



Six Sigma DMAIC Improvement Story

Green Belt Project Objective:
**To Reduce Aviation Accounts Receivables
Greater than 90 Days Past Due**

Last Updated: 03-6-14

Team: **SIGMA SQUADRON-90**

Jenny Deblois (Co-Team Leader) Sara Del Calvo (Co-Team Leader)
Roy Ferreira Juan Badia Fernando Casamayor Eugene Codner

Anne Lee (Sponsor)



Lean Six Sigma Problem Solving Process

The team utilized the 5-Step DMAIC problem solving process.

DMAIC Performance Improvement Process

Process Step		Description of Team Activities
Number	Name	
1	DEFINE	<ul style="list-style-type: none"> • Select Problem • Identify Project Charter • Develop Project Timeline • Establish Method to Monitor Team Progress • Construct Process Flowchart • Develop Data Collection Plan • Display Indicator Performance “Gap”
2	MEASURE	<ul style="list-style-type: none"> • Stratify Problem (i.e. “Gap”) • Identify Problem Statement
3	ANALYZE	<ul style="list-style-type: none"> • Identify Potential Root Cause(s) • Verify Root Cause(s)
4	IMPROVE	<ul style="list-style-type: none"> • Identify and Select Improvement(s) • Identify Barriers and Aids • Develop and Implement Improvement Plan • Confirm Improvement Results
5	CONTROL	<ul style="list-style-type: none"> • Standardize Improvements within Operations • Implement Process Control System (PCS) • Document Lessons Learned • Identify Future Plans



Select Problem and Identify Project Charter

The project was assigned by Aviation Mgmt & the team developed a Project Charter.

Project Charter	
Business Case	Project Name: To Reduce Departments Accounts Receivable balance (over 90 Days) 2. ✓
	Problem/Impact: Past Due Accounts adversely affect Aviation many ways including: Additional Accounts Receivable Staff time is required to follow-up on accounts and sometimes negotiate and monitor special payment plans; may cause an economic disadvantage to customers with good payment histories; could potetially affect the annual cost per enplaned passenger 1. ✓
	Expected Benefits: Reduce the A/R balance greater than 90 days
Objectives	Outcome Indicator(s) P3- \$ Accounts Receivable Greater than 90 Days Past Due
	Proposed Target(s) Target = \$16.4 million
	Time Frame: Oct 2013 through June 2014
	Strategic Alignment: Supports the County's Fiscal Responsibility; provide sound financial and risk mgmt
Scope	In Scope: Aviation A/Rs > 90 Days
	Out-of-Scope: Other County Departments' A/Rs
	Authorized by: Anne Lee
Team	Sponsor: Anne Lee
	Team Leader: Jenny Deblois, Sara Del Calvo
	Team Members: Roy Ferreira, Juan Badia, Fernando Casamayor, Eugene Codner
	Process Owner(s): Sergio San Miguel, MDAD Controller; Greg Owens, Division Director, MDAD Real Estate
	Mgmt Review Team: Anne Lee
Schedule	Completion Date: 27-Jun-14
	Review Dates: Monthly and Final Review in July 2014
	Key Milestone Dates: See Action Plan



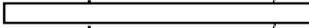
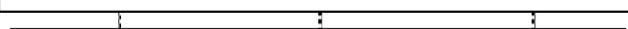
Develop Project Timeline Plan

The team developed a timeline plan to complete the Project.

4. 

Legend:	
	= Actual
	= Proposed

WHAT: Complete DMAIC Story Project by June 27, 2014

DMAIC Story Process Step	WHEN					
	2013			2014		
	Oct	Nov	Dec	Jan	Feb	Mar
1. Define	 		Completed 11/20/13			
2. Measure		 		Completed 12/6/13		
3. Analyze			 	Completed 01/31/14		
4. Improve				 		
5. Control						  on going

06/27/14



Monitor Team Progress

The Team and Management used a Checklist to monitor team progress.

		DMAIC Story Checkpoints		
PLAN	Step 1 Define	Objective: Demonstrate the importance of improvement needs in measurable terms.		
		1. The stakeholders' need(s) were identified.	✓	
		2. The problem can be described as an "object" with a "defect" with unknown cause(s) that need to be identified.	✓	
		3. A line graph outcome indicator was constructed that appropriately measures the problem (or gap).	✓	
	Step 2 Measure	Objective: Investigate the features of the indicator, stratify the problem and set a target for improvement.		
		4. A schedule for completing the five DMAIC Story steps was developed.	✓	<ul style="list-style-type: none"> Team identified an indicator; developed a Flowchart and a Spreadsheet Paretos, Histograms and Pie Charts
		5. Data contained or directly linked to the indicator were stratified from various viewpoints (i.e., what, where, when and who) and a significant dataset was chosen.	✓	
		6. A target for improvement was established based on the stakeholders' need.	✓	
	7. The impact of the target on the indicator was determined.	✓		
	Step 3 Analyze	Objective: Analyze the stratified data to identify and verify the root causes.		
		8. A problem statement that describes the "remaining dataset" was developed.	✓	<ul style="list-style-type: none"> Single Case Bore; Fishbone ; RC Verification Matrix
		9. Cause and effect analysis was taken to the root level.	✓	
10. Potential causes most likely to have the greatest impact on the problem were selected.		✓		
11. A relationship between the root causes and the problem was verified with data.	✓			
DO	Step 4 Improve	Objective: Develop and implement countermeasures to eliminate the verified root causes of the problem.		
		12. The impact of each root cause on the gap was determined.	✓	<ul style="list-style-type: none"> Countermeasures Matrix; Barriers and Aids; Action Plan
		13. Countermeasures were selected to address verified root causes.	✓	
		14. The method for selecting the appropriate countermeasures was clear and considered effectiveness and feasibility.	✓	
	15. Barriers and aids were determined for countermeasures worth implementing.	✓		
	Step 5 Control	Objective: Confirm that the countermeasures taken impacted the root causes and the problem; and that the target has been met.		
		16. The action plan reflected accountability and schedule.	✓	<ul style="list-style-type: none"> Line Graph
		17. The effect of countermeasures on the root causes was demonstrated.	✓	
18. The effect of countermeasures on the problem (or indicator) was demonstrated.		✓		
19. The improvement target was achieved and causes of significant variation were addressed.	✓			
ACT	Step 5 Control	Objective: Prevent the problem and its root causes from recurring. Maintain and share the gains.		
		20. The effect of countermeasures on the indicator representing the stakeholders' need was demonstrated.	✓	<ul style="list-style-type: none"> Process Flowchart; Process Control Chart Lessons Learned
		21. A method was established to document, permanently change, and communicate the revised process or standard.	✓	
		22. Responsibility was assigned and periodic checks scheduled to ensure compliance with the revised process or standard.	✓	
		23. Specific areas for replication were identified.	✓	
Objective: Evaluate the team's effectiveness and plan future activities.				
24. Any remaining problems (or gaps) were addressed.	✓			
25. Lessons learned, P-D-C-A of the Story process, & team growth were assessed & documented.	✓			



Hidden Costs of A/Rs greater than 90 Days Past Due

5. 

