

BROWARD REGIONAL 911 SYSTEM

Final Report:

Assessment Findings & Recommendations

Overview

- This Report represents a compilation of findings from the Phase I System assessment **and** the Phase 2 recommendations for the future state of the System.
 - Phase 1 included an analyses of qualitative and quantitative data.
 - The Phase 2 (final phase) of the project/report provides a series of specific recommendations designed to improve overall System effectiveness & efficiency. The document merges both Phases into this Final Project Report.
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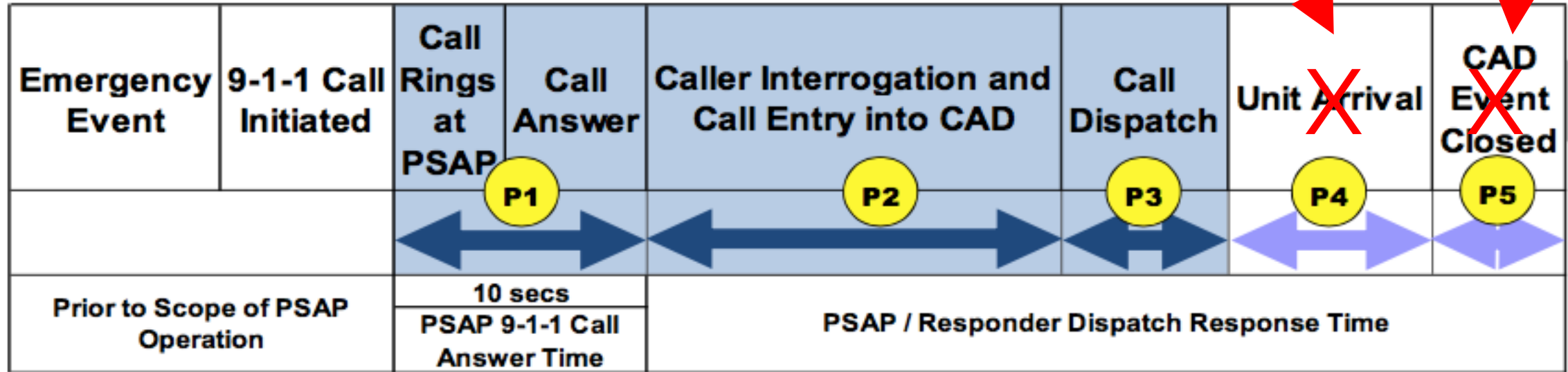
Framework

Report brings forward the findings from the Phase 1 report and organizes them into five groupings as follows:

- Observational Findings
 - Technology
 - Governance and Oversight
 - Performance Measures
 - Effectiveness and Efficiency
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P1 thru P5

Turn-Out Time – Fire (60-80 sec.)
 Travel Time - Fire (Fire 4 minutes) (Law - ?)



P1 9-1-1 Call Answer Time

P2 Time from Call Answered to Call Entered in CAD (and forwarded to Dispatcher)

P3 Time from CAD Entry until a Unit is Dispatched


P4 Time from Unit Dispatched until Unit Arrives on Scene

P5 Time from Unit Arrives on Scene until Incident is Closed

Observational Findings

Observational Findings are those that comment on the Regional System and require no further action.

These are primarily observed, positive attributes of the Regional System.



