



# Integrated Research Management Team Implementation Guide

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## Executive Summary

This document serves as a guide for anyone interested in the concept, use, or development of an Integrated Research Management Team (IRMT) to support collaborative research. It provides historical context, purpose, goals, objectives, planning processes, responsibilities, advantages of IRMT utilization, and example documents/templates that have been successfully used to support inter-project collaboration, safety, planning, host unit interactions, and overall operations on multi-project collaborative live-fire research campaigns. The integration of Incident Command System (ICS) principles into management of multi-project prescribed fire research campaigns is described, including duty descriptions of key positions, briefing cycles, development of Incident Action Plans, and the roles and responsibilities of researchers before, during, and after live fire research events. The case is made that an IRMT adds significant value when multiple research projects are co-located with potentially overlapping/synergistic/conflicting objectives, particularly when research occurs in remote areas involving potentially dangerous operations. Based on proven ICS principles, and modified to meet scientific objectives, the document describes how an IRMT can significantly improve safety and inter-project synergy, while minimizing coordination workload on researchers and host units.

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## Introduction and Purpose

This guide provides:

- Contextual and background information.
- Descriptions of an Integrated Research Management Team (IRMT).
- IRMT management objectives and methods.
- Considerations for IRMT establishment.

- Example documents and processes.

Primary beneficiaries of an IRMT include researchers involved in complex, multi-project field campaigns, as well as host unit managers and practitioners. While the IRMT concept is derived from the Incident Command System and developed to support multi-project wildland fire research initiatives, the adaptability of the IRMT organizational structure and the guidance provided here is useful for managing any type of complex research operations. The IRMT concept is most effective when objectives include collaboration among scientists, synthesis of results, co-production between researchers and managers/practitioners, and minimization of workload on host units. This document is a deliverable for DoD’s Environmental Security Technology Certification Program (ESTCP) project RC20-7189, “*Integrated Research Management Team Supporting SERDP/DOD Wildland Fire Science Initiative*”.

## Background

The italicized excerpts and text box below from “*ON FIRE: The Report of the Wildland Fire Mitigation and Management Commission*” (WFMMC), Chapter 6 (Integrating Modern Science and Technology) provide important context for understanding the drivers behind IRMT development and implementation (USDA 2023).

*“Climate change and rapidly changing ecosystems represent fundamental shifts in conditions that current fire behavior models, and indeed the current fire management system, are not designed to meet. In a time of rapid ecological change, disparate scientific disciplines need to work in concert to successfully understand, model, and adapt to altered conditions.”*

*“Wildfire science and technology is a broad, distributed sector. It encompasses numerous entities, including more than 50 federal programs spread across multiple departments, many (if not most) of the states, academic institutions, Tribes, and a wide variety of private sector entities including potential investors and vendors (Interagency Council for Advancing Meteorological Services and U.S. Group on Earth Observations, 2022; PCAST, 2023). This space has only become more complex as new partnerships have developed or deepened in the last few years, including, for example, expanded interest in wildfire science and technology from the National Aeronautics and Space Administration (NASA), the Department of Defense (DOD), and the National Science Foundation (NSF). Furthermore, many entities already in this space have recently increased investments, for example the National Oceanic and Atmospheric Administration (NOAA) and U.S. Geological Survey (USGS).”*

### Recommendation 113

Congress should provide funding to support Innovative Landscapes research areas that link scientists with land and fire managers to assess fire risk, plan fuels treatment, monitor before and after treatment and evaluate change in fire risk using the latest fire models, best data, and new and proven technology.

As mentioned in the WFMMC report to Congress, the Department of Defense has invested in wildland fire science through its environmental research programs: Strategic Environmental Research and Development Program (SERDP), and Environmental Security Technology Certification Program (ESTCP) (USDOD 2024a). Since 2012 SERDP and ESTCP have funded 45 wildland fire research projects in what

became known as the DoD Wildland Fire Science Initiative (WFSI). Many of these research projects required data-gathering during active, pre-planned prescribed fires at various locations around the country, including several DoD installations. Researchers and managers involved in these projects realized that, based on lessons learned from previous wildland fire field research campaigns, to maximize their respective and collective project efficiency there was a tremendous need for inter-project management, coordination, and synthesis to support management-relevant science and technology development through co-production with fire managers. This requirement for interproject synthesis and facilitated co-production was not included in the original stand-alone proposals.

A white paper, developed collaboratively by researchers and managers involved with previous live-fire research, was submitted to SERDP/ESTCP in April 2020, followed by a full ESTCP proposal for the establishment of an IRMT with the primary objective to *“Develop an integrated system to maximize collaboration, personnel safety, probability of success and overall positive impact of the DoD Wildland Fire Science Initiative while providing proof of concept for an “Integrated Research Management Team” as a national model via successful establishment and implementation.”* The proposal was funded and the IRMT began operation in April 2020. Principal Investigator and Co-Principal Investigators include managers and scientists involved with the [Prescribed Fire Science Consortium \(Skowronski, N., and others 2021\)](#), with firsthand experience at previous large-scale collaborative research burn campaigns, including [RxCADRE—Prescribed Fire Combustion and Atmospheric Dynamics Research Experiment \(Peterson, D.; Hardy, C. 2016\)](#), and [FASMEE—Fire and Smoke Model Evaluation Experiment \(Prichard, S.; Larkin, S.; and others 2019\)](#). Due to its success supporting these collaborative wildland fire research events, in 2023 the IRMT was enlisted to support establishment and co-production activities of the [Eastern Innovation Landscape Network \(USDOD 2024b\)](#).

The integration of scientific research into wildland fire operations poses challenges and potential risks to both researchers and the actual fire operations if not well organized and implemented. Without significant pre-planning, the desire of many research projects to co-locate on experimental burns for inter-project synergy can quickly overwhelm local fire managers’ capacity for managing the incident complexity inherent in these operations. Individual SERDP projects made no allowance for the *collective* impacts of bringing large numbers of scientists (60+ in some cases) and projects to individual sites. The planning and logistics for access (particularly on DoD installations), airspace, personnel safety, equipment storage and set up, etc., can overburden a host site’s staff, leading to project failure or, at a minimum, to damaged relationships or suboptimal results for fire operations and/or the planned research. In addition to safety concerns, actionable science can be compromised if integration of research objectives is not fully understood by fire managers and practitioners. Conversely, well managed prescribed fire research campaigns provide excellent opportunities for building communication channels and relationships between researchers and fire managers that support true co-production of actionable science. These concepts have been previously discussed in the context of “rapid-response” research during on-going wildfires (as different from prescribed fires), where the value, challenges, and lessons-learned were addressed (Lentile et al. 2007a; Lentile et al. 2007b). The longer, site-specific planning horizon provided by prescribed fires provides an excellent opportunity for truly collaborative, synergistic wildland fire research.

The [Incident Command System](#) (ICS) provides the underpinnings for the IRMT. ICS is used for all wildland fire operations on federal lands and is defined as “*a standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries*” (FEMA 2024). Many fire researchers are unfamiliar with ICS and typically have no practical fire experience or ability to access wildfires or prescribed fires. The one-off nature and increasing integration of wildland fire experiments into active wildland fires requires coordination and effective information flow among science teams before, during, and after the research burns, which ICS provides. The IRMT is designed to facilitate increased inter-project synergy for enhanced scientific outcomes and land management applicability by using ICS concepts, documentation, and processes for pre-planning and implementation phases of research burn campaigns.

## What is an IRMT?

An Integrated Research Management Team is an organizing structure used to manage complex incidents such as large research projects to ensure safe and effective scientific outcomes. The core IRMT consists of 6-8 personnel that are funded at least part-time for the duration of a multi-project research campaign. They must have an in-depth understanding of Incident Command System (ICS) principles and application. Interest and background in supporting research is also key when selecting IRMT members. The IRMT Leader, and designated team members, can enlist or fund additional part-time specialists as needed during the planning and execution phases of an onsite research campaign. Additionally, the IRMT plays a role in enhancing co-production by conducting a robust After-Action Review (AAR) (National Wildfire Coordinating Group 2024), capturing relevant lessons learned, and disseminating results.

## IRMT Goals

The primary goal of an IRMT is to provide an integrated system to maximize personnel safety, collaboration, and overall positive impact for integrated research projects. An effective result is co-production of actionable science outcomes while minimizing impacts to the host units. Facilitating participation, synergies, communication, coordination, and data sharing between participating projects for enhanced science outcomes is also a key IRMT goal.

## Why use an IRMT?

In support of the primary goals described above, the IRMT provides multiple benefits:

- Develops a detailed Incident Action Plan (IAP) which provides clear direction and includes a comprehensive listing of the tactics, resources, and support needed to accomplish the objectives. An IAP provides organizational structure and clear lines of authority to coordinate and enhance project objectives under its purview. Figure 2 references an example IAP for the Ft. Stewart 2024 research campaign.
- Provides incident management/coordination expertise via ICS—which host unit fire managers understand (common operating picture) —for smooth integration with fire operations.

- Defines field campaign roles and responsibilities of Principal Investigators, Discipline Leads, IRMT members, and host unit.
- Provides overarching view for inter-project coordination to prevent inter-project conflict/interference.
- Provides unified support for inter-project GIS and mapping.
- Provides research campaign contextual data. (See Attachment 10)
- Provides continuity of support for multi-year research campaigns.
- Enhances safety, learning, and efficiency on future campaigns through collaborative, documented, and shared After Action Review (AAR) process.
- Allows researchers to focus on research while the IRMT focuses upon logistical and coordination-related tasks.
- Minimizes administrative, planning, logistical, and coordination impacts to host units by establishing protocols and expectations for meetings, communications, and authorities (chain-of-command, span of control).
- Facilitates integration of scientific research into fire operations.
- Provides structured communication opportunities between researchers and managers to facilitate co-production of science.
- Facilitates optimal data collection strategies among researchers.
- Serves as “gate keeper,” providing a screening process for integrating additional value-added/compatible research projects from different funding sources into research burn campaigns.
- Facilitates data sharing, cohesion, and synergies among research projects and with host unit land managers.
- Provides oversight and direct line of authority for the funding entity or entities.
- Maintains multi-project campaign documentation and records for historical purposes.
- Supports invited guests’ tours, which enhance knowledge and exposure of projects.
- Facilitates public outreach products for both researchers and land managers/practitioners.
- Adaptable to any complex research campaign with field-based interactions; not just fire applications.

