



## Understanding Smokejumper Deployment in Fire Program Analysis (FPA) Initial Response Simulation (IRS) Module IR\_004\_WP

### Topic:

FPA's approach to processing smokejumper deployment in the Initial Response Simulator (IRS) module.

### Introduction

FPA must account for smokejumper deployment to adequately model and simulate information in the Initial Response Simulator (IRS). The fire event model deploys the specified number of smokejumpers' Crew resources defined in the Dispatch Logic defined for each Fire Workload Area (FWA) per Fire Dispatch Levels.

Determining the quantity and capacity of smokejumper aircraft is outside the current FPA scope.

### Term

**Stick:** Two smokejumpers as line producers. One stick is the minimum number of smokejumpers that can initially be dispatched to a fire.

**Crew:** Number of smokejumpers defined by Daily Staffing per fire resource within FPA.

### Discussion

The IRS model handles smokejumpers in terms of crews. Each crew consists of the number of smokejumpers as defined in Daily Staffing; this will be the number of line producers per fire resource. The minimum number of smokejumpers defined in Daily Staffing as a single fire resource is two (2). If additional resources are required to contain a fire the system will dispatch as many smokejumper fire resources as are defined in dispatch logic. FPA recommends that the Daily Staffing of a Smokejumper (SMJR) fire resource not exceed eight people as that is the maximum number that a smokejumper aircraft will deliver at one time.

The IRS module design follows these assumptions:

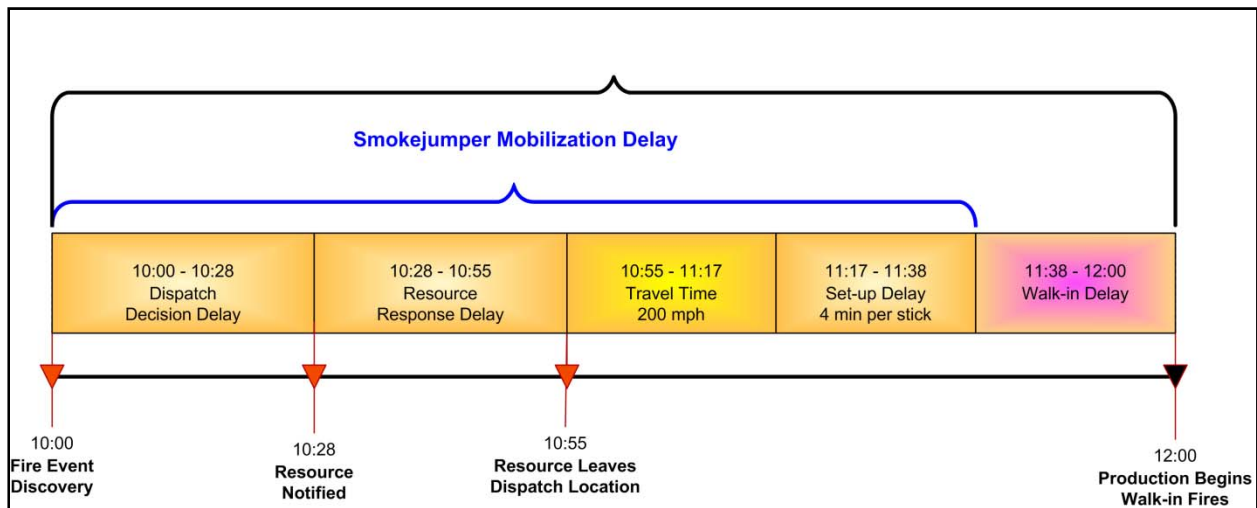
- Based on feedback from Interagency Smokejumper subject matter experts, the model specifies 24 as the maximum number of smokejumpers that can be deployed by a single aircraft per day.
- IRS defines a generic smokejumper platform to deploy smokejumpers from a Dispatch Location to a Fire Workload Area (FWA) within a Fire Management Unit (FMU). This platform is defined as:
  - Has the capacity to deliver up to eight smokejumpers per load. Two spotters are aboard who act as aircraft crew for reloads; they do not jump to a fire scene. Spotters are included to ensure the model is capturing the cost per platform load of smokejumpers.



