DCAT
Dispatch Cost Analysis Tool
V1 Business Requirements
August 2023

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INTRODUCTION

Dispatch Cost Analysis Tool (DCAT)

Dispatch Cost Analysis Tool (DCAT) is a proposed Wildland Fire Information and Technology (WFIT) affiliated investment intended to develop a national standard process to evaluate dispatch center workloads, identify recommended staffing, and determine agency Dispatch costs based on workload by unit/agency for supporting a dispatch center. The intent of Tool's output, Final Agency Adjusted Total, is to serve as a starting point for dispatch board of directors or coordinating groups to discuss financial contributions. It is not intended to determine an exact financial obligation.

The Interagency Dispatch Implementation Project (IDIP) identified a need for a Dispatch Cost Analysis Tool (DCAT). Page 11 of the IDIP Final Report – September 2016. This project fulfills the Deliverable: Project Plan/Charter Item #3 - Dispatch Governance and Staffing

STAKEHOLDERS

Dispatch Centers, Fire Managers, Budget Officers, Agency Administrators, Fire Business Officers, and Administrative Officers have expressed the need for a national tool, that cannot be manipulated, to determine agency Dispatch costs, staffing needs, and dispatch core duties. Annually, many interagency dispatch center boards meet to determine and allocate their respective agency contributions. The proposed tool will recommend contribution percentages by each agency represented within the local unit(s). The business case and proposed workload analysis utilizes defined data elements, methodologies and assigned weighted values associated with core duties. The output values from the model serve to address contentions between partnering organizations by objectively recommending a data driven contribution share by agency. Knowing the appropriate costs of the dispatch/coordination system for each agency will be of value in optimization and modernization.

STANDARD DATASET

DCAT would utilize 3-, 5- or 10-year average IRWIN incident, IROC and historical ROSS resource data eliminating redundant data mining, need to identify authoritative data sources, or ensure authentication of data accuracy, and reliability of the data. By interconnecting the DCAT with IRWIN Read Only services, data associated with individual dispatch center is available via IRWIN queries and IROC reports. Queries and reports will be available to the DCAT Dashboard via a combination of IRWIN, InFORM and/or IDME Read Only Services. Utilizing these services enables access to existing fire data without necessitating funding or developing an additional application. Initial capability will focus on Local Dispatch Centers (Tier 3). Geographic Area Coordination Centers GACCs (2nd Tier) will have slightly different methodologies and weights and will be covered in a yet to be drafted section.

CHALLENGES:

Extensive discussions regarding IRWIN incident data rather than InFORM data revealed some of the data in InFORM does not accurately reflect the dispatch center's workload whereas IRWIN records directly corelate to dispatch center workload. A possible solution is to use InFORM Data if the Fire Occurrence Record (FODR) has a corresponding IRWIN Identifier (IRWINID). Additional challenges have been identified for historical ROSS data. The Data Management Program is working to combine ROSS historical data and IROC data. In the interim IROC will be maintaining User Community reports for pre-IROC data for IRWIN services.

BENEFITS:

This capability addresses identified business needs and provides benefits throughout the wildland fire community, including:

1. Develop a national standard process to evaluate dispatch center workload.
2. Utilize the workload analysis to develop dispatch center staffing needs.
3. Display dispatch center workload by unit/agency percentage.
4. Determine Dispatch support costs for dispatch centers based on workload percentage by unit/agency.

The implementation of a standard interagency costing tool benefits the federal wildland fire agencies/bureaus, tribes, states, and local governments. A national standardized process will enable management to look at the entire dispatch/coordination system from a workload and budget perspective.

RELVANT SYSTEMS

IRWIN

InFORM

IROC

ROSS (historical data)

IQCS

IQS

Computer Aided Dispatch (CADs)

IDME (Future)

DATA ELEMENTS

DCAT will include previously defined NWCG data elements. If necessary, requests will be made for additional elements. A complete list can be found in the IRWIN v9 Data Mapping Worksheet.