The team identified costs associated with Accounts Receivable greater than 90 days past due. Costs include...

- Additional Accounts Receivable, Real Estate and Legal staff time is required to follow-up on accounts and negotiate and monitor special payments
(conservatively estimated at 400 hrs/mo X 12 mo X \$20/Hour=\$96,000 per year)
- The potential to affect the annual cost per enplaned passenger
- Cash may be affected *(\$18.2 million not immediately available for use)*
- An economic disadvantage to customers with good payment histories

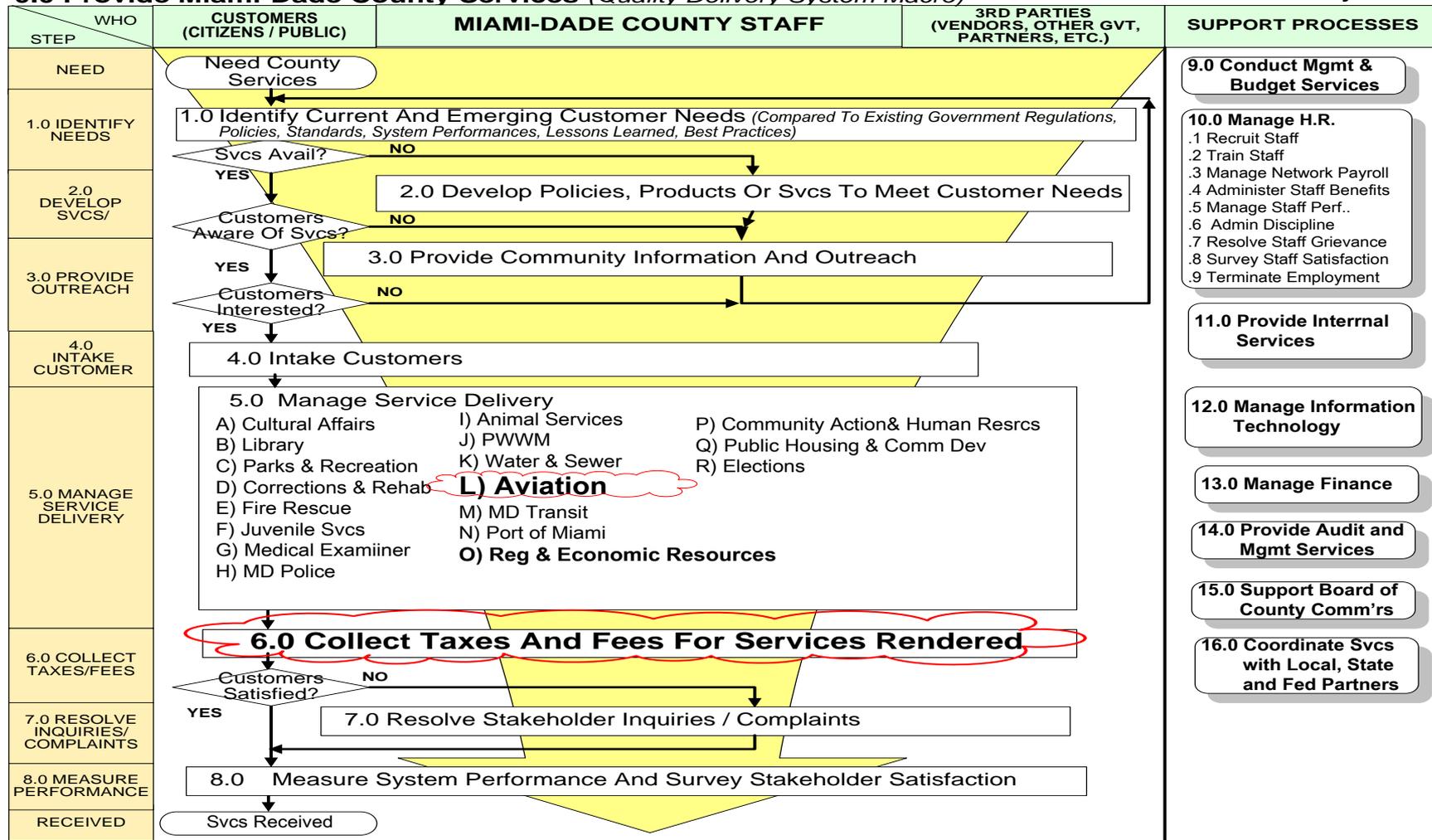


Review Miami-Dade's Quality Delivery System

We noted where our process "fits" in the MD Quality Delivery System.