- BSO is an Accredited Center of Excellence as awarded by the International Academies of Emergency Dispatch (IAED). BSO utilizes emergency medical dispatcher (EMD) services – a best practice for 911 centers, and a requirement for ongoing accreditation.
 - The County has implemented a set of quality assurance and improvement processes that assist in objectively moving the System forward.
 - The number of 911 callers required to be transferred has been essentially eliminated under the consolidated regional system. As a result, total call processing times were reduced by approximately 30 seconds.
 - The P1 interval and P3 interval can be accurately evaluated based on current data in the CAD and telephony system. BSO performs well for these dispatch intervals.
 - The P2 interval (the time from when a 911 call is answered until the information is sent to an assignment dispatcher to alert first responder) must be cautiously evaluated due to the technology and data limitations existing in the current CAD and 911 systems. The County has indicated this issue will be remedied with implementation of the new CAD in early 2017.
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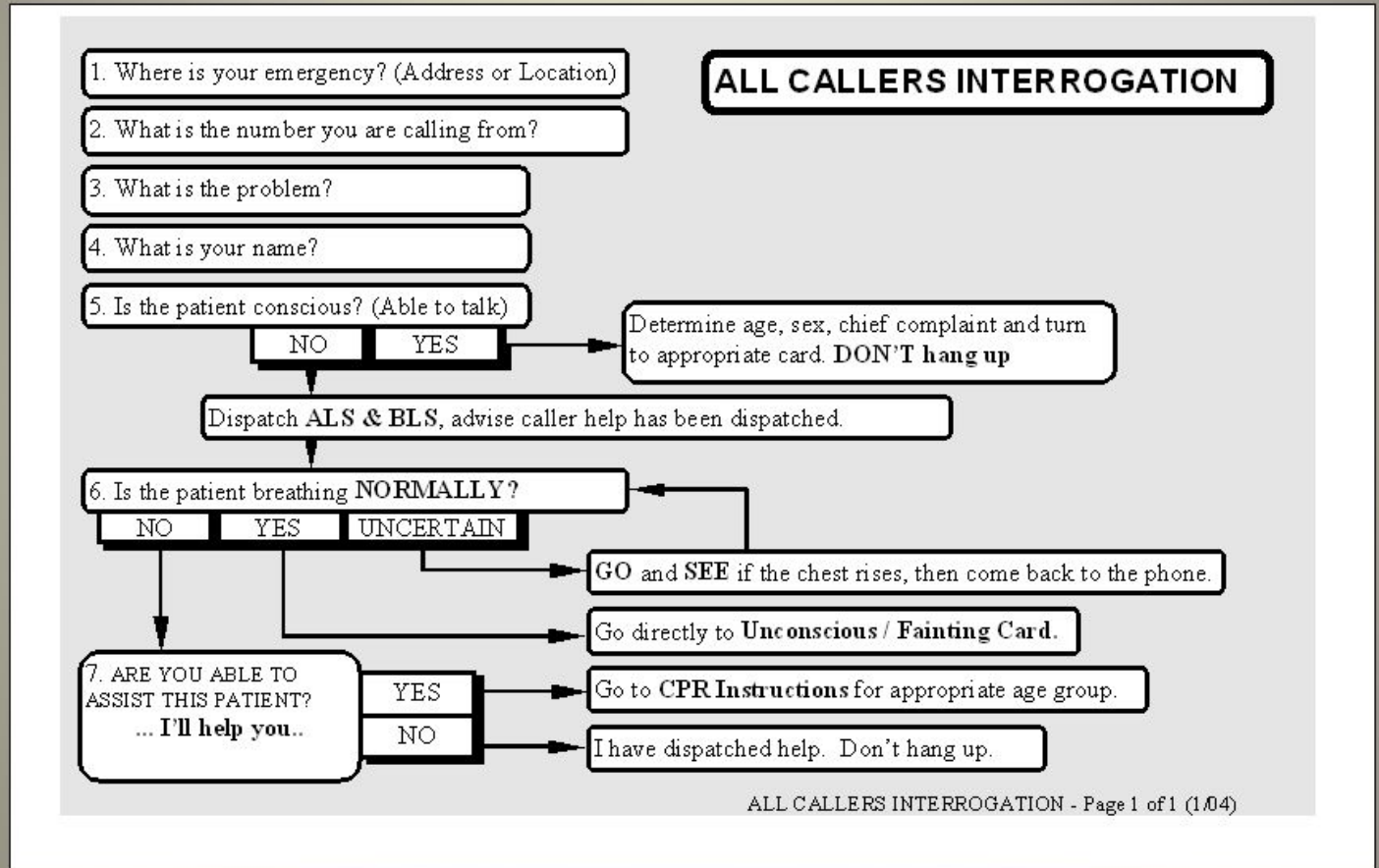
Technology Findings