METHODOLOGY USED FOR NUMBER OF ELEMENTS AND WEIGHTS

Picking the number of elements to be measured posed a challenge. If the system uses too few elements, large swings in the results could be experienced based on what may appear to be infinitesimal data changes. However, if too many elements are selected, the "worth" of the elements becomes diluted and the data becomes inconsequential.

The six elements recommended were identified and categorized into CAD or Resource Ordering They represent a dispatch center's core duty workload determined by IDIP Subject Matter Experts (SMEs). Additionally, a 7th unmeasured element of Baseline is included. The sums of weights for all elements must equal 1.00. The elements are arranged in order from most to least effort. Weights were assigned by SMEs considering each element relative to one another. Rational is included below for each element.

INPUT DATA ELEMENTS

1. ***All Wildland Fires within the Dispatch Zone***

   Description & Queries

   Any incident record with NWCG Event Categories included in NWCG Event Kind Fire (FI).
   https://www.nwcg.gov/sites/default/files/data-standards/stds/values.pdf
   FI in inclusive of:

- Debris/Product Fire
- Non-Statistical/Other
- Prescribed Fire
- Structure Fire
- Vehicle Fire
- Wildfire

DCAT will not include incident counts for preposition, severity, support, and all-risk for this data element.

System of Record (SOR) The respective agency's final fire reporting system if it has an IRWIN ID

Specification

Counts are towards the protecting agency at Point of Origin (POO) derived from the IRWIN Data Element Unique Fire Identifier. The UniqueFireIdentifier (UFI) is derived by IRWIN concatenating the year from the FireDiscoveryDateTime, the POOProtectingUnit and the LocalIncidentIdentifier. If IRWIN finds the UFI is not unique to IRWIN, the incident record will be rejected. The ability to query historical decommissioned NWCG Event Kind Categories needs to be accounted for within the requirements i.e., Wildland Fire Use and Prescribed Natural Fire.

Weight

0.5

Weight Rationale

Takes the most effort of all elements. Receiving reports of fires, plotting, determine ownership, send response, provide logistical support, Intel, weather, etc.

2. ***Resource Orders processed for incidents within the Dispatch Zone***
   Description & Queries:

   - *All NWCG Event Kind and Categories.* *https://www.nwcg.gov/sites/default/files/data-standards/stds/values.pdf*
   - Orders filled with zone resource or if filled with resource from outside of the zone
   - Reassignments (local and non-local resources) within the zone/area count towards unit benefitting from the reassignment.
   - Cancelled and Cancelled UTFs orders are counted.
   - Workload includes reassignments of non-local resources outside the zone/area, or demobilization of local or non-local resources (treated as equivalent workload).
   - All resource categories are included in the count (Overhead, Crews, Equipment, Aircraft, and Supplies). Although expanded dispatch, if in place, may handle some of this work, it is common for regular dispatch center staff to be involved in some aspect. Additionally, it is work completed by the center and thus needs to be included in the measure of the workload.
   - Include subordinate and support requests.

   System of Record (SOR) IROC via IRWIN services.

   Specification

   Counts are specific to the protecting agency at Point of Origin (POO)/lead agency (RX) based on Unit ID in the Unique Fire Identifier. The Unique Fire Identifier (UFID) is populated by IRWIN by concatenating the year from the Fire Discovery Date Time, the POO Protecting Unit and the Local Incident Identifier. If IRWIN finds the UFI is not unique to IRWIN, the incident record will be rejected. The ability to query historical decommissioned NWCG Event Kind Categories needs to be accounted for within the requirements i.e., Wildland Fire Use and Prescribed Natural Fire.

   Weight

   0.2

Weight Rationale
Takes the next most effort. Creation of orders, collection of information for completion of the resource order. (Reporting instructions, special needs, inclusions, exclusions, date, and time needed). Follow up with the POC for the order for clarification or substitutions.

