

Modeling Approach-Pinellas County



**SCENARIO REVIEW AND DISCUSSION: BASELINE, IPS AND
SANFORD/MILLICAN (FIRE TRANSPORT), HYBRID, CARES**



Outline of the Presentation



- Who we are
- What we were asked to do
- How we accomplished it
- The modeling

- Baseline
- IPS
- Sanford Millican
- Hybrid
- CARES

A red bracket on the left side of the slide groups the five modeling options (Baseline, IPS, Sanford Millican, Hybrid, CARES) and points towards the text on the right.

Description of scenarios
Summary of findings

Who we are



- Fitch
- Optima

What we were asked to accomplish



- Using commercially available software evaluate
- IPS report
- Sanford Millican report
- Determine the workload of Sanford Millican and correct it to reflect a realistic outcome
- Based on the consultants' experience develop an optimized option that would form the baseline for discussion between the county and the cities
 - The system excellence had to be maintained (or as close as possible)
 - The system costs had to be reduced if possible (No increased cost)

How we accomplished it



- Pulled data from two computer aided dispatch systems from fiscal year 2011
- **Consultant and PSS Staff Conference Calls:** Occurred biweekly between September 2012 and end of May 2013; cancellations were infrequently and were usually due to consultants having recently been on-site)
-
- **Bi-weekly Situation Reports** (Project Updates): provided bi-weekly for the duration of the project through end of May 2013
-
- **Consultants on site over project duration:**
 - Jay Fitch PhD
 - Chief Jim Broman MPA
 - Guillermo Fuentes MBA
 - Chris Callsen
 - Dianne Wright MPA

How we accomplished it continued



- **Stakeholders included in various meetings:**

- **Mayor and Commissioners**
- **County Administrator and Staff**
- **Public Safety Services Staff**
- **County Information Technology**
- **Fire Chiefs and staff**
- **City Managers**
- **State elected officials**
- **Other local elected officials**

- **Labor Representatives**
- **EMS Advisory Council**
- **Medical Control Board**
- **Ambulance Contractor**
- **System Medical Director**
- **Hospital Administrators**
- **Lt. Sanford and Capt. Millican**
-

How we accomplished it continued



- **Survey tools:** Sent to Fire Chiefs to clarify operational issues for Sanford/Millican and one for IPS to clarify operational issues.
- **Fire Chiefs:** Chiefs were engaged and offered opportunities to meet with consultants, attend simulation previews and to provide feedback on the models on all but one on-site visit.
- **Crew Cost Development:** sent to Fire Chiefs to review, confirm or amend

On-Site Dates

Mid-October 2012

Early November 2012

Early December 2012

Early January 2013

Mid-January 2013

Early February 2013

Early March 2013

Mid-March 2013

Late April (Two WebEx meeting opportunities)
2013

Early May 2013

Mid-May 2013

Planned: June 24

Planned: July 2013

Planned: August 2013



Modeling

Understanding the data

Fire District	Total Calls	Fire Emergency Other	Fire Emergency Medical	Cancelled or Downgraded	% Cancelled/ Downgraded
St. Petersburg	47,084	7,619	27,083	12382	26.3%
Clearwater	24,602	3,919	14,482	6201	25.2%
Largo	19,993	2,493	12,642	4858	24.3%
Pinellas Park	14,063	2,314	8,174	3575	25.4%
Seminole	10,025	1,533	6,062	2430	24.2%
Lealman	7,353	1,051	4,404	1898	25.8%
Palm Harbor	7,225	884	4,456	1885	26.1%
Dunedin	6,246	785	3,794	1667	26.7%
Tarpon Springs	3,763	663	2,183	917	24.4%
South Pasadena	2,348	229	1,495	624	26.6%
Safety Harbor	2,318	375	1,432	511	22.0%
East Lake	2,228	373	1,278	577	25.9%
Gulfport	2,036	405	1,097	534	26.2%
St. Pete Beach	1,908	279	1,200	429	22.5%
Pinellas Suncoast	1,802	320	977	505	28.0%
Oldsmar	1,645	312	919	414	25.2%
Treasure Island	1,254	220	712	322	25.7%
Madeira Beach	1,108	199	598	311	28.1%
Redington Beach	685	111	384	190	27.7%
Belleair	592	110	376	106	17.9%
Belleair Bluffs	526	88	306	132	25.1%
Tierra Verde	311	64	168	79	25.4%
Fort Desoto Park	140	24	68	48	34.3%
Oldsmar Contract	8	1	4	3	37.5%
Pinellas County	159,263	24,371	94,294	40,598	25.5%