## Delegation of Authority

A delegation of authority (DoA) is a statement provided to the incident commander (in this case the IRMT Leader) by the agency executive delegating authority and assigning responsibility. The DoA is negotiated between the IRMT Leader and the agency executive and is specific enough that the research project Principal Investigator fully recognizes the authority of the IRMT. This authority comes directly from the entity, or entities funding the participating research projects and covers all phases of the research campaign. If participating projects come from different funding organizations, e.g., Joint Fire Science Program, NASA, EPA, United States Geological Survey (USGS), SERDP, a DoA from each funding entity to the IRMT is necessary.

Research projects without a DoA to the IRMT may not participate in IRMT-managed collaborative research due to risk of incompatibility, e.g., trampling another project’s fuels sampling plot, interfering with burn operations, not following chain-of-command, etc. Principal Investigators who adhere to IRMT

guidance may continue to participate in IRMT-managed collaborative research events and are more likely to receive future funding opportunities.

## Research and Fire Operations Integration

To ensure planning and research objectives are met, the IRMT organization builds effective relationships with the host unit's leadership well ahead of planned burns. As part of this relationship building, the IRMT ensures that the researchers understand that they are guests and that the host unit manages all aspects of the actual burn operations.

As guests of the hosting unit, the IRMT and researchers must understand and mitigate the impacts of their planning, preparation, and implementation on local operations. IRMT members with operational expertise collaborate with the host unit on specific strategies, such as firing patterns, timing, or other modifications to operations to better meet research objectives. In all cases, final decisions pertaining to burn operations belong to the host unit.

Geographic Information System (GIS) support is important for project-long integration and collaboration. The GIS support and maps provided by the IRMT in collaboration with researchers and local units increase safety and enhance research integration into burn operations by showing locations of researchers' instrumentation, staging areas, vehicle parking areas, etc.

As part of standard operating procedures at the local unit a pre-fire briefing is held by the Burn Boss (or designee) to review operations, safety, logistics, and plans for the day. It is important that appropriate IRMT personnel and researchers attend this briefing. The IRMT Leader, or their designee, will typically be asked to speak to provide a brief overview of research activities and objectives. The IRMT also leads a briefing with researchers each morning of the campaign to ensure coordination of activities. To facilitate integration with the on-scene fire operations, the IRMT:

- Assigns fire qualified "Group Leaders" to work directly with Discipline Leads as needed to ensure safety, oversight, and integration/coordination with fire operations while allowing the Discipline Leads to focus on meeting research objectives. Discipline Leads are researchers assigned to lead research in related "Disciplines", e.g., fire behavior, fuels, emissions, micrometeorology, etc. For more information see Attachment 5, Discipline Lead Position Description.
- Minimizes interruptions or delays to the host unit's implementation team.
- Ensures instrumentation is set up and tested as early as possible.
- Maintains 100% accountability for all researchers during the burn.
- Develops and enforces a Traffic/Parking Plan to ensure fire personnel are not blocked or impeded by researchers or their vehicles.
- Encourages all researchers to become at least minimally wildland fire qualified; this includes completion of these NWCG classes: IS-700a, I-100, L180, S130, S190, and annual RT-130. These courses are often offered free of charge at local land management agencies, with some available online.
- Assigns research-specific radio frequencies, approved by the host unit to prevent interference with burn operations.

- Ensures Discipline Leads have access to, and understand how to properly use, a pre-programmed two-way radio.
- Ensures all researchers who are required to be near the fireline to meet their research objectives as described in the Discipline Research Campaign Plan (Attachment 9) wear all required personal protective equipment (PPE).
  - Note: The acquisition of PPE is the responsibility of the researcher, not the host unit or the IRMT. Researchers and Invited Guests without PPE will be restricted to IRMT-designated “Safe Areas”.

## Integration of ICS Principles

To facilitate effective integration with the IRMT and host unit operations staff, all participating researchers are encouraged to complete the 4-hour Introduction to the Incident Command System, ([IS-100 online course](#)). This course provides an overview of how ICS functions, thereby facilitating integration of researchers into the field campaign. ICS provides common language, structure, and standards that all fire managers/practitioners are required to understand and utilize.

The IRMT follows the basic ICS tenets of span of control, ability to expand and contract based on incident complexity, common terminology, position roles, etc. Importantly, the IRMT ensures that all participating researchers understand and adhere to ICS fundamentals, hence the need to complete the IS-100 course, above. The IRMT uses appropriate documentation and standard [ICS forms](#) so that research-related radio frequencies, organizational charts, etc. can be smoothly integrated into host unit burn plans.

Like existing Incident Management Teams that manage wildfires and other incidents, an IRMT consists of a stable core group of dedicated staff, including a designated leader. For multi-project research campaigns, the IRMT provides individuals to fill the key ICS functions of Information, Safety, Plans, Operations, Logistics, and GIS support, with Incident Commander and Liaison functions filled by the IRMT Leader. Land managers, who are typically knowledgeable about ICS, understand these positions/functions and how to interact with them.

## ICS Integration-Research Branch

During research burns, the IRMT is organized as a pre-planned “Research Branch” with [ICS roles](#) filled to ensure safe and efficient operations without undue impact on the prescribed fire operations. There is close coordination between the Research Branch and the local unit Burn Boss who maintains operational control of the prescribed fire. In an organizational chart the IRMT Research Branch falls under the authority of the host agency during prescribed fire operations.

To prepare for the research burn campaign, the IRMT Leader or designee facilitates periodic planning calls, correspondence, online folder sharing, contact lists, etc. well in advance (up to 14 months). Ahead of the campaign the IRMT Leader serves as Liaison between the IRMT and host unit’s Fire Management Officer and/or other leadership. During the campaign the IRMT’s Operations Chief serves as the primary point of contact with the host unit’s Burn Boss.

ICS span of control guidance states that, to ensure efficiency and safety, a leader on an incident has no more than seven direct subordinates. To maintain an appropriate span of control, the IRMT/Research Branch organizational structure can be managed several ways:

- The use of “Discipline Leads”, who are researchers with pre-assigned research focus areas, has proven successful for research burn campaigns. (See Attachment 5, Discipline Lead Position Description.) The IRMT has successfully used Discipline Leads for these focus areas:
  - Fuels
  - Fire Behavior
  - Energy
  - Modelling
  - Fire Effects
  - Smoke/Plume Dynamics
  - Unstaffed Aerial System (UAS)
  - Micrometeorology
  - Data Management
- The organization can be divided into functional units with individual leaders.
- The concept of a “Task Force” comprised of several Disciplines can be utilized.
- Geographically defined divisions may be useful in some situations.

An example IRMT organizational chart (Figure 1), illustrates how the Discipline Leads, can be integrated to ensure manageable span of control. The IRMT assigns fire qualified “Group Leaders” as needed to work directly with Discipline Leads for field-centric disciplines, e.g., Smoke, Fire Behavior, Fuels, etc. The Group Leader ensures accountability, timely radio communications, integration, and safety for researchers in their Group/Discipline, thus allowing the Discipline Lead and researchers to focus on their research. If available, host unit fire personnel can facilitate co-production by serving as Group Leaders. Additional information on roles and responsibilities for the various IRMT positions/functions are included in the “Implementation Considerations” section below.

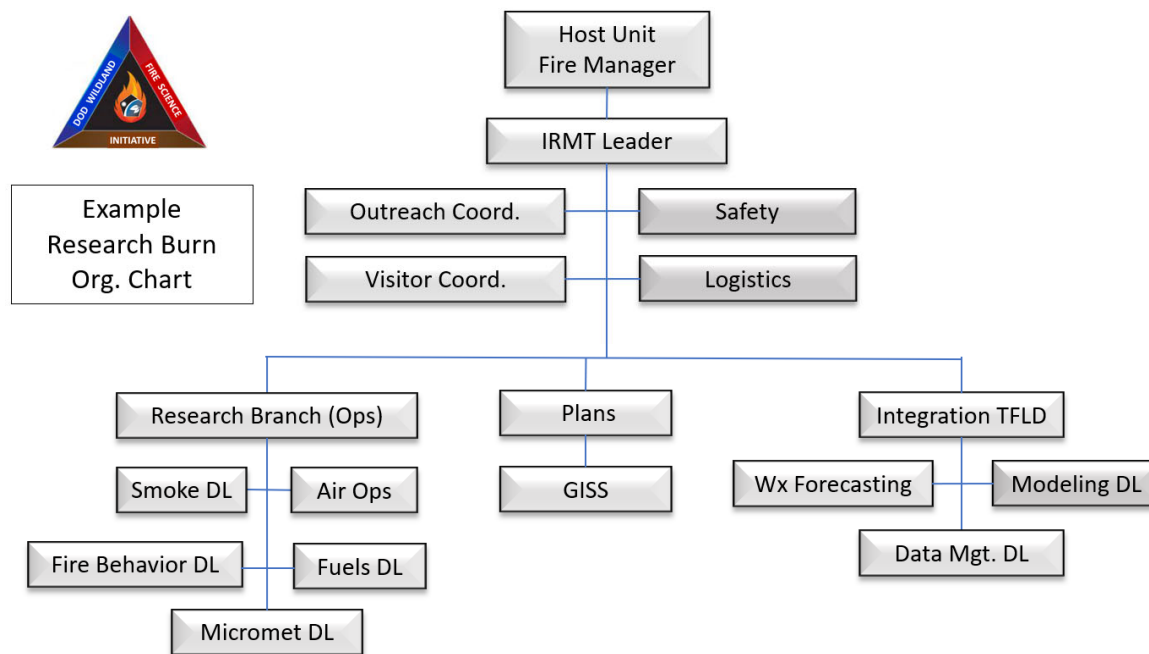


Figure 1—Example IRMT organizational chart for collaborative research burns illustrating key IRMT positions and Research Disciplines. DL = Discipline Lead, TFLD = Task Force Leader, GISS – Geographic Information System Specialist.