- The County's PSAP phone system and CAD system are not effectively linked to allow comprehensive evaluation of System performance.
- For more than half of the incident records, the event in the CAD cannot be linked to the unique Call Detail Record (CDR) that initiated the incident.
- Technology limitations resulted in only 25.6% of CAD records considered valid for use in analysis of P₂/P₃ intervals.
- County staff is unable to directly access phone and radio system data – thereby limiting their ability to analyze system performance beyond that permitted by pre-designed/canned reports, which makes some of the required reporting tedious and error prone.
- The System utilizes emergency medical dispatching (EMD) software – a best practice for 911 centers. However, no similar program is utilized for either fire or law enforcement call types.
- The CAD network is redundant in the event of a failure. However, it is not tested on a regular basis. This is a significant deficiency and is in conflict with best practices.

Technology Recommendations

- The County needs to insure the missions of technology development and technology sustainment have different focuses and roles. Therefore, the County should provide for a Technology Development Team and a Technology Sustainment Team over the next few years as new technologies are implemented and the system continues to stabilize.
- An absolute priority for the County is to develop a link between 911 phone records and the associated CAD incident records.
- BSO should maintain EMD certification training for all call takers through the International Academies of Emergency Dispatch (IAED). Call taker personnel should also be trained and certified as Emergency Fire Dispatchers (EFD) and in the system implement EFD in the near future. These certifications are considered industry best practice.
- Finally, law enforcement agencies should consider and evaluate the efficacy of Emergency Police Dispatch (EPD) being utilized in the future. This system is emerging as an industry best practice.

- Very structured call interrogation process
- Prioritizes calls based on standard questions
- High priority calls quickly identified and dispatched



- Prioritization allows appropriate resources to be sent based on the severity of the incident
- System designed to 'over-triage' incidents
- Quality assurance is based on objective criteria

ProQA for Medical (3.4.2.37)

File View Spec Logs Options Tabs Version Help

:40 6: Breathing Problems

Entry KQ PDI/CEI DLS Summary

Delay Send & continue ← Send: 6-D-1 →

KQ Answers

2. She has difficulty speaking between breaths.
3. She is completely awake (alert).
4. She is not changing color.
5. She is not clammy.

Determinants	Responses (user-defined)
C 1 Abnormal breathing	Cold ALS
2 Cardiac history	Paramedic Ambulance
D 0 Override	Hot BLS & ALS
1 SEVERE RESPIRATORY DISTRESS	Engine/Paramedic Amb
2 Not alert	Hot BLS & ALS
3 Clammy	Engine/Paramedic Amb
E 0 Override	Hot FR, BLS, & ALS
1 INEFFECTIVE BREATHING	Hot FR, BLS, & ALS

You are responding to a patient with **breathing** problems. The patient is a **89-year-old female**, who is **conscious** and **breathing**.


F GORDON O: NAE 89 year old, Female, Conscious, Breathing. SEVERE RESPIRATORY DISTRESS.
 0006000182 C: NAE - OMG

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Oversight & Governance Findings

- BSO's operation of the Public Safety Answering Points is challenged with significant morale problems embedded in issues of staffing, training and management.
- The County has inappropriately made, and public safety officials allowed, some operational decisions to be handled by the County that should, instead, be determined by public safety officials.
- Low levels of trust exist among major stakeholders. Much of this is due to role definitions. Relationships need to be redefined in order for the System to move forward effectively.