0.0 Provide Miami-Dade County Services (Quality Delivery System Macro)

Process Owner: Mayor



The team will focus on a Collection Process in the Aviation Area



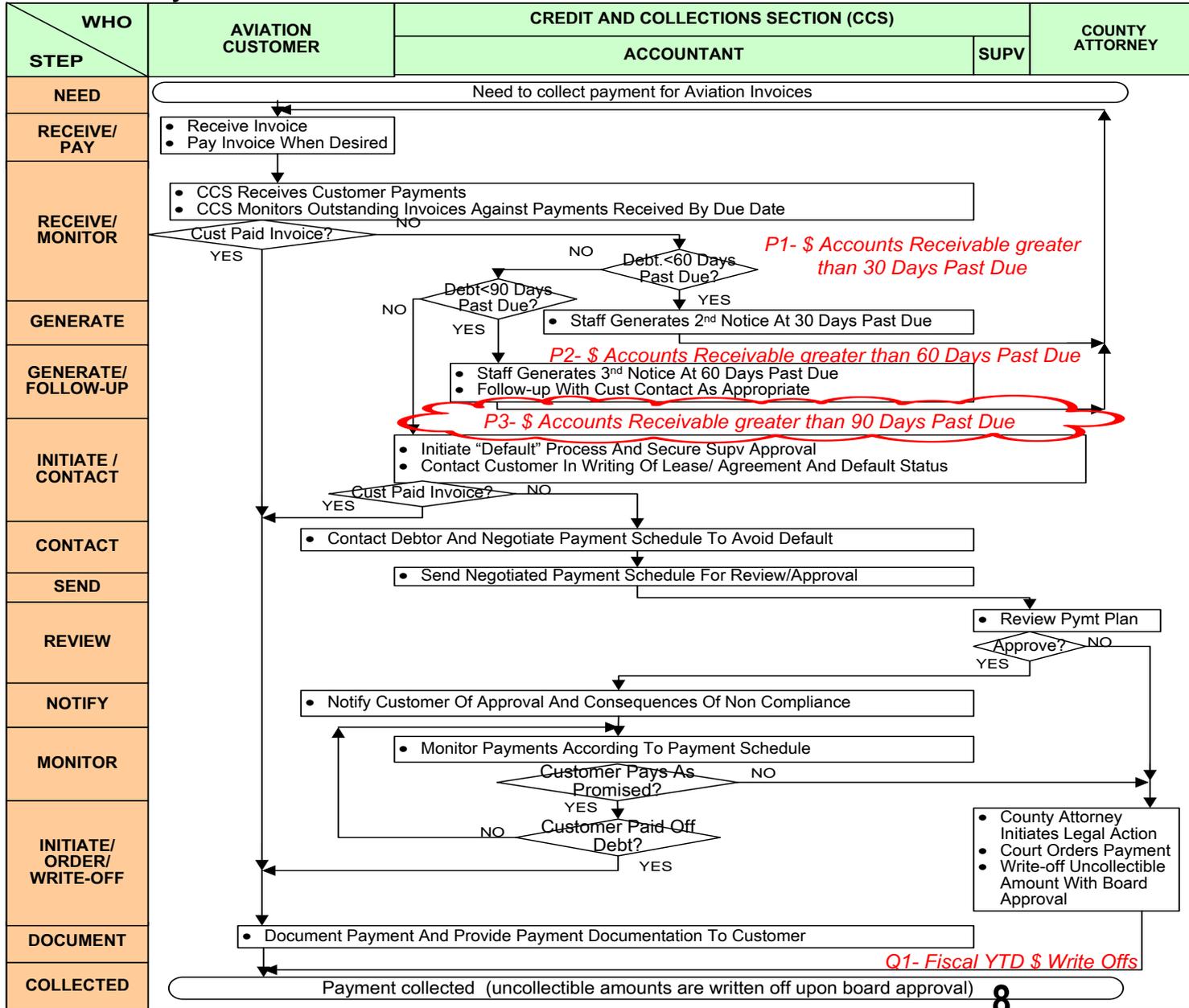
Review Process Flow Chart

The team constructed a Process flow chart describing the Process.

The team next looked closer how to capture the **P3 indicator** data.

6L.2 Collect Payments for Aviation Issued Invoices

(Process Owners: Aviation Director)



Identify Data Collection Needs

The team developed a data collection spreadsheet...each row is an **Customer Account**.

Miami Dade Aviation Collection Process Summary

BCB	DEMOGRAPHICS												
	WHO			WHERE					WHO	WHERE	WHO	WHAT	
	B	C	D	E	F	G	H	I	J	K	L	N	O
Line #	Invoice Number	Cust #	Customer Name	Invoice Category Type	Invoice Amount	Amount Paid	Balance A/R	Active Customer?	Invoice Mailed to ZIPCODE	Customer Type	Invoice Disputed ? Y/N	Credit balance	Amount of Unappl Cash
					Total			%Active			%Y	Totals	
					\$61,872,071	\$38,536,432	\$23,335,639	99.5			14.3	\$0	\$0
P3													
1	111	333	US DEP	MISCELLAN	\$ 988	\$	\$ 988	ACTIVE	33299	GOVERNMENT	Y	\$ -	\$ -
2	222	444	ABC	TRAINING &	\$ 168	\$	\$ 168	ACTIVE		GENERIC	Y	\$ -	\$ -
3	333	554	XYZ	TRAINING &	\$ 140	\$	\$ 140	ACTIVE		GENERIC	Y	\$ -	\$ -

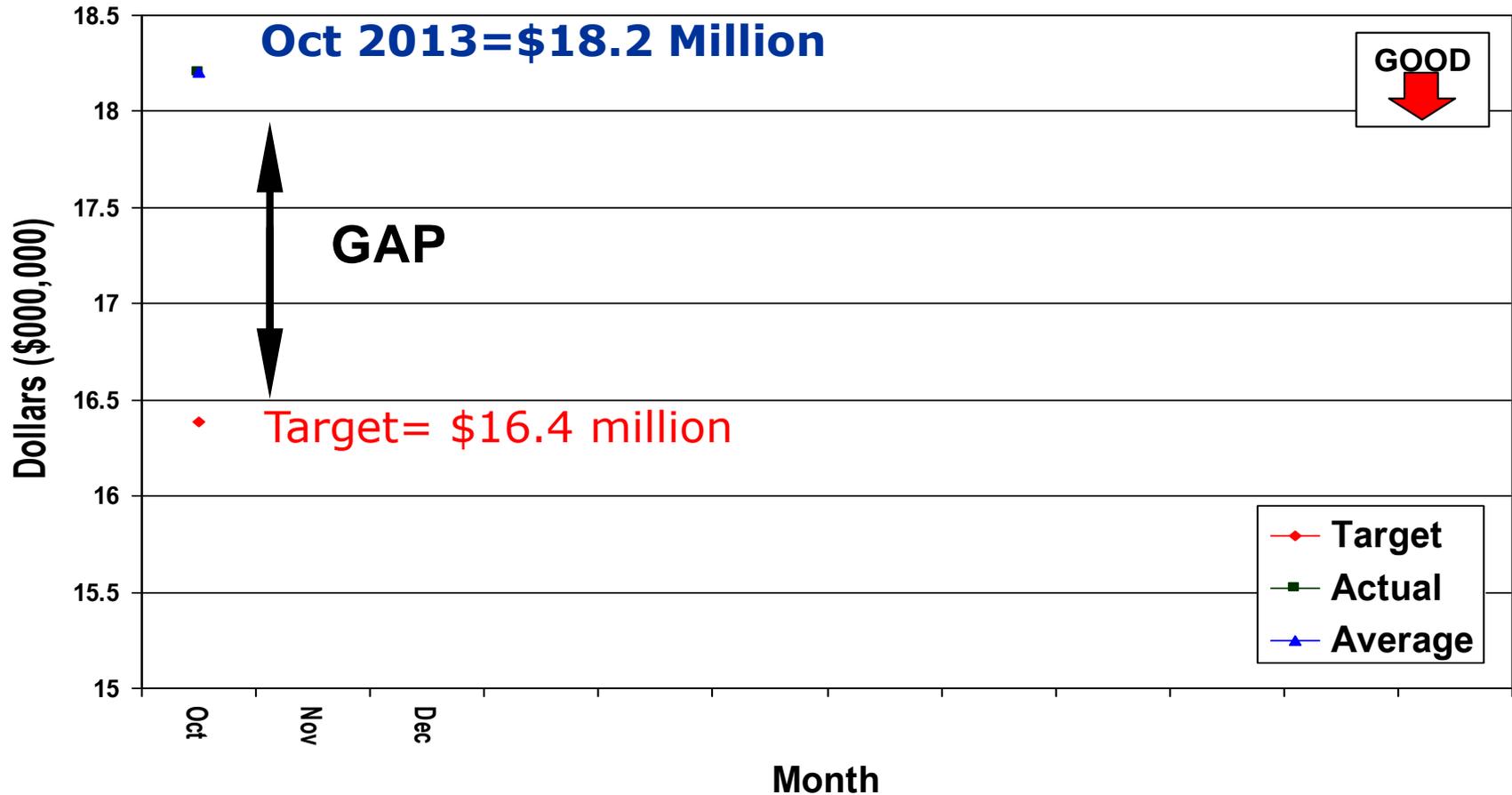
DEMOGRAPHICS				MILESTONE DATES			DURATION		BB	
WHAT	P	Q	R	S	T	U	V	AC= V-T		AH= Today-T
Security Deposit	Campus	Bankruptcy	Active Agrmt		1- Invoice Sent To Client		Last paid Date	# of Days from Invoice to Last Payment Sent	# of Days Since Invoice Sent	Comments
Totals	%MIA	%Y	%Y		Date	Day	Date			
\$0	92.9	11.6	74.3			% Mo		Avg # of Days		
								322.3	1003.8	
P4										
\$ -	MIA	N	Y		10/31/03	Fr			3698	
\$ -	TNT	N	Y		11/4/03	Tu	3/14/12	3053	3694	
\$ -	TNT	N	Y		11/4/03	Tu	3/14/12	3053	3694	



Review Selected Indicator

The team collected Q1 indicator data and reviewed performance trends:

P3 – \$ Accounts Receivable Greater than 90 Days Past Due 3.



