Spring 2021 Tactical Fire Remote Sensing Advisory Committee
and
NASA Aeronautics Research Mission Directorate
Wildfire Management Workshop

May 11 - 13, 2021
Meeting Summaries
website: **https://nari.arc.nasa.gov/tfrsac-wildfire**

The **Tactical Fire Remote Sensing Advisory Committee** (TFRSAC) hosted its spring 2021 meeting in collaboration with the NASA Aeronautics Research Mission Directorate (ARMD) **Wildfire Management Workshop** over three days: May 11 - 13, 2021. Following the two-day TFRSAC meeting, the TFRSAC and ARMD co-hosted the Wildfire Management Workshop.

The **TFRSAC** is a longstanding "Community of Practice" (CoP) co-hosted by the **USDA Forest Service** and **NASA Ames Research Center** which focuses on sharing best practices and creating new knowledge to advance the wildland management domain of professional practice. Interaction on an ongoing basis is an important part of this, and to meet those objectives the TFRSAC meets twice each year (Spring and Fall) to discuss the developments and results of ongoing investigations for new and evolving capabilities that support improved fire observation. The bi-annual meeting agendas and presentations are open-access and shared with the greater community.

Day 1 and 2: The TFRSAC 2-day meeting provided 31 presentations on a variety of topics (agenda with links to presentations and presenter email addresses):

- Fire outlook and preparedness for 2021
- Updates on fire imaging sources and programs currently employed
- Aircraft systems including UAS and lighter than air / airspace management efforts
- Working group updates
- New sensor development / airborne and spaceborne
- Research in the field
- Use of Artificial Intelligence and Machine Learning to support wildland fire information needs
- Collaboration systems and information/decision support tools for real time sharing of fire/disaster information
- Use of remote sensing to improve community resilience and better adherence to firesafe rules in the face of growing fire activity

Key points that resonated throughout the TFRSAC (and ARMD Workshop) meetings:

➢ **Institutional inertia remains an issue**

Institutional inertia is an observed resistance to technological change within the federal government. The pace of technological change within the federal government agencies can be painfully slow, and in some cases, non-existent. This inertia can be attributed to several causative factors which include:

- Lack of funding

- Comfort with existing technology and ways of doing business
- Challenging contracting and acquisitions processes and rules
- A lack of understanding of the "art of the possible"
- Distrust built up from years of being disappointed by promised silver bullet solutions

This existing system inertia needs to change. We need to move into a different way of doing business that promotes more rapid adoption of technology to produce better outcomes.

➢ **Artificial Intelligence / Machine Learning** is moving to the forefront in remote sensing. There is significant activity in the application of artificial intelligence (AI) / machine learning (ML) to solve manpower intensive issues in remote sensing support to wildland fire. Some examples are as follows:
- Finding new fire starts from multiple sensors
- Recognizing Smoke (with low false alarm rate)
- Drawing points, lines, and polygons on active fires (early and extended attack)
- Fire behavior modelling/prediction

This will continue to be a topic of considerable discussion going forward.

➢ **Communities of Practice are a good first step**

Communities of Practice provide a low level-of-effort forum where federal agencies can overcome a number of institutional issues by providing an open forum where needs and solutions can be discussed in an information sharing environment. Vendors are asked to check their sales credentials at the door and treat the meetings as information sharing event rather than a sales opportunity.

Day 3: The **NASA ARMD workshop** focused on needs within the three phases of the fire season: pre-fire season, during the fire season (initial and extended attack), and post-fire. The workshop leaders considered the needs of the various stakeholders and operators who are involved in wildfire management planning, fire suppression, and post-fire analysis. The host time frame of interest spans near-term (< 3 years), mid-term (3-7 years), and long-term (10+ years) needs.

The goal of the workshop was to understand the state of the art in wildfire management and to identify the needs and challenges of stakeholders at various decision cycles from planning, prediction, detection, tracking, mitigation, and post-fire remedial efforts. These needs will reflect the various agencies and roles that are involved in wildfire management. NASA intends to use this input to inform potential contributions towards research, development, testing, and implementation opportunities to improve the state of the art in wildfire management.

The workshop included two breakout sessions which addressed a variety of topics:

- Planning for Fire Season
- Prediction Methods and Challenges
- Aerial Fire Surveillance

- Suppression and Mitigation
- Post-Fire Remedial Efforts

The output from these breakout sessions will be made available and shared after final review internal review and editing.

Director Bob Baird, the USFS Pacific Southwest Fire Director was the keynote speaker at the ARMD Workshop and set the tone for the meeting. Bob's critical requirements for wildland fire response:

- Where is the Fire?
- Direction, Spread, Speed, Intensity
- Real Time Modeling-Like Tornado "Storm Tracks"
- Where are the Firefighters?
- Where are the Personnel, Engines, Aircraft?
- Where are the Values at Risk?
- Homes, Business, Natural Resources, Critical Infrastructure
- Where are the people and how do they get out?
- Can they understand how to get out?
- **All in one Common Operating Picture Across Any Device**

He also noted:

"Near Real Time IR wildfire detection, tracking, and projection is needed on the front lines of wildfire management in austere areas of to respond to the wind driven and fast-moving wildfires."

Director Baird's closing comment: "Failure is not an option!". Bob's full presentation here.

Attendance: The meetings were very well attended. The TFRSAC had 280 registered attendees. The ARMD workshop had 323 registered attendees with significant overlap between the 2 meetings (246 people registered for both meetings).

YouTube participation stats:

- TFRSAC Day 1:
    - Peak Number of Concurrent Views: 111
- TFRSAC Day 2:
    - Peak Number of Concurrent Views: 143
- ARMD Wildfire Management Workshop:
    - Peak Number of Concurrent Views: 132