## IRMT Implementation: Considerations and Roles

The IRMT must be an active force for coordination, facilitation, and problem solving. Some general considerations, activities, and roles for key IRMT positions are described below:

**IRMT Leader:** Overall responsibility and authority for successful implementation of the IRMT and support of the research campaign(s) falls to the IRMT Leader. Authority over the participating research project is provided to the IRMT by the entities funding the research as discussed in the “Delegation of Authority” section. When on the host unit - particularly during prescribed fire operations - the entire IRMT, including the Lead, falls under the authority of host unit leadership. Providing clear communications and “leader’s intent” to all researchers, IRMT members and host units is key. The IRMT Leader may also have specific reporting requirements to the research-funding entity or entities.

Additional responsibilities are described below:

- **Communications with researchers** – The IRMT Leader or designee (Deputy or Plans Chief) establishes a schedule for video or conference calls, develops agendas, captures minutes from the calls, and provides a forum for communication and collaboration with all affected parties. As an example, the IRMT found monthly calls sufficient for the DoD Wildland Fire Science Initiative (WFSI), with a few breaks during times of lower activity, and more frequent calls in the 5-6 weeks leading up to the collaborative burns. In addition to organizing and leading the

regular group calls, the IRMT Leader provides timely responses to questions, suggestions, etc. from individual researchers. Open communications and IRMT accessibility and engagement are key. In addition to communications led by the IRMT, providing a forum for Discipline Lead “thematic calls” in the weeks leading up to the research burns where they present their discipline’s planned activities, requirements, instrument locations, etc. fosters integration, shared data, and efficiency among researchers has proven useful.

- **Host Unit Point of Contact** – The IRMT Leader, Deputy, or designee, serves as Liaison and primary point of contact (POC) for the host unit, though POC responsibilities for specific roles such as GIS file sharing, public outreach, and logistics coordination are delegated to appropriate IRMT members.
- **Site visit coordination** – Task-appropriate IRMT members as determined by the IRMT Leader make at least one pre-fire site visit during the planning stages to meet the host unit managers and burn implementers to establish relationships and gather key information. Participating Principal Investigators and/or their staff may also need to visit the burn units in the months leading up to the burns to determine best instrument locations, conduct pre-fire monitoring, etc. While responsibility for coordinating can be delegated, the key point is that there should be no surprises to the host unit with researchers or the IRMT just “showing up” and wanting access; nor should there be confusion regarding who the host unit’s research POC is at any given time.
- **Online file structure establishment** – Ensuring that a repository for planning documents, maps, rosters, briefings, etc. that is accessible to all researchers and the IRMT is required for successful interproject collaboration and is an important responsibility for the IRMT Leader. This file structure serves as a *collective inter-project record* for the research campaign(s).
- **Funding** – When planning for complex multi-project live fire research campaigns where IRMT support is desirable, IRMT funding must be factored into overall research costs as part of the initial research proposal(s) by the funding agency/agencies. Whether funded as a standalone project by the lead agency or added to the cost of individual projects as a “service tax” for individually funded projects, secure funding is required for service continuity. As an example, IRMT expenses for recent multi-project campaigns in the Southeastern U.S. averaged less than \$100,000 per campaign. However, the IRMT cost will be much higher for a research campaign that includes significant logistical support such as setting up a remote fire camp requiring a field kitchen, showers, etc. Primary IRMT costs include salary, travel (including appropriate vehicle rentals), sanitation and wash stations at the burn sites, office/other supplies, printing of Incident Action Plans (IAPs) and rental space for Incident Command Posts and briefing areas.
- **Advanced air space coordination**- For research which requires entry into controlled airspace during fire operations and at military installations, including weather balloons, advanced notification to the IRMT is required. Since these clearance and coordination procedures require a review and approval process, it is recommended that users submit these airspace requests to the IRMT Leader or the designated IRMT Air Operations POC at least two months prior to planned deployment.
- **Weather Forecasting/Parameterization** – Daily fire weather spot forecasts from the National Weather Service are provided during IRMT/researcher pre-burn briefings, however, for more specific research-related requirements including atmospheric soundings, advanced fire behavior/smoke model validation-specific forecasting, etc. where IRMT support/coordination is

requested, researchers must contact the IRMT Leader at least two months in advance of the research campaign to allow adequate time for coordination.

**Safety:** Considering the inherent complexity of a research burn campaign, including researchers who may have little to no fire (or field) experience, the IRMT provides an experienced Safety Officer. The Safety Officer works closely with IRMT Logistics, Operations, Plans, and the IRMT Leader prior to and during the operational burns. Prior to the field campaign, the Safety Officer works closely with Logistics and the host unit to develop the Medical Plan and provide input on the numbers and locations of the staging area(s), observation area(s), evacuation locations and routes, etc. During the field campaign, the Safety Officer provides the Safety Message for the IAP, oversight of field operations, and daily safety briefings to the researchers.

**Operations:** As the primary operational contact with the host unit Burn Boss and the field supervisor for all attending research teams the Operations Section Chief (Ops) plays a crucial role during the campaign. Major responsibilities for the Operations Section Chief include:

- **Incident Action Plan Inputs** – Ops provides input to Plans during initial development of the IAP and throughout the campaign to provide resource status updates, any requirements for additional resources, e.g., fire qualified “Facilitators” to assist specific Disciplines, and other IAP updates as required to meet campaign objectives. All planning meetings are attended so that Ops can provide evaluation and updates from daily operations to the IRMT for review. Information is also gained and shared from Ops’ participation in the Burn Boss’s pre-fire briefings including any host unit concerns, planned ignition timing, patterns, and duration.
- **Operations Safety** – Ops coordinates closely with the Safety Officer on tactical decision making and to assure that all safety measures are being followed including but not limited to PPE use, location of researchers during ignition, and timing of ingress/egress into burn units both pre- and post-ignition. Ingress/egress decisions are also closely coordinated with and approved by the host unit Burn Boss or their designee.
- **Research Operations Management** – Prior to the campaign, Ops reviews all submitted Research Campaign Plans (RCPs) and asks clarifying questions as needed to the Discipline Leads and Principal Investigators to gain a thorough understanding of research objectives and specific operational requirements, e.g., timing and requirements for entering the burn unit, etc. When reviewing the RCPs Ops also looks for inter-Discipline synergies and opportunities for shared resources to enhance outcomes. Throughout the pre-planning and operational phases of the campaign Ops ensures coordination and information sharing with all other IRMT functions and with the host Unit Burn Boss(es). Ops attends host unit Burn Boss operational briefings to share information with the prescribed fire crew and gather information for the IRMT Incident Briefing to the researchers including planned ignition times, patterns, and duration. Achieving research objectives while minimizing impacts to host unit operations are key responsibilities. Additional responsibilities include:
  - Aircraft operations. If UAS and/or other research aircraft are present an IRMT Air Ops and/or UAS Specialist will be present to meet span of control and/or complexity requirements.
  - Contingency planning. To facilitate achievement of local operational objectives and research objectives Ops must continually evaluate the current situation and plan for

contingencies, including equipment failure, illness/injury, weather changes, etc. Contingency plans are shared with the IRMT, researchers and host unit Burn Boss as appropriate. In coordination with the host unit and Safety Officer a plan is developed and briefed across the organization to manage an “incident-within-incident”, e.g., serious injury, escaped fire, requiring rigorous communications and coordination with the host unit and, potentially, emergency response resources.

**Logistics:** Providing logistical support, immediately prior to and during the field campaigns is a management responsibility of the IRMT. In most cases, the researchers are self-sufficient with their lodging, meals, drinking water, and PPE. Specific IRMT logistics requirements and considerations are described below:

- **Communications** – Tasks associated with communications include developing a Communications Plan for the Incident Action Plan (IAP), programming and issuing handheld radios and, in some cases, finding ways to enhance cell signal.
  - Communication Plan. A solid Communications Plan, including designated and approved radio frequencies for different incident functions using the [ICS 205](#) (Incident Communications Plan) is included in the IAP. This includes air-to-ground and air-to-air frequencies when aircraft are involved. If working on DoD lands, frequencies must be pre-approved by the installation well in advance.
  - Radios. Prior to the field campaign, IRMT Logistics gains access to a cache of handheld programmable radios sufficient to meet the needs of the campaign. All radios must be programmed prior to the start of the campaign by someone knowledgeable of the various nuances of different models and operational modes. Radios, preferably with battery packs (aka ‘clam shells’) and extra batteries, should be issued (loaned) to those who need them and collected at the end of each individual burn campaign. The logistics section provides training to those unfamiliar with their use. Radio checks are performed with every radio prior to issuance or research campaign use.
  - Cell phones. In some remote areas, lack of cell signal poses a challenge and must be taken into consideration and mitigated. When and where possible, the IRMT (Logistics Branch) may deploy a temporary cellular communications booster or satellite link to enhance mobile communications.
- **Medical** – The IRMT ensures that a Medical Plan (using [ICS 206 Form – Medical Plan](#)) or similar is included in the IAP, with information on local hospitals and burn centers. Information on host unit protocols and, if prescribed fires are in remote area, a map that includes ambulance exchange points is also included. Anyone on the prescribed fires that has medical credentials, e.g., EMT, is pre-identified by the IRMT, identified in the IAP, and issued a radio. When feasible and warranted by the number of personnel present, arrangements are made to station an ambulance at the prescribed fires.
- **Sanitation** – The logistics section chief or designee evaluates the need for restrooms and hand washing wash stations. If there are no rest rooms close to the planned burn area(s), the logistics

section ensures arrangements for portable toilets and wash stations at the staging area(s), and potentially other locations, are made well in advance.