The team next looked closer at the Gap.

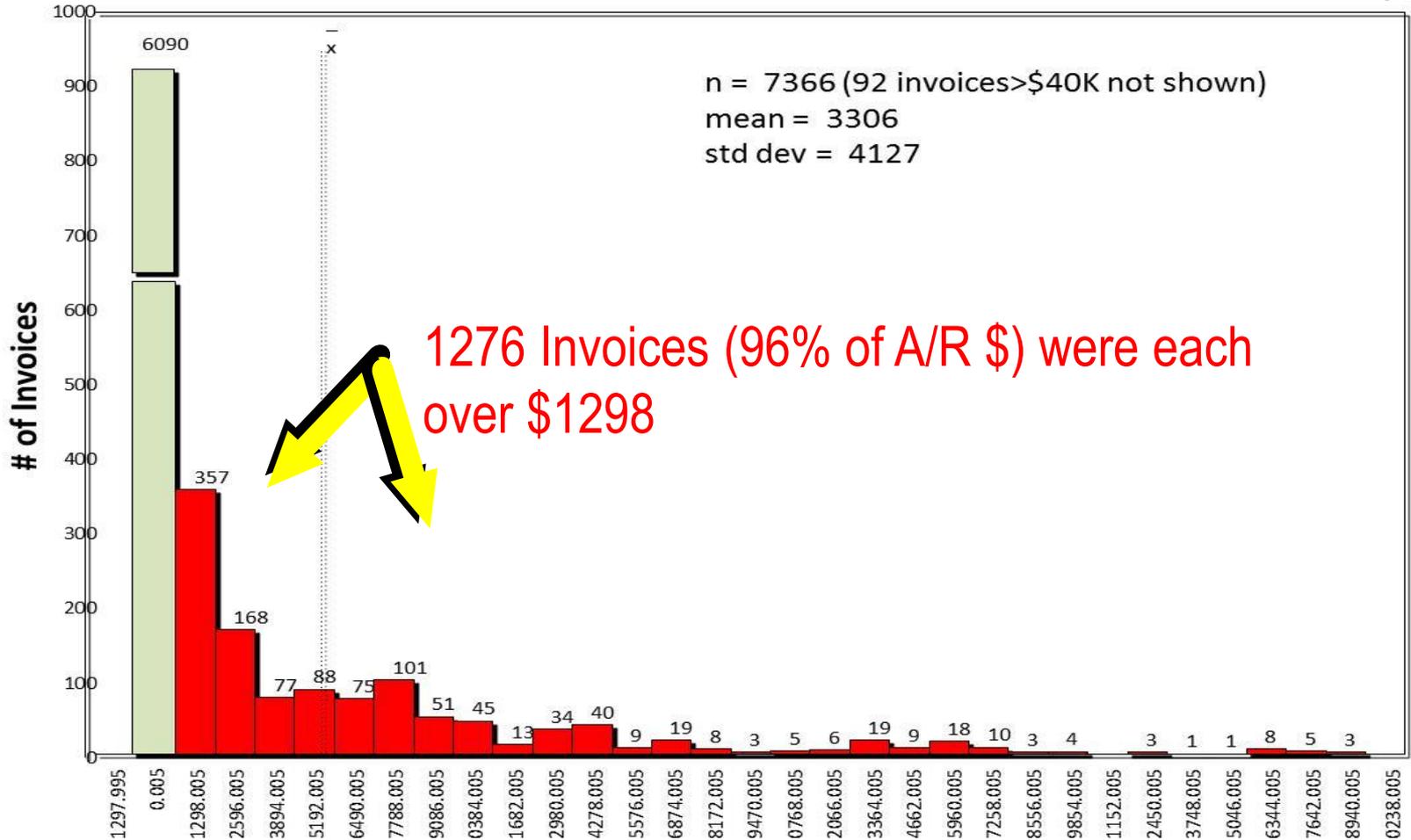


Stratify the Problem

The team stratified October 2013 Account Receivables > 90 days using a histogram and found...

Invoices Past Due > 90 Days as of Oct 2013

5.



The team looked closer at the 1276 high amount Invoices.