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- Each smokejumper platform travels at a fixed speed of 200 miles per hour (175 knots).

The IRS module totals the values of smokejumper delay times to determine arrival time for a load of smokejumpers per FWA. Fire resource Arrival Time is calculated as the total of the Mobilization Delay (includes Dispatch Decision Delay, Resource Response Delay, Set-up Delay), the Travel Time from Dispatch Location to the FWA Travel Time Point (TTP), and the Walk-in Delay. Figure 1 displays how FPA calculates smokejumper Arrival Time:



**Figure 1: Calculating Smokejumper Deployment Times in FPA-IRS Module**

IRS measures Arrival Time as the time from first fire detection until the time smokejumpers arrive and produce fireline towards containment on a modeled fire event. IRS defines several delay times in order to calculate the Arrival Time.



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These delays are:

Delay	Smokejumper-Specific Description
Dispatch Decision Delay - The time from fire event discovery, (including time to determine a response strategy), through FPU direction to send resources.	FPA applies a Dispatch Decision Delay of 10 minutes for all fire resources.
Resource Response Delay - The time from when an FPU notifies fire resources to prepare for fire duty until the fire resources leave the Dispatch Location. Only FPA Data Administrator can edit this value.	IRS uses an Interagency agreed to time of 10 minutes as the value.
<p>Travel Time - The travel time between the dispatch location and the FWA workload point, excluding delays. The FPA system calculates this value as the distance between Dispatch Location and FWA Travel Time Point based on particular fire resource Producer Type.</p> <p>Travel Time = (distance DL to FWA TTP)/ (average travel speed for the fire resource).</p>	<p>The calculated time for the fire resource to be transported from the Dispatch Location to the geographic centroid FWA Travel Time Point (TTP) in a straight line miles distance. FPA uses 200 miles per hour as the smokejumper aircraft speed.</p> <p>Travel Time for Smokejumper when the Smokejumper Aircraft (Dispatch Location 1) is at a different Dispatch Location than the Smokejumpers (Dispatch Location 2), the system will calculate the distance between Dispatch Location 1 and the FWA TTP plus the distance between Dispatch Location 2 and the FWA TTP, add them together for the Travel Time.</p>



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Delay	Smokejumper-Specific Description
<p>Set-up Delay - The time from the end of calculated Travel Time until fire resources are ready to produce or begin walk-in. Examples of Set-up Delay include:</p> <ul style="list-style-type: none"> <li>• Time to unload dozer from lowboy and size up fire;</li> <li>• Time to determine a landing spot, land, and unload a helicopter.</li> </ul> <p>Only FPA Data Administrator can edit this value</p>	<p>For smokejumpers, this is the time for a crew of two (stick) to exit the aircraft and get their cargo dropped. The value for Set-up Delay is four (4) minutes per 2 people, multiplied by the number of 2 person combinations per crew deployed. In the case of a crew with Daily Staffing being an uneven number then the single person will also incur the four (4) minute Set-up Delay. Example: Fire Resource MSO SMJ 1, Daily Staffing = 5 people. The system will add three Set-up Delays, one each for two groups of two and one for the last, single person.</p>
<p>Smokejumper Walk-in Delay</p>	<p>The typical time for smokejumpers to walk from a suitable landing zone to the typical initial response fire. FPU planners enter this value in the system.</p>
<p>Deploy and Reload</p>	<p>FPU specify in the Dispatch Logic the number of smokejumper fire resources (crews) required per Fire Dispatch Level (FDL) within an FWA. The system then doubles the Travel Time as depicted in <a href="#">Figure 2</a> and applies all but the Dispatch Decision Delay to all reloads prior to their starting fireline production.</p> <p>If the Dispatch Logic has requested more than eight smokejumpers and the Dispatch Location has been described as having two or more smokejumper aircraft, then the number of smokejumpers requested, not to exceed multiples of eight smokejumpers per aircraft, will arrive and start production at the same time.</p>