- **Traffic/Vehicle Management** – The IRMT establishes and posts travel routes to the staging area(s) and the burn unit(s) in the IAP, making note of any areas that require 4WD or AWD vehicles. A parking plan is established and enforced for the staging area to keep vehicles out of areas where people will be gathering and working. It is particularly important to ensure that researchers' vehicles do not interfere with prescribed fire operations. To assist with pre-fire planning a questionnaire for Principal Investigators, (see Attachment 2) is used to gather and compile information on, among other things, numbers and types of vehicles, trailers, etc. the research teams will be bringing to the field campaign. IRMT will provide an adequate number of appropriate vehicles to support themselves.
- **Facilities** - When possible, collaborative research burns are planned where overnight lodging is available in hotels for researchers and the IRMT. The IRMT makes suggestions for lodging and works to get reduced rates for the group. All attendees are expected to procure their own lodging. The IRMT will arrange access to briefing areas and office space for an Incident Command Post, preferably with copy machine availability. A quiet indoor briefing area, large enough to hold the entire IRMT, Discipline Leads, and host unit representatives, and with internet presentation equipment is ideal. In the field, providing a canopy for shade and an IRMT presence at the staging area and/or observation area is important.

**Planning:** Plans supports the research campaign through tracking resources and people, facilitating the production of an Incident Action Plan to ensure the success of the overall campaign and leading the IRMT's morning and evening briefings. Additional information on Planning Section activities is provided below:

- **Incident Action Plan** - The IRMT Plans Section, including GIS support, is responsible for developing/compiling and publishing the Research Incident Action Plan (IAP) for the research campaign. IAP development and updates require direct engagement with all other IRMT functions. The IAP includes many of the standard ICS forms including [ICS 201 \(Incident Briefing\)](#), [ICS 203 \(Organization Assignment List\)](#), and [ICS 204 \(Assignment List\)](#). Developing a comprehensive map of all instrumentation types and locations is an important function. For reference, the 2024 Fort Stewart IAP is available via the QR Code below (Figure 2).



Figure 2—QR Code for 2024 Fort Stewart IAP and Maps (updated May 2024).

- **Research Campaign Plan** - Each Discipline Lead completes a Research Campaign Plan (RCP, Attachment 8), preferably a month or more prior to the campaign and provides it to the IRMT to aid in development of the IAP. The RCP provides an organization chart, discipline objectives, tasks, operations requests, safety concerns, staffing list with qualifications, and resources they'll need to meet the Discipline's research objectives. It supports inter-project and inter-discipline collaboration and resource sharing to streamline field work, data collection, and integration. Each Discipline's RCP includes estimates for day-of-burn instrument set up time and location(s), which are used by the IRMT to coordinate briefing times and interactions with host unit managers. The information provided by each Discipline is incorporated by the Plans section into the IAP as separate Division Assignment pages (ICS 204s).
- **Check in/Check out** - Plans runs a check-in and check-out process to track all campaign participants. Participants check in upon arrival in the area, then out again, as they leave the project area at the end of the campaign.
- **Resource Tracking** – In addition to checking in and out of the campaign (as described above), Plans, in coordination with Ops, tracks daily location/status of researchers to ensure accountability and safety whenever researchers are in the field during the campaign.
- **Mapping/Field Data Locations** – a Geographic Information System Specialist (GISS) collects GIS data from the host unit, Discipline Leads, IRMT members and Principal Investigators, generates maps and posts the data and maps for access by all participants. On-site mapping ensures both operational and data collection protocols are observed and are consistent, supporting burn operations, GIS data integration, and research quality.
- **Contextual Data** – Providing contextual data (See Attachment 10) for all researchers is an important responsibility of the Planning Section.
- **Internal IRMT Communications** – Plans facilitates internal IRMT communications and record keeping including but not limited to roster updates/maintenance, compiling/sharing meeting notes and, in collaboration with the IRMT Leader, facilitating internal IRMT meetings including After Action Reviews (AARs). Where cell signal is reliable Plans establishes a group chat specifically for internal IRMT communications.

**Outreach:** This position serves to facilitate coordination with the host unit to provide information for media and cooperators. The Outreach Coordinator enables and supports communication about and within the campaign including, but not limited to, real-time reporting, interviews, and integration with the host unit’s Public Information Officer (PIO). For fire-related research managed by the IRMT, the [Fire Science Exchanges/Consortia](#) (Joint Fire Science Program 2024) (Figure 3) provide an excellent outreach resource and, if contacted well in advance of the research campaign, may be able to integrate their Outreach Specialist into the IRMT for pre-, during and post-fire outreach coordination with the host unit. If present during the entire campaign, they can capture an overview of campaign events which serves as an historic record. If Fire Science



Figure 3—Fire Science Exchanges.

Exchange personnel cannot attend the burn campaign, and particularly if there’s significant media interest, the local PIO could be included in the IRMT for at least the duration of the research burn campaign and the days leading up to it. In cooperation with host unit PIO(s) or designated staff, specific responsibilities of the Outreach Coordinator include:

- Development of press releases, coordination of film and media productions and social media posts to disseminate information to the public and various stakeholders.
- Providing accountability and oversight for all outreach personnel in the field.
- Serving as primary outreach point-of-contact for the IRMT and host unit.
- Ensuring that all outreach activities are conducted safely.
- Ensuring that outreach activities do not interfere with the operations and objectives of other groups including researchers, fire personnel, and the host unit.
- Serving similar functions to those of the Visitor Coordinator when visitors include members of the press or other external media sources.
- Ensuring a cohesive and strategic outreach message for the research campaign and related activities of participating research organizations and projects.

**Visitor Coordinator:** This position is responsible for the facilitation of visitors and guests to the campaign. The primary objective of this role is to ensure these individuals are safely positioned to optimize opportunities to observe fire operations and encounter scientists conducting research on the project. The Visitor Coordinator is responsible for organizing travel to the field site, working with Safety, Logistics, and Operations to establish an observation site which will maximize viewing for fire operations and opportunities for conversations with research teams. Depending on the complexity of visitor management (e.g. numbers of visitors, planned activities, political importance, time commitment

required, and other factors), visitor coordination may be managed by the IRMT's Outreach function, the host unit Public Information Office, or the IRMT Lead.

## Researcher Guidance and Responsibilities

For the IRMT and the overall research campaign to be coordinated and successful, researchers must actively collaborate and engage with the IRMT and the other participating projects. Fully understanding and accepting the role and authority of the IRMT is fundamental. Active engagement of researchers includes participation in scheduled calls and timely responses to information requests from the IRMT. Attachments to this Guide provide necessary information to all in the research campaign and host unit. Attachment 2 provides an example of a pre-fire coordination questionnaire sent to PIs. PIs and Discipline Leads provide candid feedback to the IRMT whenever there are opportunities for improvement in IRMT services. This includes completing a post-campaign IRMT evaluation (Attachment 4). The 'Principal Investigator Prescribed Fire SOP' (Attachment 6) provides specific PI responsibilities to ensure safe, cohesive field operations for all research projects.

In the months leading up to the research burn campaign, Discipline Leads are responsible for developing an interproject "Discipline Research Campaign Plan" (RCP) that combines requirements, objectives, and coordination for the different projects in their discipline. Discipline Leads provide an overview of this plan during regularly scheduled calls following the general guidance provided in Attachment 7, "Briefing Checklist for Discipline Leads". Attachment 8 provides a template for the RCP.

## IRMT Implementation Phases

**Phase 1: Pre-fire Planning and Coordination:** For each burn campaign, Phase 1 activities begin by identifying all pre-fire, in-fire, and post-fire measurement objectives. The core members of the IRMT then build a command structure in keeping with the principles of ICS, focusing on a logical grouping of objectives/resources while keeping a reasonable span-of-control. The IRMT focuses on supporting the in-fire objectives and researchers while facilitating collaboration between research projects. The core team, in collaboration with the researchers, will identify appropriate "Discipline Leads". The Discipline Leads then produce the Research Campaign Plan (RCP) for their Discipline well ahead of the field campaign. Contextual data (See Attachment 10) is gathered by the IRMT and shared with researchers as it becomes available.

The RCP serves as a resource for projects participating within each Discipline, and for the IRMT, for pre-campaign planning and during-campaign operations. It includes specific research objectives, measurement intent, critical logistics, instrument placement requirements, timelines, and any other details required for successful outcomes. The IRMT will cross-reference these plans among Disciplines and adapt the command structure, safety, logistics, and operations as needed.

The IRMT will work with both researchers and host unit to determine feasibility and negotiate adjustments as necessary to ensure research and fire operations compatibility and coordination. Specific ignition objectives are pre-identified by the researchers and vetted with the host unit's fire management team.

If not pre-determined by participating research projects, the IRMT will facilitate site selection for the collaborative research burns. Figure 4 illustrates an example matrix of rankings (see

footnote to figure 4) used for assessing compatibility of different sites for collaborative research burns. Other factors that may be important, depending on specific research objectives could include fuel loadings, topography, and burn objectives, e.g., stand replacing crown fire vs. lower intensity surface fire, etc.