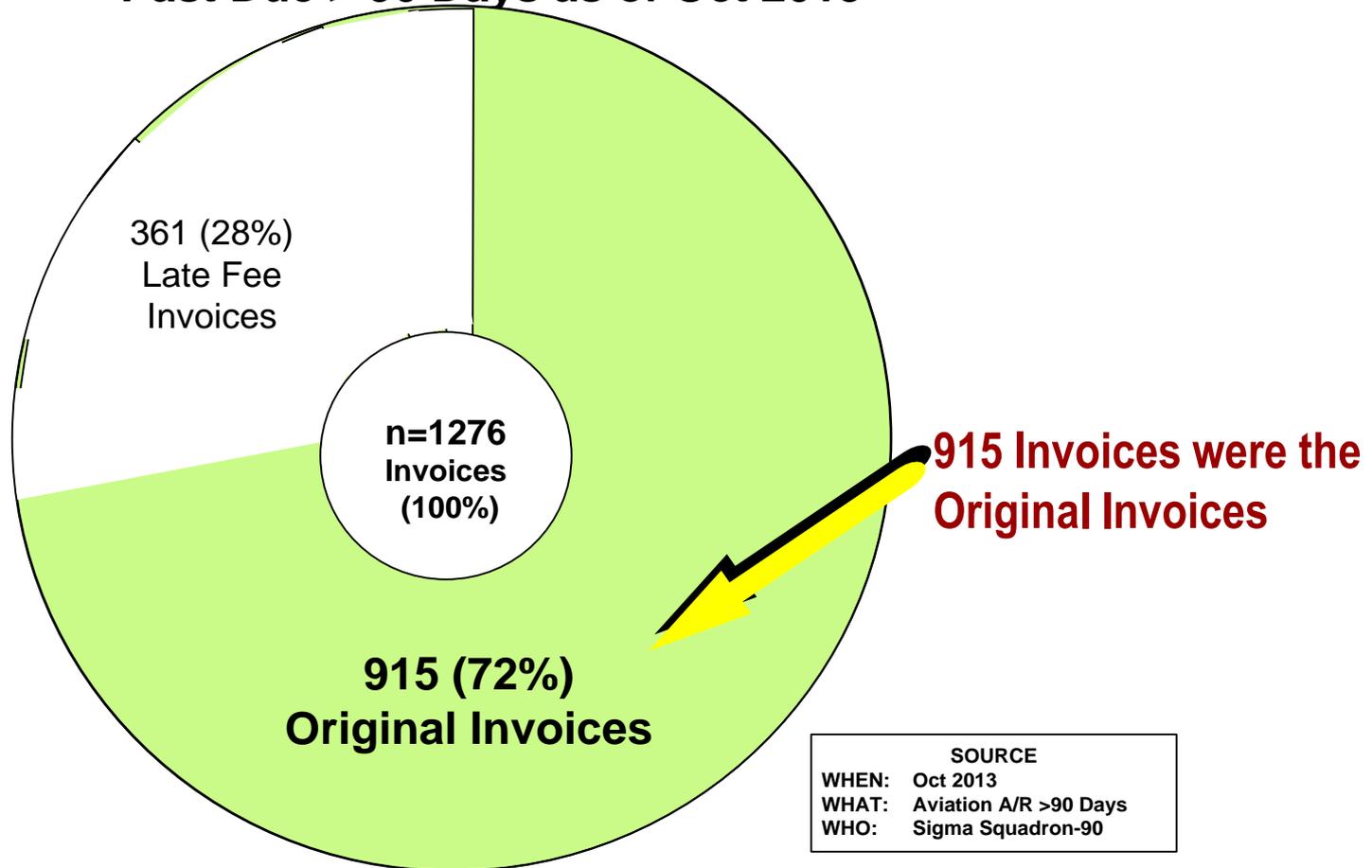


Stratify the Problem

The team stratified the 1276 invoices many ways and found...

Invoices each greater than \$1298 and
Past Due > 90 Days as of Oct 2013

5. ✓



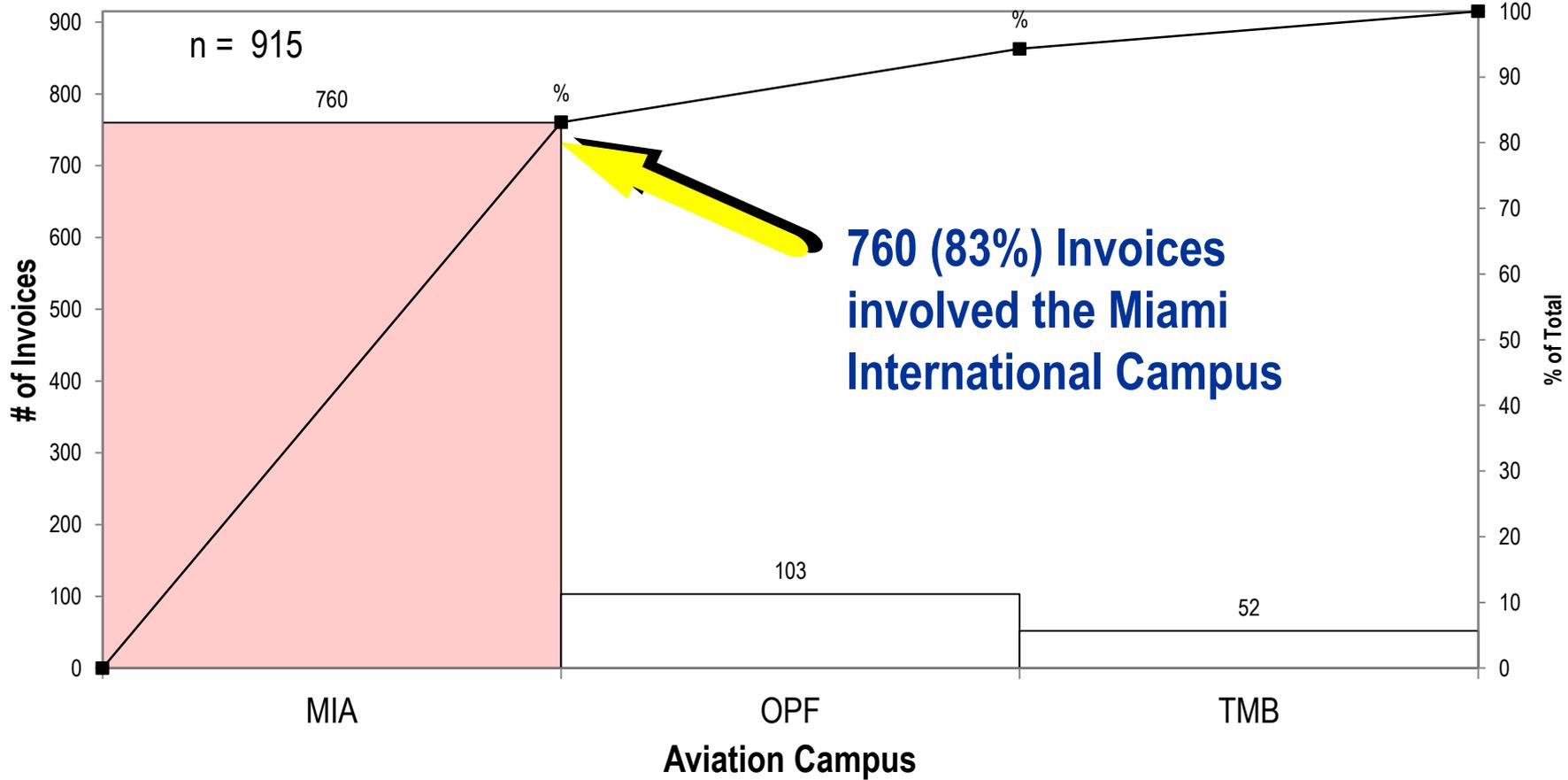
The team looked more closely at these 915 original invoices.



Stratify the Problem

The team stratified the 915 invoices many ways and found...