Review: Baseline Scenario



- System tuned to match historic performance
- Simulates both fire and EMS incident response
- Quick Reminder: The system (and the model) contain both rescue units and rescue capability
- Modeling Approach:
 - Set Boundaries of Performance (Worst Case and Best Case)
 - Evaluate Performance
 - Optimize Unit/Resource Placement
 - Determine Scenarios Based Upon Specified Criteria

Summary Baseline



Simulation Baseline

Achieves response time targets. Less than 1 percent difference from historic fire model and 3-4 percent from the historic Sunstar model

Has a combined 1.2 million unit hours

Has crew costs of \$ 112.8 Million

IPS Scenario Discussion

IPS A-1 (No Resource Added)

- Essentially 'IPS Baseline'
- No Rescue Capability Added
- Performance Impact:
 - Fire Medical Calls ↓ to 83.29% (-8.63)
 - Fire Other Calls: ↓ to 92.25% (-1.37%)
- **IPS A-2 (All 19 Fire Units Transitioned to ALS Capability)**
 - Fire Medical Calls ↓ to 91.13%
 - Fire Other Calls ↓ to 92.37%

IPS A-3 (Resource Enhancement and Optimized)

- 13 units upgraded to Rescue Capability
- Optimization used to evaluate the best possible station placements for upgraded capability

Response Target	Call Count	Baseline	Scenario	Difference
Fire Emergency Medical	94,294	91.92%	90.75%	-1.17%
Fire Emergency Other	24,371	93.63%	92.37%	-1.26%
All Fire Calls	156,454	92.20%	90.96%	-1.24%

Summary IPS



Simulation IPS

Achieves response time targets as an aggregate but some areas are hurt by this model

Cuts over 215 thousand unit hours from the system

Decommissions 25 apparatus and 150+ firefighters would need to be laid off

Has crew costs of \$90.8 Million

Incurs additional fleet operational costs of \$5.0 Million, the use of heavy equipment for response has additional risks of accidents and of vehicle break down

Demonstrates excess capacity in the system

Fire Transport Scenarios (Sanford/Millican)



SM-1 (Initial Configuration)

- Implementation of MPDS Driven Dispatch Approach
- 12 Hour Shift Schedule for PLU Rescue Units
- 16 Peak Hour Units
- 36 Rescue Units
- Performance on Fire Medical Calls exceeds the baseline as does Fire Emergency Calls
- Primary Concern: Utilization: Rescues @ 42.21% and PLUs @ 62.18% (very heavy workload)

SM-2 (Utilization Constrained)

- 12 Hour Shift Schedule for PLU Rescue Units
- 48 Peak Load Units
- 43 Rescue Units
- Performance on Fire Medical Calls exceeds the baseline as does Fire Emergency Calls and Fire All Calls
- Utilization Controlled: Rescues @ 24.60% and PLUs @ 34.34%

Summary Sanford/ Millican Proposal



Simulation SM-1

Achieves response time targets.

Has crew costs of \$111.8 Million

Crew utilization levels are not safe to implement (over 60 percent work load for 12 hours and over 40 percent for 24 hours)

To be cost competitive the system SM-1 cuts over a 135 thousand unit hours from the system, so for basically the same cost you are getting less service

New governance structure operationally difficult to implement

Summary Sanford/ Millican Adjusted



Simulation SM-2

Achieves response time targets.