		DoD Wildland Fire Science Initiative Burn Site Alternatives						
		Wt.	Eglin AFB	Ft. Stewart	Osceola NF	Tall Timbers	Sycan Marsh	JB Lewis McCord
Criteria	*Successful research burn history	25%	5	1	5	5	5	4
	Enthusiastic host unit support	15%	3	5	5	5	5	4
	Ease of site access for personnel	15%	1	2	5	5	3	2
	**Ease of burning/complexity	15%	2	3	5	5	4	4
	# of projects listing site in proposal	10%	5	4	4	5	1	3
	Ease of access for UAS	10%	1	2	4	5	5	1
	Ease of access for other aircraft	10%	1	2	5	5	5	1
	Total	100%	18	19	33	35	28	19
Weighted Total			2.85	2.55	4.8	5	4.15	3
*Includes historic data useful for current suite of projects								
**Includes duration of burning (single vs. multiple days), military mission conflicts, narrow prescription windows, lack of logistical amenities (e.g. sanitation, lodging), etc.								
Note: Scoring scale is 1-5 with 5 being "best".								

Figure 4—Example Site Selection Matrix.

Timewise, the pre-planning phase is by far the most demanding for IRMT personnel, particularly the IRMT Leader, Planning, and Logistics positions. Pre-fire site visits are required for these personnel to contact local managers, describe the function of the IRMT, determine suitability of suggested sites, and determine coordination and logistical requirements. Pre-event site visits are especially critical when working on military installations when research aircraft operations including UAS are being planned, as many installations have time-intensive vetting/approval processes. The USDA Forest Service and USDI provide agency-specific fire-aviation policies and procedures that provide general guidance. Military mission planning protocols and points of contact (POCs) for military installations must be identified and documented. Additional pre-planning tasks include acquiring and verifying approved radio frequencies for communication between researchers, managers, practitioners, aircraft, and remote sensors, and gaining researcher access to the planned burn units. Logistics including access and transportation to/from the research areas, medical contingencies, pre-shipping/storage of scientific equipment on site, sanitation, parking plans, etc. must all be finalized prior to the arrival of the researchers on site.

The key goal of Phase 1 is to gather critical information for development of the individual Research Campaign Plans and Incident Action Plan for the campaign. An ancillary goal is to enhance collaboration and build trust between the IRMT, researchers, and the host unit. The general campaign planning information flow is illustrated in Figure 5. This graphic represents

primary communication channels and methods but does not preclude direct communications to the IRMT by Principal Investigators, Discipline Leads and others as needed.

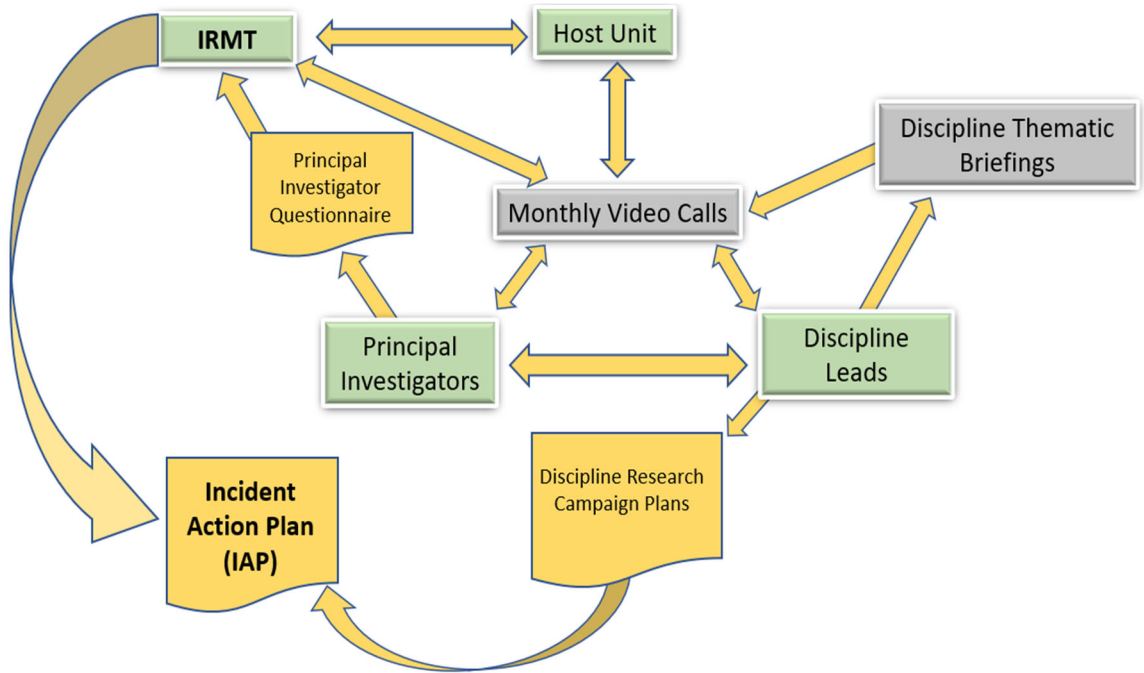


Figure 5—IRMT Campaign Planning Information Flow.

For successful completion of Phase 1, critical members of the IRMT must work with host unit fire personnel to develop a burn plan that balances research objectives with resource management objectives and the host fire team’s operational requirements.

**Phase 2: Implementation of Research Fires:** This phase begins when the IRMT and researchers arrive on site (two days prior to the first planned prescribed fire is recommended) for check-in and equipment/instrumentation setup.

The IRMT establishes a Research Command Post, signage, briefing area(s), staging areas, etc., and ensures all required logistical support is in place for the group. The implementation phase includes the entire time that the researchers and IRMT are on site including the actual implementation days as well as post-burn equipment removal. The IRMT Planning Section finalizes an Incident Action Plan (IAP) specifically for the Research Branch (does not include the host unit’s Prescribed Fire Plan) that covers the duration of the implementation phase.

The IAP is available to all participants via printed copies and/or electronically. Hard copies are recommended for at least the IRMT, Discipline Leads, Group Leaders, and the host unit. For additional IAP information, see “Planning” on page 15. During implementation, the IRMT Leads daily pre-fire briefings and After-Action Reviews (AARs) for all the researchers and interested managers/practitioners. AARs are completed and documented for each research fire managed by the IRMT following the [Interagency Standards for Fire and Aviation Operations \(National Interagency Fire Center 2024\)](#). AAR results are shared with host unit managers, practitioners, and participating researchers as feedback in the ongoing adaptive management cycle.

During project implementation, the IRMT maintains researcher accountability and safety by tracking their locations through communication with the Group Leaders and Discipline Leads, using chain of command communication techniques. In coordination with the host unit, the IRMT establishes safe observation areas and determines when access into the burn unit is prohibited and allowed.

Time management among Discipline Leads, Group Leaders, Research Operations, and the ignition team is critically important to ensure all researchers have time to complete instrument setup and get to a designated safe area prior to planned ignition time.

Contextual data, e.g., daily fire weather forecast, RAWS data, etc. (See Attachment 10) is provided to researchers as it becomes available.

**Phase 3: Synthesis, Performance Evaluation and Feedback:** Phase 3 begins after everyone is demobilized from the campaign and returns to their respective home base. The goals of the IRMT during this phase are to, 1) facilitate synergy and free flow of information between the participating projects, and 2) gather performance evaluation information from the researchers and host units as part of an iterative performance improvement process. As illustrated in Figure 6 below, overall IRMT project design, management, and support for research projects and host units should follow an “adaptive management” approach where gathering, integration, and dissemination of lessons learned is paramount among researchers, IRMT members and host units.

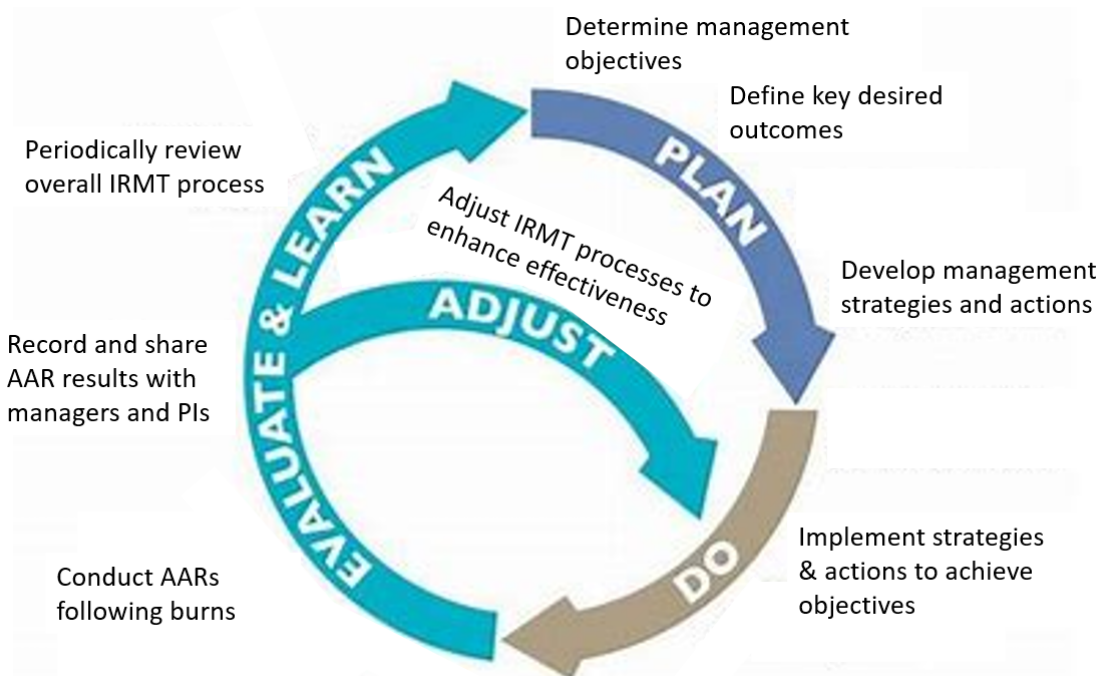


Figure 6—Adaptive management cycle illustrating ongoing IRMT processes designed for gathering, implementation and dissemination of lessons learned.