Original Invoices each greater than \$1298
and Past Due > 90 Days as of Oct 2013

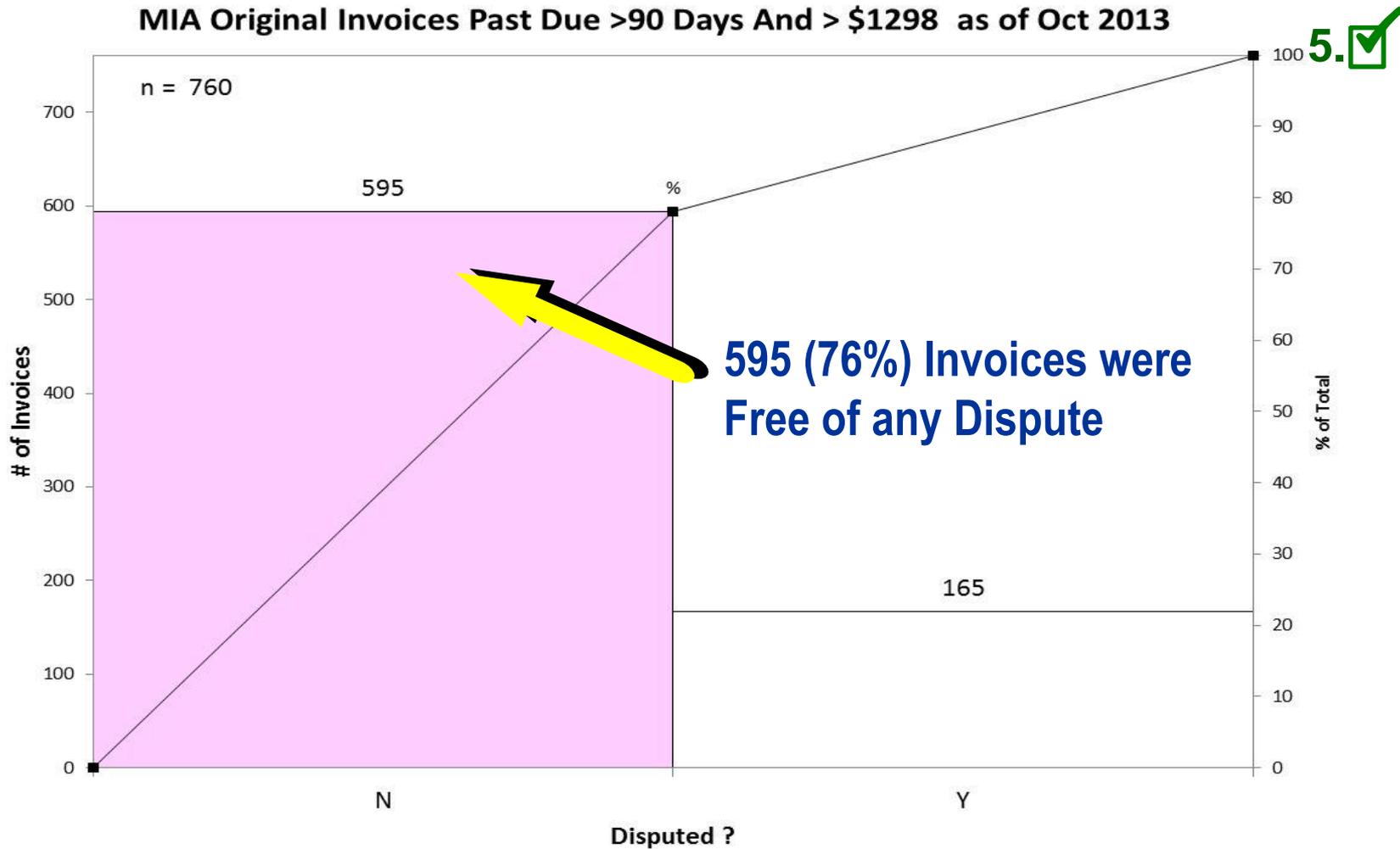


The team looked closer at these 760 Invoices.



Stratify the Problem

The team stratified the 760 invoices many ways and found...



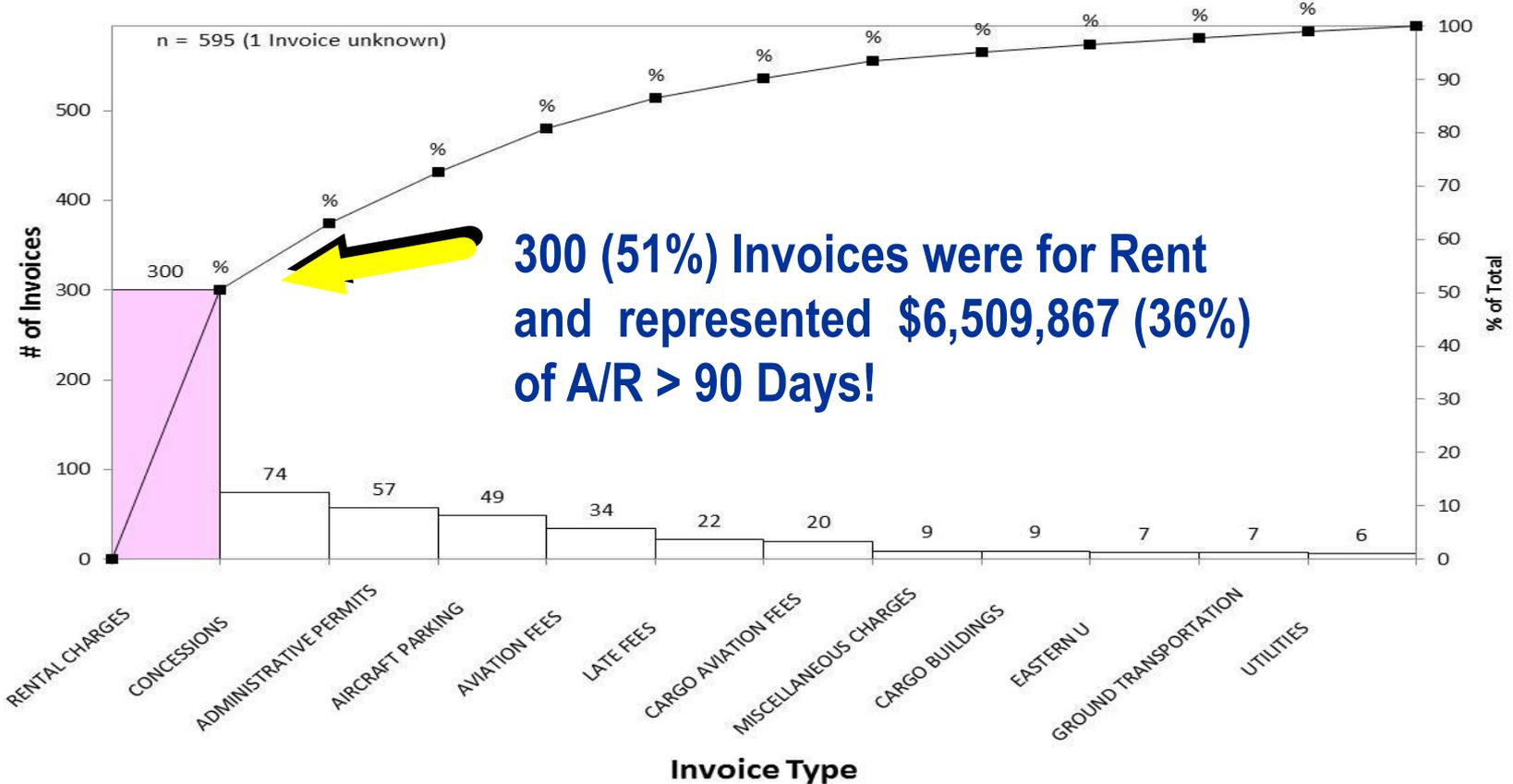
The team looked closer at these 595 Invoices.



Stratify the Problem

The team stratified the 595 Invoices many ways and found...