3. ***Number of qualified ICT3s filled for incidents within Dispatch Zone***
***Description & Queries*:**
- *All NWCG Event Kind and Categories. https://www.nwcg.gov/sites/default/files/data-standards/stds/values.pdf*
- ICT3 filled is part of an IMT3 or individual ICT3 order.
- ICT3 reassignments (local and non-local resources) within dispatch zone/area count towards the POO/lead agency unit benefitting from the reassignment.
- ICT3 reassignments of non-local resources outside the dispatch zone/area, or demobilization of local or non-local resources (treated as equivalent workload).
- It is recognized that this assumes all ICT3s are put on a IROC order, however that may not be a dispatch zone's standard operating procedure.
**NCSC working to ensure that creating an IROC order for all ICT3s is the standard operating procedure.*

System of Record (SOR) IROC via IRWIN integration

Specification
Counts are specific to the protecting agency at Point of Origin (POO)/lead agency based on Unit ID in the Unique Fire Identifier. The Unique Fire Identifier (UFI) is populated by IRWIN by concatenating the year from the Fire Discovery Date Time, the POO Protecting Unit and the Local Incident Identifier. If IRWIN finds the UFI is not unique to IRWIN, the incident record will be rejected. The ability to query historical decommissioned NWCG Event Kind Categories needs to be accounted for within the requirements i.e., Wildland Fire Use and Prescribed Natural Fire.

Weight
0.2

Weight Rationale
Takes more effort to support an IMT3 organization than an IMT1/NIMO/IMT2 organization due to the capabilities held within those organizations. Dispatch centers inherit much of that workload to support Type 3 incidents (e.g., ICS-209, NIROPS, ground support, etc.).

4. ***Number of IMT1s, NIMOs, and IMT2s filled for incidents within Dispatch Zone***
***Description & Queries*:**
- *All NWCG Event Kind and Categories. https://www.nwcg.gov/sites/default/files/data-standards/stds/values.pdf*
- Reassignments (local and non-local resources) within dispatch zone/area count towards the unit benefitting from the reassignment.
- Workload includes reassignments of non-local resources outside the dispatch zone/area, or demobilization of local or non-local resources (treated as equivalent workload).

System of Record (SOR) IROC via IRWIN integration.

Specification

Counts are specific to the protecting agency at Point of Origin (POO)/lead agency based on Unit ID in the Unique Fire Identifier. The Unique Fire Identifier (UFI) is populated by IRWIN by concatenating the year from the Fire Discovery Date Time, the POO Protecting Unit and the Local Incident Identifier. If IRWIN finds the UFI is not unique to IRWIN, the incident record will be rejected. The ability to query historical decommissioned NWCG Event Kind Categories needs to be accounted for within the requirements i.e., Wildland Fire Use and Prescribed Natural Fire.

Weight
0.034

Weight Rationale
There is additional workload (e.g., in-briefing/close-outs, daily coordination, supervision of expanded, etc.) than merely processing resource order, which is also counted as a separate element. Since processing individual resource order is counted separately, this element represents the additional workload incurred while coordinating an IMT1/NIMO/IMT2 request and fill.

5. ***Resource orders processed for incidents outside of Dispatch Zone***
Description & Queries:
- *All NWCG Event Kind and Categories. https://www.nwcg.gov/sites/default/files/data-standards/stds/values.pdf*
- Will include subordinate and support requests
- Orders filled with local zone/area resources.
- Reassignment of local resources outside the zone/area.
- Cancelled are not counted because their resources are associated with a filled request.
- UTFs are not counted - consider part of Baseline as the Dispatch Center would try to fill with any resource regardless of agency.
- Excludes Supplies

System of Record (SOR) IROC via IRWIN integration.