IRMT performance evaluations completed by the host unit and researchers can take many forms. The format used by the current IRMT consists of online Likert surveys. This format allows anonymity, which encourages candor, and provides the additional advantage of automatically generating summary reports for each individual campaign, used to track performance improvement over time. Attachments 3 and 4 provide examples of the evaluation forms for host unit and researchers respectively.

## Summary

While not necessary for all research campaigns, an Integrated Research Management Team adds significant value when multiple research projects are co-located with potentially overlapping/synergistic/conflicting objectives, particularly when research occurs in remote areas involving potentially dangerous operations. Based on proven ICS principles, and modified to meet scientific objectives, the IRMT significantly improves safety and inter-project synergy, while minimizing coordination workload on researchers and host units. Beyond live-fire research, an IRMT has also proven useful in supporting Eastern Innovation Landscape Network (USDOD 2024b) workshops and other activities.

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# Attachments

## Attachment 1. Acronym List

AAR – After Action Review  
AFB – Air Force Base  
ATV – All Terrain Vehicle  
AWD – All Wheel Drive  
COTS – Commercial Off the Shelf  
DL – Discipline Lead  
DoA – Delegation of Authority  
DoD – Department of Defense  
EPA – Environmental Protection Agency  
ESTCP – Environmental Security Technology Certification Program  
FAA – Federal Aviation Administration  
FASMEE – Fire and Smoke Model Evaluation Experiment  
FOUO – For Official Use Only  
GA - Georgia  
GIS – Geographic Information System  
GISS – Geographic Information System Specialist  
GL – Group Leader  
GPS – Global Positioning System  
IAP – Incident Action Plan  
ICAMS – Interagency Council for Advancing Meteorological Services  
ICS – Incident Command System  
IRMT - Integrated Research Management Team  
JFSP – Joint Fire Science Program  
NASA – National Aeronautical and Space Administration  
NF – National Forest  
NGO – Non-Governmental Organization  
NWCG – National Wildland Fire Coordinating Group  
NWS – National Weather Service  
PCAST - President’s Council of Advisors for Science and Technology  
PI – Principal Investigator  
POC – Point of Contact  
PPE – Personal Protective Equipment  
RCP – Research Campaign Plan  
RxCADRE – Prescribed Fire Combustion Atmospheric Dynamic Research Experiment  
SERDP – Strategic Environmental Research Development Program  
SOP – Standard Operating Procedure  
SUV – Sport Utility Vehicle  
TFLD – Task Force Leader  
UAS – Unstaffed Aerial System

USDA – U.S. Department of Agriculture  
USDI – U.S. Department of Interior  
USGS – U.S. Geological Survey  
UTV – Utility Task Vehicle  
UXO – Unexploded Ordnance  
WFSI – DoD Wildland Fire Science Initiative  
WFMCC – Wildfire Management and Mitigation Commission

## Attachment 2. Principal Investigator Questionnaire

### DoD/SERDP Wildland Fire Science Initiative

1. SERDP Project Number, if applicable:
2. POC name, phone, and email address:
3. Lead organization name:
4. Do you plan to attend the   (location)   research burn campaign planned for   (date)  ?
5. Provide description of location requirements for equipment, e.g., inside burn unit, outside burn unit, upwind, downwind, around perimeter, etc. (UAS and other aircraft denote airspace requirements here):
6. GPS/GIS proposed locations of equipment on the burn or around perimeter (If multiple locations attach map). Use Latitude/Longitude format:
7. How long is set up time required for plots, equipment, or data collection prior to burn day?
8. How many people will you have during the setup? During the burn?
9. Will you be staying for the duration from setup through the burn?
10. Does your instrumentation pose a safety risk to people in the vicinity? If so, what are the safety risks, e.g., laser, tower with guy wires (trip hazard), etc.? If so, what safe distance is required for people to move past the equipment? How should it be identified?
11. Is equipment stationary or mobile during collections?
12. Is the research device self-sufficient on the day of burn? (i.e., can it collect data without you being present?)
13. Height of equipment when fully operational (if greater than 8')?
14. What is/are your project's *required* location(s) on burn days to meet your research objectives? For example, will you be collecting data or turning on equipment inside the unit immediately prior to burning, do you need to be with your equipment during burn, etc.?
15. How many vehicles and what type vehicles will you have? 4WD?
16. How many trailers will you bring?
17. Are you bringing ATV's/UTV's and how many of each? (Certain restrictions may apply and will change depending on locations; you may not be able to use them at certain locations.)
18. Do you have a VHF radio? If so, are you able to field program it?

Attachment 3. IRMT Evaluation by Host Unit

1. Fire Managers' assessment of Integrated Research Management Team (IRMT) performance/value:

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
The IRMT supported operational risk management during prescribed fire operations, enhancing safety of participants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IRMT involvement enhanced pre-burn planning & coordination as compared to working with all involved PIs independently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The IRMT followed up with an effective AAR following the prescribed fire event to capture lessons learned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IRMT involvement facilitated my understanding of overall research objectives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Please share any additional comments, suggestions, observations, etc. that may be useful for improving IRMT value and performance for host unit fire managers:

Enter your answer

Attachment 4. IRMT Evaluation by Principal Investigators

1. This questionnaire is designed to evaluate the effectiveness of the IRMT in support of wildland fire research on the Tall Timbers Hanna Hammock Research Burn and provide feedback for improvement. Select your response for each of the statements provided. \*

	Strongly disagree	Disagree	Neutral or don't know	Agree	Strongly agree
The IRMT increased researcher safety on the prescribed fire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IRMT pre-burn planning & logistics coordination allowed me to spend less time on logistics and coordination with host units and more time on my research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The IRMT improved pre-burn planning/coordination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IRMT involvement facilitates better interproject data sharing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An effective AAR was supported by the IRMT following the prescribed fire event to capture lessons learned and facilitate future performance improvement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The IRMT enhanced co-production with local managers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IRMT onsite coordination assisted my project in meeting research objectives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The onsite pre-burn briefing by the IRMT was easy to understand and effective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Provide additional feedback on IRMT performance and/or suggestions for improvement below. \*

Enter your answer

## Position Description

**Position Title:** Discipline Lead

### Prerequisites

- Principal Investigator (PI), Co-PI or listed Collaborator on current funded project
- Planned participation in collaborative multi-project research burns
- Willingness to voluntarily fulfill duties of the position
- Recognizes the authority of the Integrated Research Management Team (IRMT) for pre-planning and implementation of the research burn campaign(s)
- In depth knowledge of discipline
- Working knowledge of the Incident Command System including completion of ICS 100, <https://training.fema.gov/is/courseoverview.aspx?code=IS-100.c>

### Major Duties

- Establishes and maintains cooperative relationships with individuals in other research projects within the assigned discipline that are involved in collaborative research burns managed by the Integrated Research Management Team (IRMT).
- Solicits information from researchers within assigned discipline to determine requirements for meeting live-fire research objectives.
  - Uses this information to develop realistic time requirements, priorities, and sequence of events timeline for day of burn.
  - Develops contingency plans considering potential.
    - equipment malfunction,
    - changes in weather, ignition plan, pattern and/or timing, and
    - other factors specific to the discipline.
  - Shares this information with the IRMT and other participating projects during regularly scheduled calls and as otherwise appropriate. (See Briefing Checklist)
- Establishes intradisciplinary organization to include equipment, instrumentation, and personnel roster; shares this information with IRMT in a “Discipline Research Campaign Plan” using the IRMT-provided template as far in advance as practicable.
- Provides leadership and consultation to ensure strategic research objectives within assigned discipline are met.
- Serves as Subject Matter Expert for assigned discipline.
- Coordinates and reviews work plans for assigned projects to minimize potential conflicts between projects prior to and during research burn implementation.
- Provides single point of contact to the IRMT for matters pertaining to assigned discipline including:

- Pre-fire planning - Conducts preplanning briefings within established discipline to define discipline objectives, metrics for success, special needs, limitations, and go/no criteria to meet scientific mission objectives to present to IRMT.
- Communicates during research burns through established chain of command.
- Conducts After Action Reviews (AARs) within the discipline to identify mission success and lessons learned; shares AAR results with IRMT.
- Notification of any problems, real or potential, that occur within the discipline.

**Purpose/Scope**

The purpose of the position is to facilitate successful completion of research objectives for individual participating projects within the assigned discipline as well as the overarching scientific objectives of the collaborative research burn campaign. Coordination with participating research projects is required. The Discipline Lead facilitates successful completion of scientific objectives within their assigned discipline through collaboration with their peers and timely communication and coordination with the IRMT during all three phases of live-fire research, 1) Pre-planning and Coordination, 2) Implementation, and 3) Post-fire Synthesis. The IRMT provides organizational structure and communication tools, e.g., scheduled meetings, online shared file structure, Incident Action Plans, liaison with host units, AARs, etc. to support the Discipline Lead and facilitate all three phases of live-fire research. As required for safety and coordination with the IRMT during the campaign the IRMT will provide an NWCG-qualified “Group Leader” or host unit “Facilitator” to manage radio traffic, provide general support, and work directly with the IRMT chain of command to allow the Discipline Lead to focus on meeting research objectives.

Recognized “Disciplines” that may require a Discipline Lead include:

- Fire Effects
- Micrometeorology
- Fuels
- Fire Behavior (e.g., in situ heat flux, spread rates/patterns)
- Smoke/Emissions
- UAS
- Modeling
- Data Management

**Data Standards.** Example below is from a DoD Wildland Fire Science Initiative research campaign in the Eastern Time Zone.

