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## Challenge: time/safety-critical decisions under uncertainty



- Uncertainty management: fire and human dynamics
- Complexity management: planning under uncertainty
- Limited human-AI trust

AI augmenting human sense/decision-making



<https://www.cnet.com/tech/tech-industry/nvidia-and-lockheed-martin-plan-to-fight-forest-fires-with-ai-heres-how/>

Nvidia and Lockheed Martin plan to fight forest fires with AI. The companies have teamed up with state and federal firefighting services and are creating a dedicated lab to predict the path of fires to help stop them in their tracks.

# What is needed to build trust-worthy and trusted AI



## 1. Reduce uncertainty in fire and human dynamics

- Synthetic data to augment limited real data for training classifiers
- Fast approximations of physics-based models for prediction
- Lifelong learning to ingest new data
- **Reasoning to augment machine learning**  
(inject expert knowledge, enable dialog, reduce data required, enable V&V)



## 2. New design methods for human-AI teams

- **Human sense/decision-making performance models**
- Scalable algorithms for real-time asset allocation and planning under uncertainty
- Scalable probabilistic V&V methods (formal and simulation-based)



## 3. Build human-AI trust

- **Manage AI performance/explainability trade-off**
- AI-based human attention management (when and how to engage humans)
- AI agents and humans learning from each other (build trust over time)
- Immersive virtual environments for joint human-AI training



*Trust-worthy does not imply trusted.*