Crew costs are significantly more than other models: \$120.9 Million

Complies with utilization recommendations

New governance structure operationally difficult to implement

Utilization Across Models



Unit Type	Baseline	IPS-1	IPS-2	SM-1	SM-2
Rescue	14.46%	N/A	N/A	41.21%	24.60%
Engine	8.70%	14.84%	13.49%	8.44%	7.54%
Truck	3.91%	5.75%	8.72%	3.57%	3.07%
Squad	4.41%	5.87%	6.80%	3.56%	2.89%
Fire PLU	N/A	N/A	N/A	62.18%	34.34%
Sunstar	54.80%	55.27%	54.90%	N/A	N/A

Understanding Hybrid Models



- What are Hybrid Models
- Cost per time on task
- Cost per Call
- Fragmenting transport systems
- Cost of fragmenting transport systems

What are Hybrid Models



- Hybrid models are based on the principle of subdividing the calls to multiple transport providers either based on geography (one city transports and another provider does the rest of the calls) or on call type (emergency versus interfacility) or a combination of both. One has to first determine the cost per call by each of the providers in order to understand if it is fiscally responsible to substitute one provider with another.

Crew Time on Task



- There are two components to the cost of these hours of crew time-on-task. First, a crew is paid for its whole shift, not solely while it is running on a call. It is not possible to directly purchase hours of crew time-on-task. Rather, the only thing that can be purchased is total crew hours.
- Second, the concept of workload enters the picture. For instance, a fire department crew works a 24 hour shift. Of the 24 hours, only some fraction can be spent actively responding to the needs of patients. This fraction is referred to as “workload” and is defined as:
 -
 - $\text{Workload} = [\text{hours crew time-on-task}] / [\text{total crew hours}]$ **[Eqn. 1]**
 -
 - What the emergency medical transport function in Pinellas County requires is hours of crew time-on-task. This metric is obtained by an algebraic rearrangement of Equation 1.
 -
 - $[\text{hours crew time-on-task}] = \text{Workload} * [\text{total crew hours}]$ **[Eqn. 2]**

Cost per time on task



Cost Factors	Sunstar Ambulance Service	St. Petersburg Fire Department 24-hr Rescues
Hours of Crew-On-Task (active work) A	1.00	1.00
Workload B	0.57	0.246
Hours of Crew-On-Shift (total hours on duty) C = A / B	1.75	4.07
Cost of 1.00 Hour Crew-On-Shift (total hours) * D	\$42.23	\$124.52
Cost of 1.00 Hour Crew-On-Task E = C x D	\$73.90	\$506.18
Relative Cost 1.00 Hour Crew-On Task F = E / Sunstar	1.0 X	6.8 X

Cost per Call



District	Crew Time-on-Task [\$\$ / hour]		Call Volume	Total Personnel Costs of Transports		Increased Cost of Transport by FD's
	Sunstar	Fire Crews		By Sunstar	By FD's	
St. Petersburg	\$73.90	\$506.18	27,083	\$ 2,001,434	\$ 13,708,873	\$ 11,707,439
Clearwater	\$73.90	\$300.20	14,482	\$ 1,070,220	\$ 4,347,496	\$ 3,277,276
Largo	\$73.90	\$366.26	12,642	\$ 934,244	\$ 4,630,259	\$ 3,696,015
Pinellas Park	\$73.90	\$308.83	8,174	\$ 604,059	\$ 2,524,376	\$ 1,920,317
Seminole	\$73.90	\$327.36	6,062	\$ 447,982	\$ 1,984,456	\$ 1,536,474
Lealman	\$73.90	\$348.58	4,456	\$ 329,298	\$ 1,553,272	\$ 1,223,974
Palm Harbor	\$73.90	\$362.03	4,404	\$ 325,456	\$ 1,594,380	\$ 1,268,924
Dunedin	\$73.90	\$311.54	3,794	\$ 280,377	\$ 1,181,983	\$ 901,606
Tarpon Springs	\$73.90	\$336.67	2,183	\$ 161,324	\$ 734,951	\$ 573,627
South Pasadena	\$73.90	\$385.81	1,495	\$ 110,481	\$ 576,786	\$ 466,305
Safety Harbor	\$73.90	\$349.84	1,432	\$ 105,825	\$ 500,971	\$ 395,146
East Lake	\$73.90	\$311.75	1,278	\$ 94,444	\$ 398,417	\$ 303,973
Gulfport	\$73.90	\$270.61	1,200	\$ 88,680	\$ 324,732	\$ 236,052
St. Petes Beach	\$73.90	\$313.37	1,097	\$ 81,068	\$ 343,767	\$ 262,699
Pinellas Suncoast	\$73.90	\$406.10	977	\$ 72,200	\$ 396,760	\$ 324,560
Oldsmar	\$73.90	\$299.84	919	\$ 67,914	\$ 275,553	\$ 207,639
Treasure Island	\$73.90	\$293.50	712	\$ 52,617	\$ 208,972	\$ 156,355
Madeira Beach	\$73.90	\$277.72	598	\$ 44,192	\$ 166,0747	\$ 121,885

