The research outcomes of this project will make a great impact on grassland preservation, wildlife habitat, prevention of woody plant invasion, and environmental protection. The developed tool can also be generalized to wildfire management.

**Next Steps** – 1) Continue engaging with the two communities; 2) Refine the research approaches; 3) Work on a IRG proposal.