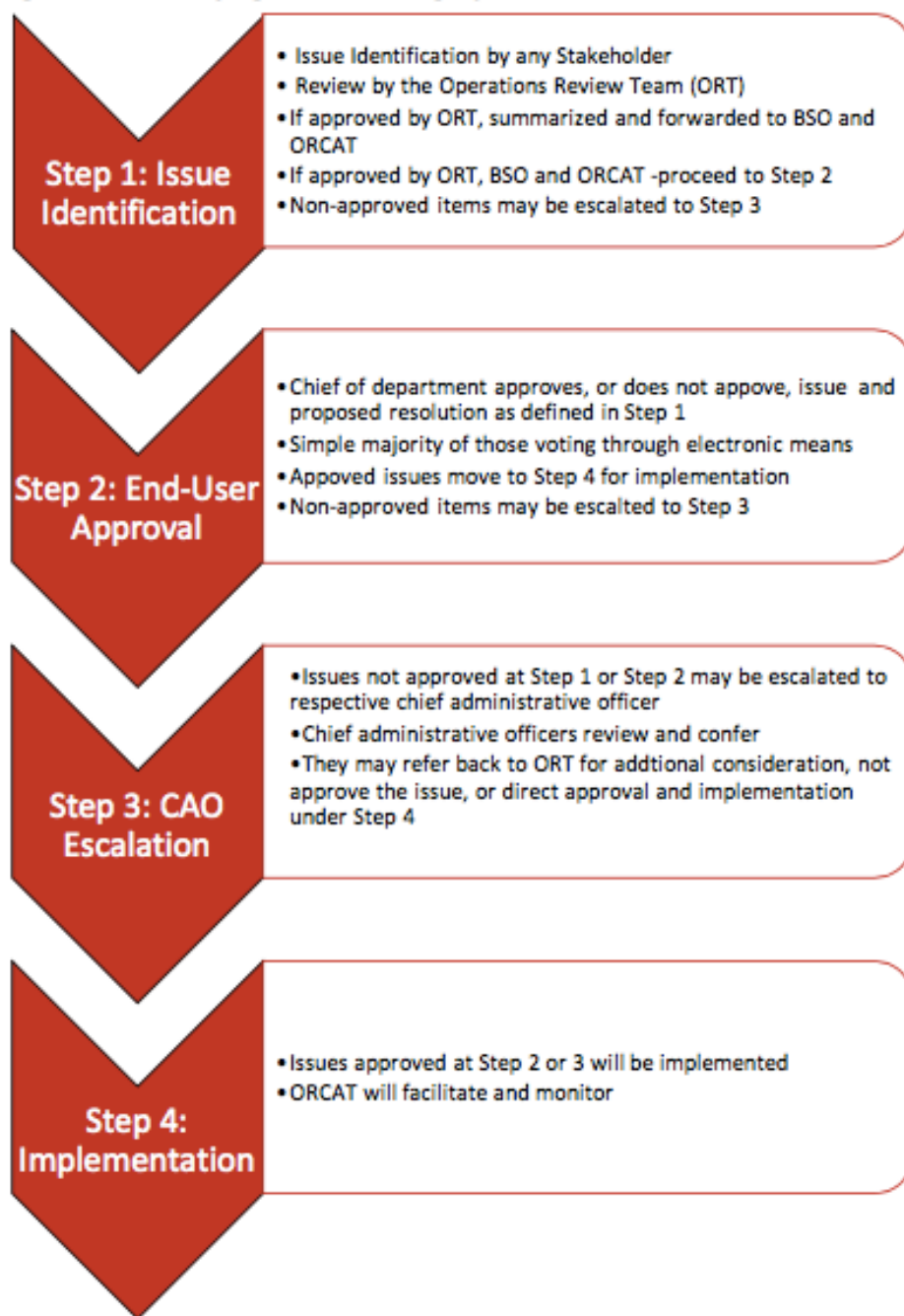
Oversight & Governance Recommendations

- Alternative work schedules for 911 personnel should be considered.
 - Supervision on the PSAP dispatch floors should be at a ratio of six to one as opposed to the current ten to one ratio.
 - Resources for dispatcher training should be increased through reallocation of current funding.
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Oversight & Governance Recommendations

- Operational Oversight and System Governance should be redefined to strengthen the role of end-users while balancing the logistical concerns of the Operator (BSO), and the financial and system governance responsibilities of Broward County.
- A “base level of 911 services” funded by the County should be more clearly defined.
- Individual agencies desiring higher levels of service should be able to fund additional staffing hours or technology in order to receive services specific to their jurisdictional needs.

Figure 71. Identifying and Resolving Operational Issues



Performance Measures Findings

- Certain performance measures have been misinterpreted, incorrectly applied, or are inconsistent with current industry best practices.
- The County's use of PASS/FAIL targets provides little in the way of information for continuous quality and performance improvement.
- The failure of the current PASS/FAIL or YES/NO, P₁ busy hour target, is that it provides no guidance as to the level of surge capacity that is fiscally responsible to build into the system.