**Table 1: Smokejumper Deployment Delays**



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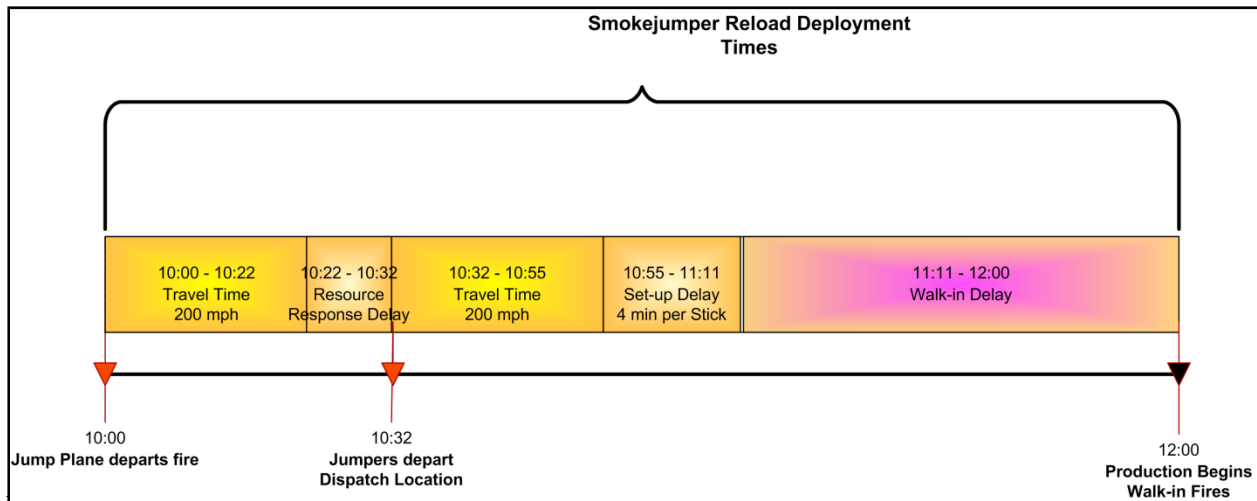


Figure 2: Calculating Smokejumper Reload Deployment Times

When a fire is contained before one or more reloads of smokejumpers arrive at a fire, IRS applies the Post Dispatch Delay Contained Not Used value to the unused smokejumpers. When a fire exceeds the user-defined Exceeds Simulation Limits before one or more smokejumper reloads arrive at a fire, FPA applies the user defined Post Dispatch Delay Exceed Simulation Limits value to all smokejumpers. See [Understanding Delays in Fire Program Analysis \(FPA\) Initial Response Simulation \(IRS\) Module IR\\_009\\_WP](#) for further information about Post Dispatch Delays.

FPA defines a smokejumper's work shift as a consecutive 18-hour shift starting at 0900 hours on the Day of the Year they are dispatched. After 18 consecutive hours of work, smokejumpers stop fire line production whether or not the fire is contained. Following a rest period (as defined by the Start hour per day), a smokejumper may resume fireline production at a new fire, or at the previous fire when the fire has not been contained, or has not exceeded the simulation limits.

### See Also

- [Understanding Preproduction Delays in Fire Program Analysis \(FPA\) Initial Response Simulation \(IRS\) Module IR\\_005\\_WP](#)
- [Understanding Helicopter Use in Fire Program Analysis \(FPA\) Initial Response Simulation \(IRS\) IR\\_006\\_WP](#)



## **Understanding Smokejumper Deployment in Fire Program Analysis (FPA) Initial Response Simulation (IRS) Module IR\_004\_WP**

- [Understanding Delays in Fire Program Analysis \(FPA\) Initial Response Simulation \(IRS\) Module IR\\_009\\_WP](#)