Fragmented systems



- The private provider would be obliged to have vehicles at the ready to back up each fire service. This forces greater idle time into the current highly efficient Sunstar transport system and increases the cost that will be charged by the private provider (some of this cost may be diminish in a future contract).
- This also creates noncontiguous coverage areas which means ambulances are moving across areas rather than stopping in the area further increasing the idle time. Below is an explanation on the cost of a disintegrated transport system

Cost of Fragmented systems



Cost Factors	Sunstar Ambulance Service Current	Sunstar Ambulance Fragmented
Hours of Crew-On-Task (active work) A	1.00	1.00
Workload B	0.57	0.34
Hours of Crew-On-Shift (coverage) C = A / B	1.75	2.94
Cost of 1.00 Hour Crew-On-Shift (coverage) * D	\$42.23	\$42.23
Cost of 1.00 Hour Crew-On Task E = C x D	\$73.90	\$124.16
Relative Cost 1.00 Hour Crew-On Task F = E / Sunstar	1.0 X	1.7 X

Cost of Fragmented system continued

District	Sunstar Crew Time-on-Task [\$\$ / hour]		Call Volume	Total Personnel Costs of Sunstar Transports		Increased Cost of Transports by Sunstar
	Current	Fragmented		Current	Fragmented	
St. Petersburg	\$73.90	\$124.16	27,083	\$ 2,001,434	\$ 3,362,625	\$ 1,361,191
Clearwater	\$73.90	\$124.16	14,482	\$ 1,070,220	\$ 1,798,085	\$ 727,865
Largo	\$73.90	\$124.16	12,642	\$ 934,244	\$ 1,569,631	\$ 635,387
Pinellas Park	\$73.90	\$124.16	8,174	\$ 604,059	\$ 1,014,884	\$ 410,825
Seminole	\$73.90	\$124.16	6,062	\$ 447,982	\$ 752,658	\$ 304,676
Lealman	\$73.90	\$124.16	4,456	\$ 329,298	\$ 553,257	\$ 223,959
Palm Harbor	\$73.90	\$124.16	4,404	\$ 325,456	\$ 546,801	\$ 221,345
Dunedin	\$73.90	\$124.16	3,794	\$ 280,377	\$ 471,063	\$ 190,686
Tarpon Springs	\$73.90	\$124.16	2,183	\$ 161,324	\$ 271,041	\$ 109,717
South Pasadena	\$73.90	\$124.16	1,495	\$ 110,481	\$ 185,619	\$ 75,138
Safety Harbor	\$73.90	\$124.16	1,432	\$ 105,825	\$ 177,797	\$ 71,972
East Lake	\$73.90	\$124.16	1,278	\$ 94,444	\$ 158,676	\$ 64,232
Gulfport	\$73.90	\$124.16	1,200	\$ 88,680	\$ 148,992	\$ 60,312
St. Petes Beach	\$73.90	\$124.16	1,097	\$ 81,068	\$ 136,204	\$ 55,136
Pinellas Suncoast	\$73.90	\$124.16	977	\$ 72,200	\$ 121,304	\$ 49,104
Oldsmar	\$73.90	\$124.16	919	\$ 67,914	\$ 114,103	\$ 46,189
Treasure Island	\$73.90	\$124.16	712	\$ 52,617	\$ 88,402	\$ 35,785
Madeira Beach	\$73.90	\$124.16	598	\$ 44,192	\$ 74,248	\$ 30,056