Performance Measures Recommendations

- The “busy hour” is to be redefined in a prospective manner.
 - Only the performance on emergency/911 incidents should be included in the performance reports – specifically life-threatening calls (Delta & Echo).
 - Monthly reports should report P₄ (turn-out times) for fire rescue incidents and P₅ (travel time) for both fire rescue and law high priority incidents.
 - Generally, performance metrics need to focus on optimizing dispatch processes as much as possible, with the end result being to get help moving to emergencies as quickly as possible.
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RECOMMENDED MONTHLY PERFORMANCE MEASURES

- County should modify the current monthly performance report format and replace it with a monthly report that focuses solely on data and provides no commentary.

METRIC	Count	Average	TARGET	TARGET COMPLIANCE
P1 Call Answer Time - Busy Hour of 1800 hrs. (NENA 56-005)			90% Within 10 Seconds	
P1 Call Answer Time - Number of Days Meeting Busy Hour Performance			All Days in Month	
P1 Call Answer Time - All 911 Calls (NENA 56-005)			95% Within 20 Seconds	
P1 Call Answer Time - All 911 Calls (NFPA1221-2016)			95% Within 15 Seconds	
P1 Call Answer Time - All 911 Calls (NFPA1221-2016)			99% Within 40 Seconds	
P1 Call Answer Time - All 911 Calls (State of Florida)			90% Within 10 Seconds	
P1 Call Answer Time - Alarm Lines			95% Within 15 Seconds	
P1 Call Answer Time - Alarm Lines			99% Within 40 Seconds	
Transfer to Secondary PSAP (NFPA1221-2016)			95% Within 30 Seconds	
P2 EMS Call For Service Processing Time - Delta & Echo Calls Only			90% Within 70 Seconds	
P2 Law Enforcement Call For Service Processing Time - Priority 1 & 2 Calls Only			Report 90th% - No specific target	
P3 EMS Call For Service Processing Time - Delta & Echo Calls Only			90% Within 20 Seconds	
P3 Law Enforcement Call For Service Processing Time - Priority 1 & 2 Calls Only			Report 90th% - No specific target	
P2/P3 EMS / Specialized Call For Service Processing Time (NFPA1221-2016)			90% Within 90 Seconds	
P2/P3 EMS / Specialized Call For Service Processing Time (NFPA1221-2016)			99% Within 120 Seconds	

P2/P3 Fire Call For Service Processing Time (NFPA1221-2013)			80% Within 60 Seconds	
P2/P3 Fire Call For Service Processing Time (NFPA1221-2016)			90% Within 64 Seconds	
P2/P3 Fire Call For Service Processing Time (NFPA1221-2016)			95% within 106 Seconds	
P2/P3 EMS Call For Service Processing Time - Delta & Echo Calls Only			90% Within 90 Seconds	
P2/P3 Law Enforcement Call For Service Processing Time - Priority 1 & 2 Calls Only			Report 90th% - No specific target	
P4 (newly defined) EMS Turnout Times - Delta & Echo Calls Only (NFPA 1710-2016)			Report 90th% - No specific target	
P5 (newly defined) EMS & Fire Travel Times - Delta & Echo Calls Only (NFPA 1710-2016)			Report 90th% - No specific target	
P5 (newly defined) Law Enforcement Travel Times - Priority 1 & 2 Calls Only			Report 90th% - No specific target	
EMD Case Entry Compliance			95%	
EMD Total Compliance Rate			90%	
EMD Quality Assurance - Cases Reviewed			1%	

NOTES:

Busy hour defined as 1800-1900 hrs.


- The County should purchase a performance measurement software package that will provide agencies with ready access to the activities and performance.