MIA Original undisputed Invoices Past Due >90 Days And > \$1298 as of Oct 2013



Problem Statement: “300 Original Undisputed Invoices totaling \$6,509,867 (each greater than \$1298 and past due greater than 90 days as of Oct 2013) were for Rent at the Miami International Airport Campus”



Identify Potential Root Causes

The team sampled 21 of the 300 Rent related Invoices and reviewed documentation before conducting Single Case Bore Analysis.

Single Case Bore Analysis

Problem Statement: "300 Original Undisputed Invoices totaling \$6,509,867 (each greater than \$1298 and past due greater than 90 days as of Oct 2013) were for Rent at the Miami International Airport Campus"

Reasons or Factors (That possibly contributed to Late Rent Payments)	Sampled 21 of 300 Invoices																	Total	Percentage			
	12208239	13234124	13242841	13242857	13242881	13242898	13242924	13242936	13242937	13242954	13242993	13243038	13245213	13245229	13245253	13245270	13245299			13245311	13245329	13245368
A 1) Automated collection notices have not been routinely sent to customers.	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X			X	17	81%
2) Lease modification has not been executed.		X		X						X			X						X		5	24%
C 3) Customer is disputing the outstanding charge.		X		X	X			X					X	X			X				7	33%
4) Customer payments and credits have not been applied accordingly.												X								X	2	10%
B 5) Lack ability to enforce prompt payment of rental charges.	X		X		X	X		X				X		X	X		X				9	43%
6) Customer is in bankruptcy, as such due to the legal proceedings Department may not terminate or modify the agreement(s) or commence eviction proceedings.						X	X									X	X				4	19%
7) Customer delinquencies are not reported to the corresponding credit agencies.	X	X			X			X						X			X				6	29%
8) Lease was terminated, awaiting final payment from tenant.									X												1	5%
9) Lease was terminated, final payment was received from the tenant.										X								X			2	10%
10) Outstanding charge is included in the customer's payment plan.	X																				1	5%

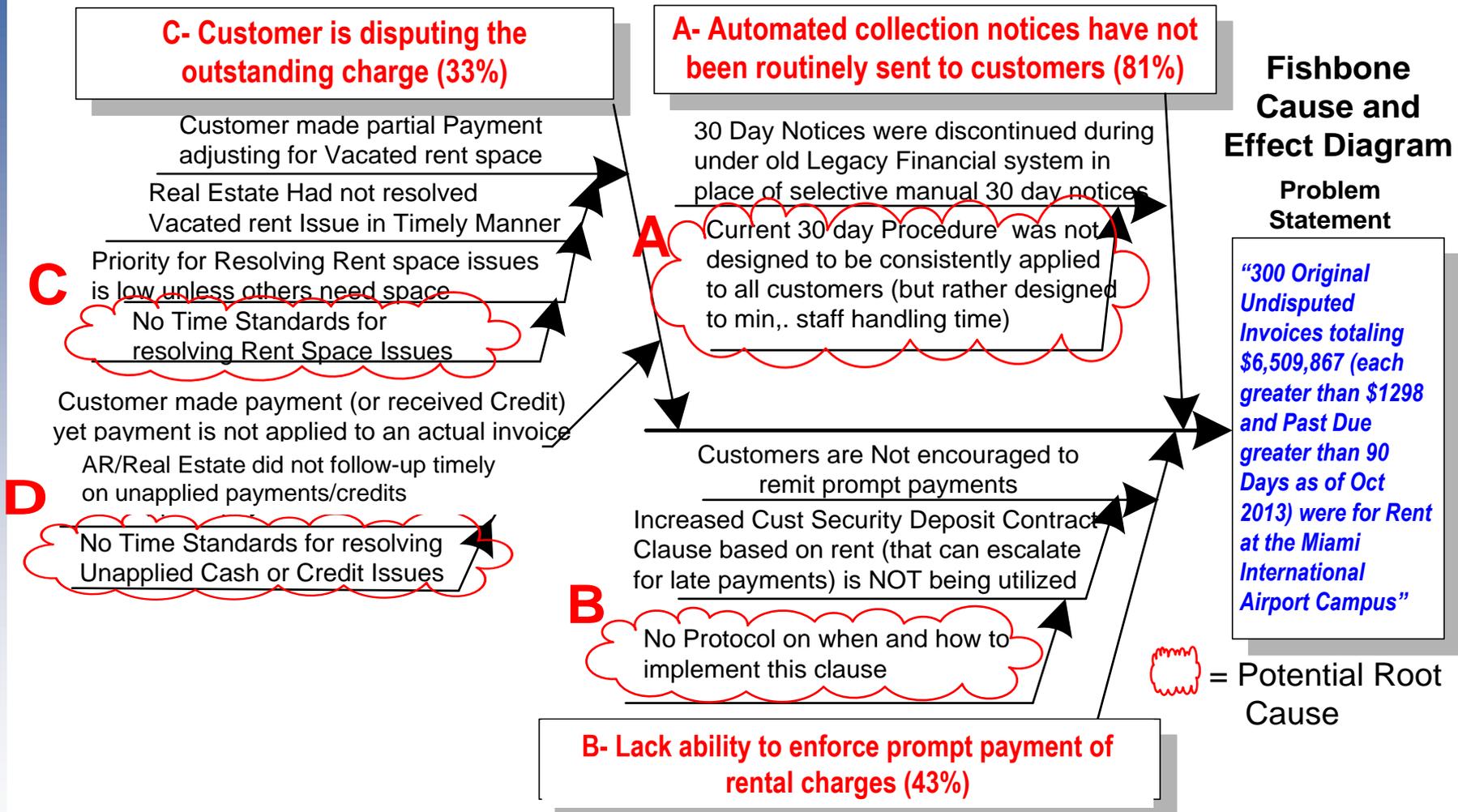
The team next looked closer at these three (3) factors.



Identify Potential Root Causes

The team completed Cause and Effect Analysis and found...

9.,10.



The team next looked to verify these 4 Potential Root Causes.



Verify Root Causes

The team collected data to verify the root causes and found.... 11.,12. 

Root Cause Verification Matrix		
Potential Root Cause	How Verified?	Root Cause or Symptom
A Current procedure for issuing past due notices was not designed to be consistently applied to all customers (but rather designed to minimize staff handling time)	Team verified the new system does not send out automatic past due notices.	Root Cause
B No protocol on when and how to implement the escalation of Security Deposit for tenants who are habitually late	The Team verified the clause exists in the lease agreement. The team also verified that there are no written guidelines on how and when to apply this clause.	Root Cause
C No time standards for resolving rent space issues/disputes	Interviewed Real Estate Division staff and verified no written standards exist.	Root Cause
D No time standards for resolving Unapplied Cash or Credits	Interviewed Credit and Collections Section and verified no written standards exist.	Root Cause

All four (4) were validated as root causes.