Datum: UTM ZONE 17N, Projection NAD83  
 NAVD 88 Vertical Lidar  
 All data in ZULU Time  
WFSI Data Portal:  
<https://wfsi-data.org>

## Research Fire Campaign Principal Investigator SOP

**Introduction.** These Standard Operating Procedures (SOP) apply to all research burn operations supported by the Integrated Research Management Team (IRMT). The IRMT has a delegation of authority over the PIs related to planned research burn campaigns. The purpose of the SOP is to support the overall objectives related to planning and implementation of research burns. Objectives include ensuring personnel safety while meeting objectives for the individual participating projects and minimizing the burden on host units. Compliance is mandatory.

**Phase 1: Pre-Fire Planning and Coordination.** This phase is the most time-consuming and the most critical for mission success. Key requirements for the PI include:

- Participation in scheduled planning calls. If PI cannot attend, ensure that an alternate is present.
- Communication with host units. The IRMT Leader serves as the Liaison and primary POC for the host units. Unless directed otherwise, any project communications required with the host unit must be coordinated through the IRMT Leader or their designee.
- Pre-fire Information sharing.
  - Objectives. Clearly identify and share with the IRMT all pre-fire, in-fire, and post-fire measurement objectives for upcoming research burn campaign.
  - Personnel. Provide a list of personnel attending the planned burn to the IRMT. Avoid last minute changes if possible.
    - Note that on military installations there's a time-consuming vetting process for any foreign nationals that may be on your team. If a foreign national is required on site, let the IRMT know as early as possible.
    - Uninvited/unapproved personnel do not participate.
  - Collaboration. Seek opportunities for efficiencies and enhanced outcomes through collaboration with other projects. Communicate identified opportunities to the IRMT for integration into pre-fire planning.
- PPE. If presence on the fireline is *required* by research personnel for meeting research objectives, e.g., maintaining line of sight with UAS, maintaining connectivity with instrumentation, ensure that all required PPE is available for these personnel well ahead of the burn including:

- Leather lace up  $\geq 8$ " top (or other approved) fire boots
- Hard hat with chinstrap
- Goggles/safety glasses
- Ear plugs/hearing protection (must be available; required if working near loud equipment)
- National Fire Protection Association (NFPA) 1977 compliant long-sleeved flame-resistant shirt (yellow recommended)
- NFPA 1977 compliant flame-resistant trousers
- Leather or leather/flame resistant combination gloves. Flame resistant flight gloves or NFPA 1977 compliant Driving Gloves are also acceptable.
- Note: The IRMT is not requiring fire shelters for non-fire-qualified individuals due to their high cost, training requirements and the fact that fire-qualified escorts are provided to ensure personnel safety. **All fire (NWCG) qualified personnel are required to have fire shelters with them whenever on the fireline.**
- Radios. At least one hand-held narrow band programmable VHF radio per research team is required. For federal agency personnel these can often be checked out from a fire cache ahead of time. If you cannot procure at least one for your team, let the IRMT know as far in advance as possible. Unapproved "walkie talkie" frequencies may not be approved for use on military installations. Plan accordingly.
- UAS. UAS flights cannot occur during aerial ignition with a helicopter and may not be approved at some DoD installations. Plan accordingly. If planning UAS operations, seek opportunities to share a platform with other projects to minimize the number of UAS required. Let the UAS Coordinator provided by the IRMT know your plans and requirements and utilize them to explore inter-project UAS collaboration opportunities.
- Contingency Planning. In many cases, the IRMT does not have control of the operational burn implementation including exact timing of ignition, firing pattern, etc. The IRMT and researchers are "guests" and do not have authority over the Burn Boss during operational burns. Burn programs and their Burn Bosses are often under intense pressure to produce maximum acres when burn windows are available. Bearing this in mind, the IRMT and projects must incorporate contingency planning, considering such things as illness of key personnel, broken equipment, inability to fly UAS due to military restrictions, ignition strategies (locations, patterns, timing) that change during a planned burn, etc. Develop "Plans A, B and C" for numbers of personnel, sensor placement/numbers, sharing resources with other projects, etc. to ensure success in meeting research objectives in the context of the often-fluid environment of an operational prescribed fire.
- Data Standards. Example below is from a DoD Wildland Fire Science Initiative research campaign in the Eastern Time Zone.

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 All data in ZULU Time

WFSI Data Portal:  
<https://wfsi-data.org>

**Phase 2: Implementation of Research Fire(s).** This phase begins when the IRMT and researchers arrive on site, generally two days prior to the planned fire, to set up equipment and all required logistical support for the group. It includes the entire time that the researchers and IRMT are on site including the actual implementation days and equipment removal. Key requirements of the PI include:

- Accountability for project staff.
  - For large research fire campaigns with multiple projects participating, a formal “Incident Check-in” process is required upon arrival for all personnel to ensure 100% accountability throughout the campaign from pre-fire instrument setup to post-fire instrument retrieval. The PI ensures that all project personnel check-in and remain accountable throughout the incident.
    - Specific check-in process for each burn is provided in advance by the IRMT.
  - PI maintains temporal and spatial control of their project staff in coordination with the Incident Action Plan (IAP), the IRMT, and applicable Discipline Lead(s).
  - Prior to demobilization back to their home unit, PI lets the IRMT know the estimated departure time for any/all personnel.
- Safety. Though the IRMT provides a Safety Officer for the campaign as well as fire-qualified personnel for researchers required to be on the fireline, the PI assists with incident safety by ensuring that project staff adhere to all provided safety guidelines and exercise good common sense including:
  - Use of appropriate PPE as described above.
    - Non-compliant PPE = no fireline access; IRMT will confirm compliance
  - Remaining hydrated (dehydration on burns is a very common problem)
  - Reporting any accidents/incidents to the Safety Officer and/or medical staff as appropriate
  - Reporting any observed hazards to the Safety Officer
- Self-Sufficiency during the fire. Research project staff provide their own food, water, sunscreen, insect repellent, etc. for the fires. Once on scene, personnel stay until the burn is complete unless there is an emergency. Come prepared. IRMT provides sanitation and hand wash stations.
- Pre-fire briefings. PI and/or designated staff attend the pre-fire briefings. Depending on the size of the campaign, all project staff may not be able to attend. Follow IRMT guidance. Provide key briefing information to project staff if they are unable to attend due to space/crowd size limitations. PPE is worn to day-of-burn pre-fire briefings for those required to be on or within the perimeter of the operational fireline.
- Transportation. Shuttles may be provided by the IRMT to minimize the number of vehicles at/near the fire scene. The IRMT suggests project teams bring the minimum number of vehicles required to safely transport personnel and meet research objectives. Follow guidance provided by the IRMT and IAP regarding travel to the burn site, parking, etc. 4WD recommended.
- Radios. Upon check-in have your VHF portable radio cloned with approved frequencies for the

campaign. IRMT loaners may be available if advance notice is given. Return IRMT loaner radios to the IRMT prior to demobilization.

- On military installations radio frequencies must be pre-approved, precluding the use of unauthorized “walkie talkies” for internal project communications.
- UAS. The IRMT provides a UAS Coordinator with responsibility and authority to manage all UAS operations during the campaign. UAS are not flown when aerial ignition with a helicopter is being conducted. UAS are on the ground prior to helicopter’s arrival and cannot fly until the helicopter has left the airspace. When possible, share a UAS platform with other projects to minimize the number of UAS flying at any given time. A pre-designated UAS talk-around channel is briefed and included in the IAP.
- AARs. At the end of each day of the campaign, including set-up and instrument retrieval days, the PI and/or key project staff involved in the day’s activity attend the After-Action Review. The purpose of the AAR is to identify and address any problems as well as to identify lessons learned and what worked well during the day’s activities. Time and location of the AAR is announced by the IRMT.

**Phase 3: Synthesis Performance Evaluation and Feedback.** While feedback and adjustments to operations are made “real time” via the communications and AARs described above, Phase 3, in which PIs play a key role, supports longer term support of IRMT performance evaluation and improvement, particularly as related to the IRMT’s ability to support individual project outcomes and the overarching objectives of the research campaign. Phase 3 includes completion of an online Likert Survey and questionnaire that provides the opportunity to anonymously comment on the overall research burn experience and IRMT performance. This phase also includes the synthesis and sharing of data, to the extent practicable, by the PIs between research projects. The overarching goals of Phase 3 are to: 1) facilitate free flow of information, synergy, and efficiency between the participating projects, and 2) provide feedback to improve the utility and practices of the IRMT in support of the efficient generation of wildland fire science. PI participation is critical.

### **Briefing Checklist for Discipline Lead IRMT Calls**

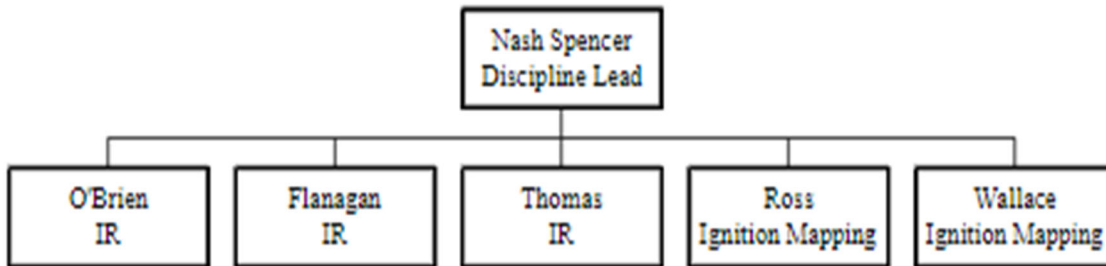
Update on current \_\_\_\_\_ (Location) \_\_\_\_\_ Discipline Research Campaign Plan:

- ✓ Milestones that must be met to achieve planned goals before the event.
- ✓ Phases of project for which team will need access to burn units.
- ✓ Data collection before the event:
  - Number of people and days to accomplish.
- ✓ Data collection during the event
  - Number of people and days to accomplish.
  - Will team members be in multiple locations during the fire?
- ✓ Data collection after the event:
  - Number of people and days to accomplish.
- ✓ Personnel required for mission success.
- ✓ Maximum vs. minimum.
- ✓ Proposed location of instrumentation/Instrument location requirements.
- ✓ Co-located with another discipline?
- ✓ GPS coordinates or approximation based on cardinal direction of wind, fuel type, ease of access.
- ✓ Other discipline data necessary for your project success? (dependent on fuels, fire behavior, LiDAR, etc.)
- ✓ Names of fireline qualified personnel on your team along with current “red-card” qualifications.
- ✓ Does team have full PPE for each member required outside of staging/viewing area during fire?
- ✓ Specialized equipment that will be on site.