Effectiveness & Efficiency Findings

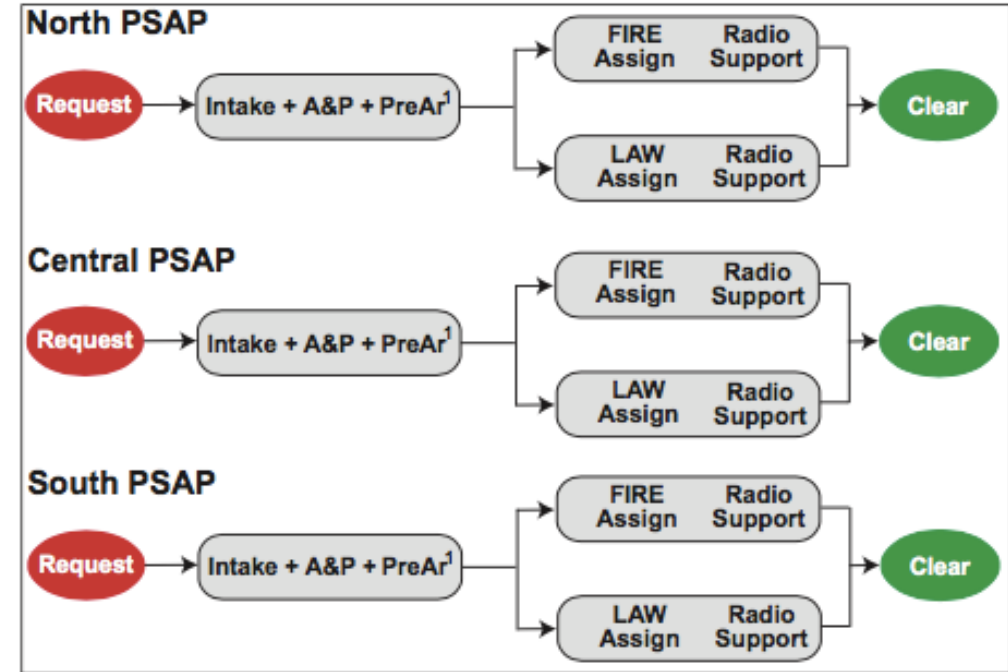
- Current PSAPs, training facility and “flee to” plans have facility limitations, especially related to adequate space.
- The consolidated system is capable of closest unit response to life-threatening emergencies, but protocols are not yet in place to implement this capability.
- Radio traffic utilization, by both fire/EMS and law enforcement units, is comparatively high. MDTs (mobile data terminals) and MCDs (mobile computing device) are not effectively utilized to reduce radio traffic.
- BSO current performance indicates overstaffing in call taker positions based on Erlang modeling.
BSO current performance indicates overstaffing in Fire Assignment positions based on Erlang modeling.

Effectiveness & Efficiency Recommendations

- Call processing staffing should be adjusted to achieve P₁/call-taking performance of between three to five seconds at the 90th percentile
 - Fire-rescue agencies should develop, approve and implement countywide nearest unit response protocols in those incidents involving high priority incidents (e.g. Delta & Echo level EMD calls).
 - Require increased usage of Mobile Data Terminals (MDTs) by field responders.
 - Long-term capital budgeting programs should consider two new purpose-specific 911 facilities.
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Current Workflows by PSAP

Figure 52. Workflows and Workstations in the BSO Dispatch System



¹Pre-Arrival Instructions only on EMS incidents with Echo-Delta determinants

	North	Central	South
F/R Dispatcher	5	5	5
Law Dispatch	6	10	7

Figure 59. Erlang Model Central FIRE Assignment Workstation BSO

Broward E911 Consolidated Communications System Workstation Performance by Hour-of-Day