Hybrid System Conclusion



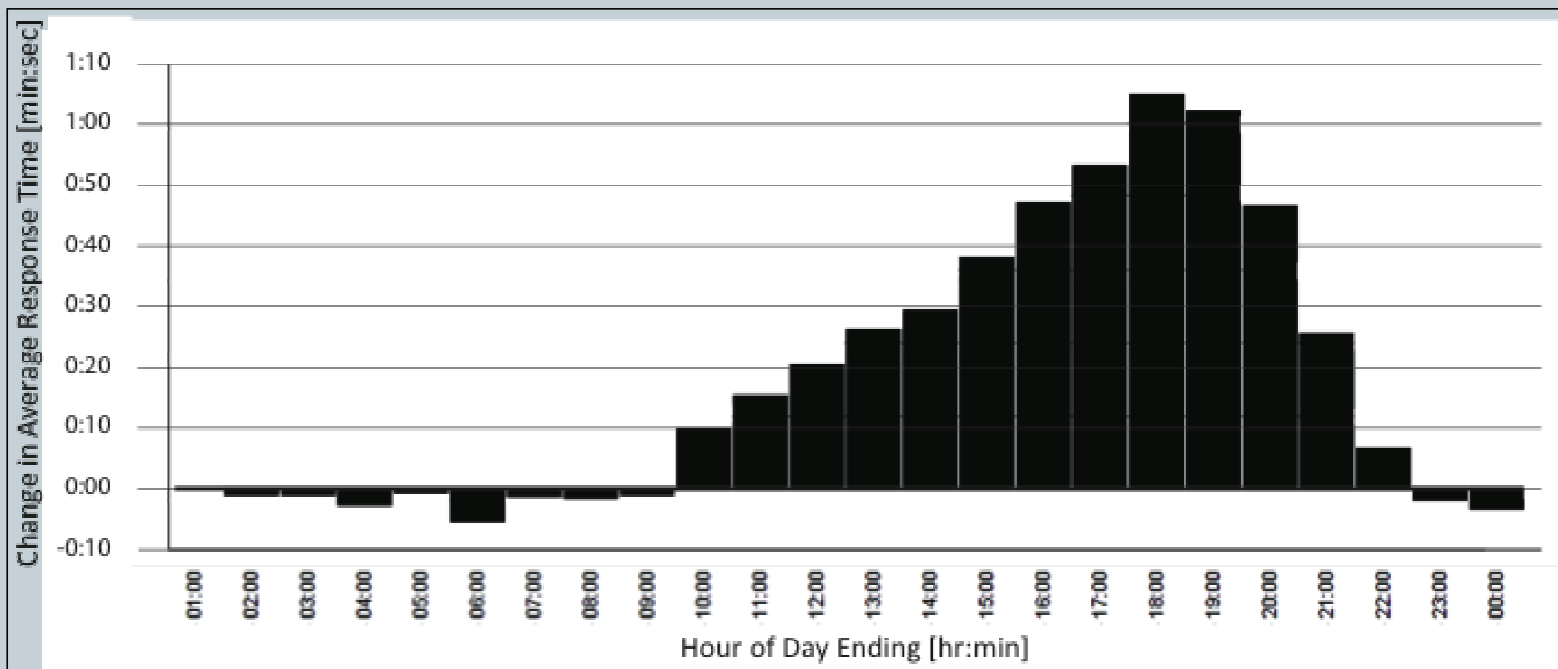
- The additional cost in the hybrid system is congruent with the findings of Sanford Millican-1. In order for a fully optimized fire transport model to be cost competitive, the system needs to be reduced by 135 000 unit hours.
- Even if one assumed that no additional dollars would be spent on the fire system and one allowed the fire departments to transport based on whatever capacity they have, the county would still need to give the private provider an additional \$ 4.675 million to maintain the current level of service (and current contract).
- Simply put the fragmentation of the transport model introduces too much idle time and non-contiguous territory that adds costs to the system.