## (Discipline Name) Research Campaign Plan (Location, Month, Year)

**Note to Author:** *This Discipline Research Campaign Plan (RCP) serves as a resource for projects participating within their Discipline, as well as for the Integrated Research Management Team (IRMT) and other Disciplines, for pre-campaign planning and during-campaign operations. It includes specific research objectives, measurement intent, logistics information/requirements, instrument placement requirements, timelines, and any other details required for successful outcomes. The IRMT will cross-reference these plans among Disciplines and adapt the command structure, safety, logistics, and operations as needed. The RCPs are referenced as attachments to the overarching Incident Action Plan (IAP) developed by the IRMT. This template provides the minimum requirements but is by no means exhaustive. The RCP serves as an inter-project collaboration tool and provides an historical account of activities, participants, etc. that can serve as a guidepost for future research campaigns. It must be completed as far in advance of the research campaign as possible to maximize opportunities for interproject collaboration.*

(Include organizational chart as shown in example below. Each person may only show up in one role, on a single Research Campaign Plan)



**OBJECTIVE:** *Clearly state the overall discipline objective, e.g.: Capture spatially explicit scorch and top-kill measurements to develop QUIC-Fire predictions of fire effects.*

**TASKS:**

*Identify all tasks, who is responsible, and include links to an appendix with complete information on sampling design, data structure, equipment used, etc. Break tasks into Pre, During, and Post Fire groups. Those labelled 'during fire' are used to create work assignments in the IAP. The example in this template is for fire effects.*

**Scorch:** *Pre- and post-fire sampling of NDVI using TetraCam, Derek Wallace leads, see Appendix A for detail.*

**Top-kill:** *pre-and post-fire inventory of stem top kill. Ream Thomas leads. See Appendix B for details.*

**STAFFING**

*List all personnel expected to be on site during burn, their qualifications, & who is available to help with operations, any special needs, or concerns, etc. This information is used to develop the Incident Action*

Plan for each Discipline’s page. If someone is medically qualified, e.g., EMT or Paramedic list this in the right column.

Name	Cell Phone Number	Email	Fire Quals/Knowledge

**OPERATIONS REQUESTS**

List any critical needs from fire operations like a specific firing pattern, avoiding walking through certain areas, trampling, etc.

**SAFETY**

Highlight any potential concerns or safety issues like trip hazards, anything relevant. Have a plan for mitigating hazards or concerns, e.g., flagging guy wires for towers.

**RESOURCES**

List any specific resources that the IRMT needs to know about outside of details in your Appendix. For example, if you need a UTV to move equipment or require personnel to help set up or take down equipment.

**LINKAGES TO OTHER DISCIPLINES**

**Identify any data collection overlaps/contingencies linked to other disciplines and the required elements, e.g.:** FIRE EFFECTS: A subset of top-kill plots will be instrumented with radiometers and FireCams. See Appendix B

**TIMELINE** -Identify critical milestones, Gantt charts can be helpful.

**ADDITIONAL INFORMATION:**

1. Provide description of location requirements for equipment, e.g., inside burn unit, outside burn unit, upwind, downwind, around perimeter, etc. (UAS and other aircraft denote airspace requirements here):
2. GPS/GIS proposed locations of equipment (If multiple locations attach map).
3. How long is set up time required for plots, equipment, or data collection prior to burn day?
4. How many people will Discipline have during the setup? During the burn?
5. Will you be staying for the duration from setup through the burn?

6. Does your instrumentation pose a safety risk to people in the vicinity? If so, what are the safety risks, e.g., laser, tower with guy wires (trip hazard), etc.? If so, what safe distance is required for people to move past the equipment? How should it be identified?
7. Is the research device self-sufficient on the day of burn? (i.e., can it collect data without you being present?)
8. What is/are your Discipline's *required* location(s) on burn days to meet your research objectives? For example, will you be collecting data or turning on equipment inside the unit immediately prior to burning, do you need to be with your equipment during burn, etc.?
9. How many vehicles and what type vehicles will you have? 4WD?
10. How many trailers will you bring?
11. Are you bringing ATV's/UTV's and how many of each? (Certain restrictions may apply and will change depending on locations; you may not be able to use them at certain locations.)
12. Do you have a VHF radio? If so, are you able to field program it?

**APPENDICES: detailed metadata on all aspects of all tasks.** Example below is from a DoD Wildland Fire Science Initiative research campaign in the Eastern Time Zone.

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## Research Burn Campaign PPE Guidance

<p style="text-align: center;"><b>Fieldwork Non-Fire</b></p>	<p style="text-align: center;"><b>BURN DAY Near-Fire/Post-fire Access / Observation Area</b></p>	<p style="text-align: center;"><b>Field Tour &amp; IRMT-Designated "Safe Areas"</b></p>
<p>Follow Agency Policy or Job Hazard Analysis Guidelines</p>	<p>Follow Agency Policy, Interagency Standards for Fire and Fire Aviation Operations Page 172-174, Job Hazard Analysis/Risk Assessment</p>	<p>Follow Agency Policy or Job Hazard Analysis Guidelines</p>
<p><b>Recommended:</b></p> <ul style="list-style-type: none"> <li>Long Sleeve Shirt</li> <li>Long Pants</li> <li>Closed Toe shoe/boot</li> <li>Gloves</li> <li>Helmet</li> <li>Eye Protection</li> <li>Sun protection</li> <li>Insect repellent</li> </ul>	<p><b>Required:</b></p> <ul style="list-style-type: none"> <li>Long Sleeved Flame-resistant Shirt</li> <li>Flame-resistant Trousers</li> <li>Wildland Fire Boots (8" lace up)</li> <li>Leather or Flame-resistant Gloves</li> <li>Fireline Helmet with Chinstrap</li> <li>Goggles/Safety glasses</li> <li>Hearing Protection</li> <li>Fire Shelter</li> </ul>	<p><b>Recommended:</b></p> <ul style="list-style-type: none"> <li>Closed toe shoe/boot</li> <li>Long Pants</li> <li>Long-sleeved shirt</li> <li>Field uniform (agency personnel)</li> <li>Sun protection</li> <li>Insect repellent</li> </ul>

## IRMT Research Burn Contextual Datasets

### Introduction:

In the complex operation of large-scale research burns, collaboration stands as a cornerstone for progress and innovation. Yet, amidst the diverse array of projects and initiatives, there often exists a challenge – the fragmentation of contextual data common to all researchers. As researchers collect data from their respective disciplines, they generate invaluable insights and findings. However, the isolated nature of data collection and analysis can hinder broader advancements and the realization of collaboration from synergistic projects.

It is within this context that the importance of utilizing common data across multiple research projects emerges as a crucial strategy. Standardizing common contextual data serves as a powerful mechanism to bridge the gaps between individual endeavors, fostering collaboration, efficiency, and ultimately, excellence in research outcomes. The Integrated Research Management Team (IRMT), in its mission to support individual research projects and to facilitate collaborative efforts, is uniquely qualified to provide contextual site and day of burn data that could be used across all participating researchers. Much of the contextual data required is curated by the IRMT. Common contextual data links datasets and manuscripts thematically.

This document defines contextual datasets common to all research burns and sets standardized compilation of those data into a single contextual dataset by each research burn. These data will be author agnostic, collected from commonly available geospatial layers, IRMT planning documents and publicly available site descriptions and weather/climatic sources.

Contextual data is guided by the following principles:

- It is data/information that is useful to most if not all participating projects involved in the research burn campaign.
- It is useful for outside (non-participatory) researchers wanting to gain a general understanding of what the research burn campaign is about, i.e., promoting the science/providing a pathway for future participation.
- It is not data that requires analysis by the IRMT.
- The data are existing, public, and readily available. The responsibility of the IRMT is to consolidate, organize and provide “one stop shopping” for basic campaign data/information.

Standard research burn campaign contextual datasets shall include, but not be limited to:

1. General site information
  - a. Contextual geospatial data
    - i. Burn unit polygons
    - ii. Regional cartographic maps (publication quality)

- iii. Hydrology, e.g., jurisdictional wetlands, streams
    - iv. Others
  - b. Site description
    - i. Dominant fuel/vegetation type (LandFire S&B 40/LandFire EVT)
    - ii. Climate data (mean temp/rainfall/wind rose)
    - iii. Soil data (soils survey types)
    - iv. Burn history (fire frequency and time since last burn)
    - v. Landform information (slope/aspect/description)
    - vi. Others
- 2. Day of burn information
  - a. Ignition method (Ground [hand, ATV/UTV], Aerial [UAS, helicopter], both [methods], etc.), but not pattern
  - b. Archived RAWS data (MesoWest)/fire weather forecast (Iowa Environmental Mesonet)
    - RAWS MesoWest- <https://mesowest.utah.edu/cgi-bin/droman/mesomap.cgi?state=GA&rawsflag=3>
    - Forecasts- <https://mesonet.agron.iastate.edu/wx/afos/list.phtml>
  - c. Burn objectives (stand replacement, maintenance, % midstory consumption, etc.)
  - d. Land management agency/Landowner
  - e. Incident Action Plan
  - f. Others