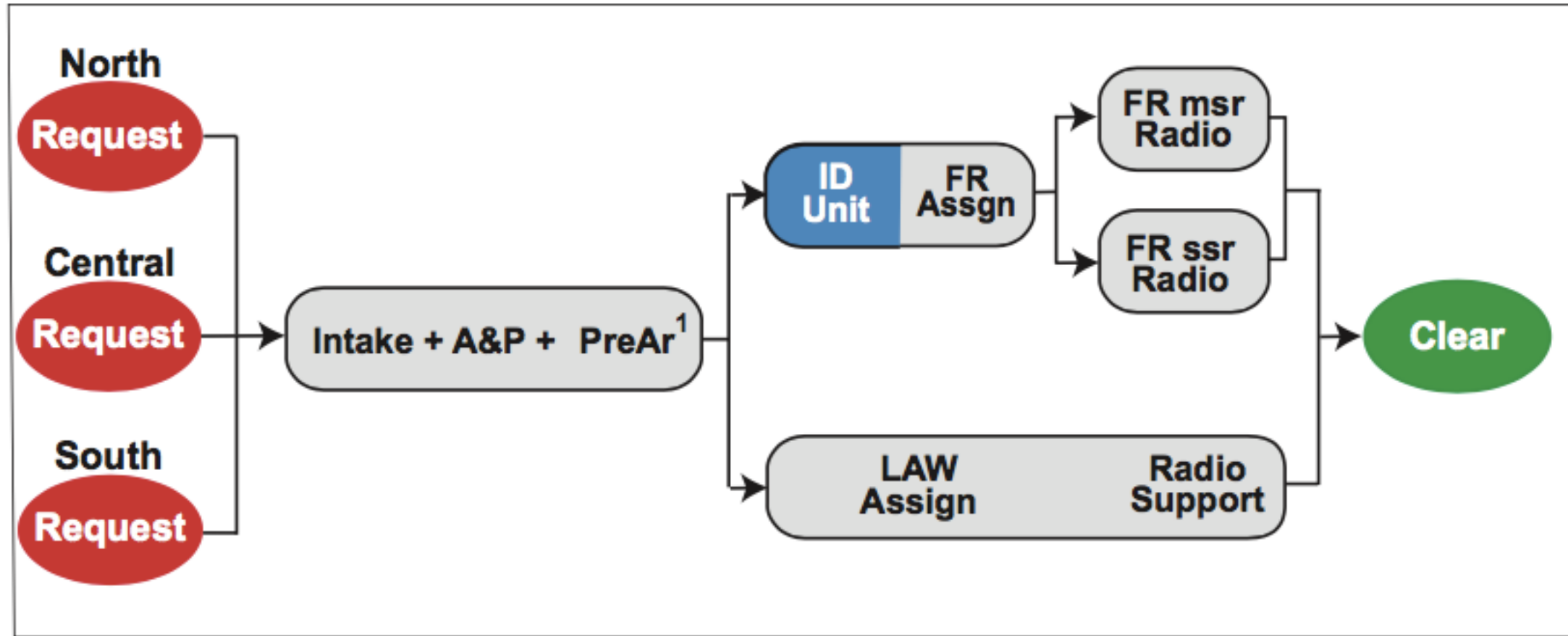
Year	Dispatch Model	Workstation Name			Surge		
2015	Triple PSAP	Central Assign FIRE			+ 0.00 σ		
Hour of Day	Hourly Averages				Workstation Staffing & Performance		
	FIRE	LAW	Radio	Σ Erlangs	OnTask	Immediate Answer [%]	Ans Delay @ 95 %-tile [sec]
00:00	9.96		108.57	0.287	5	100.00	0.00
01:00	8.84		96.56	0.255	5	100.00	0.00
02:00	8.05		87.74	0.232	5	100.00	0.00
03:00	7.44		81.15	0.214	5	100.00	0.00
04:00	6.93		75.51	0.199	5	100.00	0.00
05:00	7.32		79.99	0.211	5	100.00	0.00
06:00	8.69		94.39	0.252	5	100.00	0.00
07:00	11.85		129.07	0.342	5	100.00	0.00
08:00	15.00		163.64	0.436	5	99.99	0.00
09:00	17.14		186.62	0.497	5	99.98	0.00
10:00	18.79		204.97	0.547	5	99.97	0.00
11:00	18.73		204.29	0.546	5	99.97	0.00
12:00	19.01		207.54	0.555	5	99.97	0.00
13:00	18.68		203.84	0.546	5	99.97	0.00
14:00	18.55		202.36	0.544	5	99.97	0.00
15:00	19.14		208.99	0.568	5	99.97	0.00
16:00	18.37		200.30	0.543	5	99.97	0.00
17:00	18.72		204.37	0.555	5	99.97	0.00
18:00	18.57		202.47	0.550	5	99.97	0.00
19:00	16.96		185.08	0.502	5	99.98	0.00
20:00	16.31		178.08	0.479	5	99.98	0.00
21:00	15.45		168.45	0.454	5	99.99	0.00
22:00	13.93		152.07	0.408	5	99.99	0.00
23:00	11.96		130.68	0.347	5	100.00	0.00
Hourly Averages				Average	Req'd Hrs	Weighted	Weighted
				Erlangs	OnTask	% Immed Ans	Ans Delay
				14.35	120	99.98	0.00