Specification
Counts go to local/zone agency providing the resource for mobilization based on Unit, Provider. (Needs to be added to the IRWIN Data Mapping Worksheet). IRWIN can use its existing data lookup table service to present DCAT with the Resource Provider. The Resource Provider is the NWCG Unit Identifier data standard used to identify the agency providing the resource. Reference NWCG Unit Identifiers for valid values. The ability to query historical decommissioned NWCG Event Kind Categories needs to be accounted for within the requirements i.e., Wildland Fire Use and Prescribed Natural Fire.

Weight
0.033

Weight Rationale
Effort includes locating available resources and arranging travel if needed. May involve negotiations with receiving unit on things not covered in the special needs.

6. ***Number of local/dispatch zone resources with at least one current NWCG qualification***
Description & Queries:
- All current resources local to the dispatch zone/area - Overhead (e.g., ICT3, AADM, READ or RXB2), Crews (e.g., CRW1, Camp Crew), Equipment (e.g., engines) and Aircraft (e.g., HEL3).

- Does **not** include resources brought in on severity, support, or preposition resource orders. The workload for these resources is associated with number of resources orders above.
- Counts include the ENG/CREW/Dozer not the staffing. Staffing is captured on the Overhead resource counts.
- Excludes Supplies

System of Record (SOR) Qualification Systems (IQCS/IQS), IROC, and CADs via IRWIN integration.

Specification
Counts go to local/zone agency providing the resource for mobilization based on Unit, Provider. (Needs to be added to the IRWIN Data Mapping Worksheet). IRWIN can use its existing data lookup table service to present DCAT with the Resource Provider. The Resource Provider is the NWCG Unit Identifier data standard used to identify the agency providing the resource. Reference NWCG Unit Identifiers for valid values.

Weight
0.033

Weight Rationale
Level of effort includes maintaining status of the resource including daily resource tracking. Additionally, workload consists of fielding calls/questions from resources about past and potential future orders.

7. Baseline

Some of the core duties as well as specific actions associated with unfilled out of dispatch zone requests are not associated with any one agency and are considered mutually beneficial to all organizations within a dispatch zone. They do not lend themselves to accurate measurement and therefore an additional category is necessary to capture workload associated with "baseline" core duties.

Baseline is intended to capture core duties. Core duties are accomplished regardless of fire activity or resource ordering and are not able to be objectively measured within a system of record as inputs 1-6 are. Baseline workload equates to the minimum an agency would pay to be a part of a dispatch center, even if the DCAT assigned that agency a lower dollar amount. The dollar amount associated with the Baseline workload would be determined by the respective dispatch board or coordinating group.

Example: Baseline for Dispatch center is $2000. DCA Tool assigns one agency 1% of workload equating to $1500 and assigns another agency 30% of workload equating to $45,000. The 1% agency would need to contribute an additional $500 from what the Tool assigned to reach the $2000 Baseline amount. The 30% agency would need to contribute $45,000 because that amount is already above the Baseline.

Workload Portion Agency

The annual average by year for each element

Ability to set the query for business need – 3, 5, 10, 15, 20 years or custom i.e., 8 years.

- Calculate each agency's percentage of the total for each element.

Unit's % by element

	% of Center	weight	product
All Wildland Fires	11.11%	0.5	0.05553
Resources Orders within Zone	12.47%	0.2	0.02495
ICT3 Deployments within Zone	20.99%	0.2	0.04198
IMT1/NIMO/IMT2 Deployments within Zone	0.00%	0.034	0
Resource Orders outside of Zone	26.45%	0.033	0.00873
# Local Resources	22.08%	0.033	0.00729

Workload Portion
0.138464987

	#	%
All Wildland Fires	25.375	11.11%
Resources Orders within Zone	232.63	12.47%
ICT3 Deployments within Zone	2.125	20.99%
IMT1/NIMO/IMT2 Deployments within Zone	0	0.00%
Resource Orders outside of Zone	56.173	26.45%
# Local Resources	92.66	22.08%