Community-wide Alignment of Resources for Efficiency and Service (CARES)



- Reduce redundancy in any area that has multiple response units during hours that don't require them
- System reduced 19 (mostly rescue) units from 22:00 hours until 8 am
- The differences between response time performance of CARES-1 compared to HS-1 for Fire Emergency Medical and Fire Emergency Other calls are insignificant.
- The CARES-1 simulation shows that scheduled unit hours in the fire fleet decrease by 72,934 compared to the Historic Simulation, HS-1.
- Mileage in the fire fleet increases marginally by 10,076 miles. This will have a negligible effect on operational costs.

Evaluation of Resource Impact



Sunstar Dispatched Only As Needed: Alpha/Omega Calls



- A baseline to this scenario was developed by not dispatching a Sunstar vehicle to any one of the 23,624 Alpha and Omega calls.
- There is no significant change in compliance for Sunstar calls. There is a reduction in utilization for Sunstar vehicles, which drops from 54.80% to 47.78%. The total distance travelled for Sunstar vehicles also drops from 2,431,272 miles to 2,117,894 miles.

Response Target	Call Count	Baseline	Scenario	Difference
Echo, Delta, Charlie, NA	94,364	94.84%	94.96%	0.12%
Bravo	26,499	94.65%	94.88%	0.23%
Alpha, Omega	23,624	99.96%	99.90%	-0.06%
Any ProQA	144,487	94.56%	94.34%	-0.22%
Sunstar P1	84,379	95.73%	95.63%	-0.10%
Sunstar P2	61,707	87.51%	87.26%	-0.25%
Sunstar P1 and P2 no ProQA	6,692	37.01%	38.27%	1.26%

Sunstar Only: Alpha/Bravo



- No Fire vehicles are dispatched to the calls with Alpha, Omega and Bravo ProQA determinant, if there's a Sunstar vehicle within 10 minutes driving time.

Response Target	Call Count	Baseline	Scenario	Difference
Echo, Delta, Charlie, NA	94,364	94.84%	95.09%	0.25%
Bravo	26,499	94.65%	69.09%	-25.56%
Alpha, Omega	23,624	99.96%	98.92%	-1.04%
Any ProQA	144,487	94.56%	84.50%	-10.06%
Sunstar P1	84,379	95.73%	90.57%	-5.16%
Sunstar P2	61,707	87.51%	71.14%	-16.37%
Sunstar P1 and P2 no ProQA	6,692	37.01%	38.33%	1.32%

Summary Community-wide Alignment of Resources for Efficiency and Service CARES



Simulation CARES

Achieves response time targets.

Crew costs are less than current system \$105.7 Million

Retains a balanced inventory of apparatus – matched to call demand

Utilizes current governance structure.

Recommends use of fire on low acuity calls (alpha calls) as primary response :

- **Removing fire from alpha calls does not reduce unit hours**
- **Sending fire as primary responder increases fire work load**
- **Follows fires community mission**
- **Reduces unnecessary pressure on transport units by potentially canceling 8000 transports, scheduling 8000 transports and only having 8000 immediate responses on low acuity calls**
- **Sets the system up well for accountable care in which patient transport may not be key focus of system**

Conclusion



Pinellas County	Fire Emergency Medical [min:sec] @ 90%				
	HIS-1	IPS-1	SM-1	SM-2	CARES-1
[min:sec] @ 90%	7:12	7:24	6:34	6:16	7:15
Change from HIS-1		+12 sec	-38 sec	-56 sec	+3 sec
%-tile @ 7:30	91.92%	90.75%	95.73%	97.13%	91.66%
Change from HIS-1		-1.17%	3.81%	5.21%	-0.26%

Major Costs Items [\$\$ Millions]	HIS-1	IPS-1	SM-1 ^{1,2}	SM-2 ^{1,2}	CARES-1
Fire Agencies	\$99.1	\$77.9	\$110.8	\$120.9	\$92.8
Sunstar	\$12.9	\$12.9	\$0.0	\$0.0	\$12.9
Subtotal	\$112.0	\$90.8	\$110.8	\$120.9	\$105.7
Fleet Ops Costs	\$0.0	\$4.9	\$0.0	\$0.0	\$0.0
Total	\$112.0	\$95.7	\$110.8	\$120.9	105.7
Change	\$0.0	-\$16.3	-\$1.2	+\$8.9	-\$6.3



Questions ?