Central FIRE Assignment workstations staffed to BSO specs as documented in PSAP CALL ANALYSIS NOVEMBER 2015.xls

Effectiveness & Efficiency Recommendations

- Once the CAD is upgraded to allow automatic computer assignment / recommendation of response units for fire/rescue calls, a single “gatekeeper” function / fire rescue alert channel can be implemented to manually approve the assignment consistent with Option 2.
 - Upon dispatch, pre-defined tactical radio channels would be used for more routine for fire incidents and EMS incidents.
 - More significant incidents (structure fires, major/multiple unit responses) would be assigned a dedicated tactical channel.
- Law Enforcement radio channels also have significant existing capacity and should be consolidated to the degree possible.

Figure 68. Dispatch Model Option 2



¹Pre-Arrival Instructions only on EMS incidents with Echo-Delta determinants

Figure 1. Comparison of Current and Three Options “Seats” Required


	Current BSO Model			FITCH Options - Hours		
	All 3 PSAPs – "Seats" Required	Static or Variable by Hour	Current Staffing Hours	Option 0	Option 1	Option 2
Intake	16.1	Variable	386	493	301	301
F/R Dispatcher	15.0	Static	360	116	116	153
Law Dispatcher	23.0	Static	552	235	235	235
Subtotal	54.1		1,298	844	652	689
Phone Support	3.0	Static	72	72	72	72
TTY	3.0	Static	72	72	72	72
Support	2.0	Static	48	48	48	48
Supervisor	7.0	Static	168	168	168	168
Subtotal	15.0		360	360	360	360
TOTAL	69.10		1,658	1,204	1,012	1,049

Relief staffing not included above¹:


Fire Relief 3
 Law Relief 4
 Intake Relief 5.3

Workstations	Functions	Dispatchers		Immed Answer	Weighted Average Answer Delay [sec] @ XX th %-tile
		Min / Max	Hours OnTask		
Consolidated Intake	Call Intake, A&P ¹ , & PreArv ²	7/17	301	93.18%	5.32 sec @ 95 th 1.83 sec @ 50 th
FR Review (Gatekeeper)	FR Assign Review	1/2	38	96.41%	1.64 sec @ 95 th 0.57 sec @ 50 th
FR msr Radio*	FR Tactical Radio Support	2/4	67	89.33%	137.07 sec @ 95 th 47.17 sec @ 50 th
FR ssr Radio*	FR EMS Radio Support	2/2	48	91.99%	2.08 sec @ 95 th 0.46 sec @ 50 th
North LAW	North LAW Assign N Radio Support	2/4	65	90.95%	2.69 sec @ 95 th 0.92 sec @ 50 th
Central LAW	Central LAW Assign Central Radio Support	2/5	92	85.65%	3.37 sec @ 95 th ¹ 1.16 sec @ 50 th
South LAW	South LAW Assign South Radio Support	2/4	78	88.02%	2.56 sec @ 95 th ¹ 0.88 sec @ 50 th
Option 2 Hours-OnTask					

General Observations

- There are sufficient resources in the System to implement the recommendations – resource reallocation will be required in a number of areas.
 - Major changes should be done, for the most part, sequentially – not concurrently.
 - Recommendations should be accomplished within 12 months.
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Implementation Timeframe

- While the modeling demonstrates that sizable adjustments are available, implementation of changes should occur in a more deliberate and measured manner.
 - Many recommended changes should occur in two or three phases – titrating staffing levels while monitoring performance.
 - It is important to ensure that each change phase is completely embedded in operational procedures and the organization's culture, before seeking additional change.
 - Ultimately, changes should be able to be fully implemented within 12 months.
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QUESTIONS