Formula –

- Multiply the % by the weight for the Product Value
- Total each elements Product Value. Total generates the Workload Portion by Unit/Agency
- Multiply the Workload Portion by 100% (percentage of total workload) then divide by the Sum of All Agencies Workload Percentage

$$\frac{\textbf{Sum of All Agencies Workload}}{\text{Agency } \textbf{Workload Portion}} = \frac{100}{\textbf{Agency \%}}$$

$$\textbf{Agency \%} = \frac{100 * (\text{Agency } \textbf{Workload Portion})}{\textbf{Sum of All Agencies Workload}}$$

Output format %

Unadjusted Portion Amount

Individual Agency % workload multiplied by the Dispatch Center Total Cost (determined by center's established budget)

Example

			$ 405,356	Dsp Ctr Total Cost
	ratio figuring			
	Workload Portion	Agency %		
Sum of All Agencies Workload	0.99753	100.00%	Unadjusted Portion	
WYBHF	0.13846	13.88%	$ 56,267	
WYBIP	0.00546	0.55%	$ 2,220	
WYCDS	0.02212	2.22%	$ 8,989	
WYCDX	0.16193	16.23%	$ 65,802	
WYSHF	0.27695	27.76%	$ 112,541	
WYWAAL	0.00191	0.19%	$ 778	
WYWBD	0.207	20.75%	$ 84,115	
WYWRA	0.18369	18.41%	$ 74,644	
0	0	0.00%	$ -	
		100.00%	$ 405,356	

Output format ($)

Adjust to Baseline Amount

If Unadjusted Portion below Baseline Adjust to Baseline equals Baseline ($).
If Unadjusted Portion greater than Baseline, Adjust to Baseline = Null Value.
Output format ($)

Above Baseline

Value is equal (=) to Unadjusted Portion if that value is greater than Baseline ($)
Value is equal (=) to Adjust to Baseline Value its Unadjusted Portion is less than (<) the Baseline.

Example

		Applying Baseline	
	Baseline	$ 2,000	
Unadjusted Portion		Adjust to Baseline	Above Baseline
$ 56,267		$ -	$ 56,267
$ 2,220		$ -	$ 2,220
$ 8,989		$ -	$ 8,989
$ 65,802		$ -	$ 65,802
$ 112,541		$ -	$ 112,541
$ 778		$ 2,000	$ -
$ 84,115		$ -	$ 84,115
$ 74,644		$ -	$ 74,644
$ -		$ -	$ -
$ 405,356		$ 2,000	$ 404,578

Output format ($)

Final Agency Adjusted Totals

Final Agency Adjusted Total is the Baseline amount if the Unadjusted Portion was below Baseline. If the Unadjusted Portion was already above Baseline, the Final Agency Adjusted Total is proportionally adjusted, after those units brought up to Baseline are accounted for. Slightly reducing that agency's portion for unit's that begin above Baseline.

Example:

$ 405,356	Dsp Ctr Total Cost			
		Applying Baseline		
	Baseline	$ 2,000		
ıadjusted Portion		Adjust to Baseline	Above Baseline	Final Agency Adjusted Totals
$ 56,267		$ -	$ 56,267	$ 56,097
$ 2,220		$ -	$ 2,220	$ 2,214
$ 8,989		$ -	$ 8,989	$ 8,962
$ 65,802		$ -	$ 65,802	$ 65,603
$ 112,541		$ -	$ 112,541	$ 112,201
$ 778		$ 2,000	$ -	$ 2,000
$ 84,115		$ -	$ 84,115	$ 83,861
$ 74,644		$ -	$ 74,644	$ 74,418
$ -		$ -	$ -	$ -
$ 405,356		$ 2,000	$ 404,578	$ 405,356

$$\text{Final Agency Adjusted Total} = \frac{\textbf{Unadjusted Portion} * (\text{Sum } \textbf{Unadjusted Portions} - \text{Sum of } \textbf{Adjust to Baseline})}{\text{Sum of } \textbf{Above Baseline}}$$

Output format ($)