Identify and Select Countermeasures

The team brainstormed many countermeasures and narrowed them down to these for evaluation:

Countermeasures Matrix						
Problem Statement	Verified Root Causes	Countermeasures	Legend: Ratings			
			Effectiveness	Feasibility	Overall	Take Action? Yes/No
			5=Extremely 4=Very 3=Moderately 2=Somewhat 1=Little or None			
"300 Original Undisputed Invoices totaling \$6,509,867 (each greater than \$1298 and Past Due greater than 90 Days as of Oct 2013) were for Rent at the Miami International Airport Campus"	A - Current 30 day procedure was not designed to be consistently applied to all customers (but rather designed to min. staff handling time)	A1- Establish cost effective procedure to generate 30-60-90 letters (preferably with PeopleSoft System)	4	3	12	Y
		A2/B1- Enhance 30-60-90 day past due letters to outline consequences/benefits of timely payments	4	4	16	Y
	B - No protocol on when and how to implement this clause	B2- Revise the Security Deposit Policy for rent to include the both increases and decreases in Security Deposits	4	3.5	14	Y
		B3- Involve Real Estate Staff to assist with notifying key customer management personnel of past due accounts	4	3	12	Y
	C - No time standards for resolving rent space issues/disputes	C1- Establish timeframes and responsibilities for each party for resolving rent space issues/disputes	5	2	10	Y
	D - No time standards for resolving Unapplied Cash or Credits	D1- Establish timeframes and responsibilities for each party for resolving Unapplied Cash or Credits	5	3	15	Y

The team selected 6 countermeasures for implementation.



Identify Barriers and Aids

The team performed Barriers and Aids analysis on the selected Countermeasures.

Barriers		Aids
Impact (H, M, L)	Forces against Implementation	Forces For Implementation
H	1) Push Back Real Estate and Credit and Collections Section <i>(Supported by Aid:A,B,C,D)</i>	A) Management very supportive of team's efforts in improving A/Rs
M	2) Customer Pushback <i>(Supported by Aid:A,B)</i>	B) Beneficial impact on cost per enplaned passenger
H	3) Staffing/Resources Availability <i>(Supported by Aid:A,C)</i>	C) PeopleSoft System should allow for 30-60-90 day letter generation D) Reduce Write-off Amounts

The team next sought to incorporate this analysis into the team's Action Plan.



Develop and Implement Action Plan

Legend:
 ■ = Actual
 □ = Proposed

The team implemented an Action Plan for the team's Countermeasures.

16

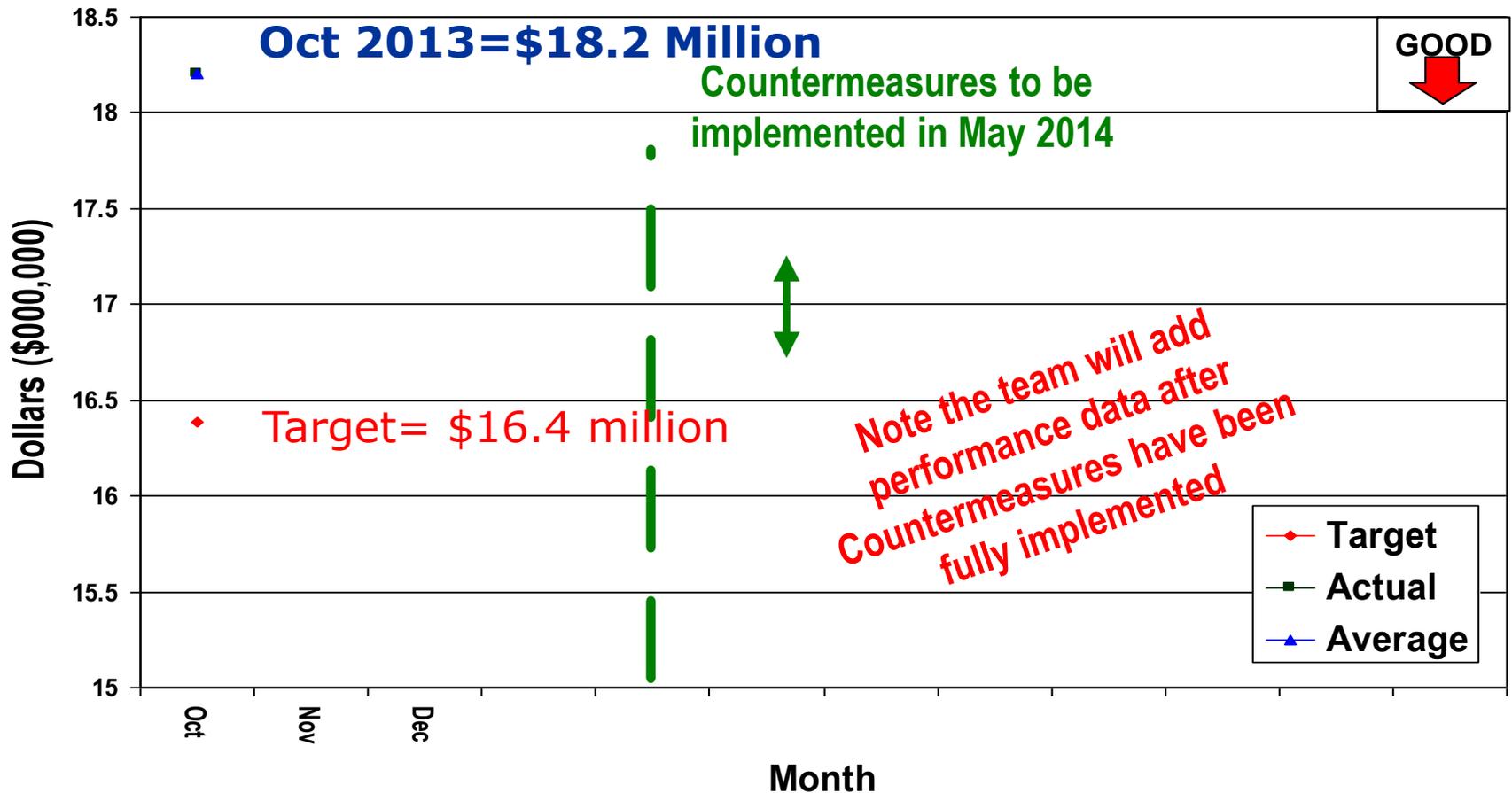
WHAT: Implement 6 Countermeasures to improve Account Receivables

HOW	WHO	WHEN										
		2014										
		Dec	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	
1. Develop Countermeasures:	Team/ PeopleSoft /Credit and Collections Staff/ Real Estate Staff											
A1- Establish Cost effective Procedure to generate 30-60-90 Letters (preferably with PeopleSoft System)							3/28/14					
A2/B1- Enhance 30-60-90 day Past Due letters to outline consequences/Benefits of timely payments And...							3/28/14					
...Apply on account charges and credits to accounts								4/30/14				
B2- Establish guidelines for enforcing Security Deposit Policy for Rent to include increases and decreases in Security Deposits								4/30/14				
B3- Involve Real Estate Staff to notify Customers about Enforcement of Security Depository Policy										5/30/14		
C1- Establish Timeframes and responsibilities for each party for resolving Rent Space Issues									5/2/14			
D1- Establish Timeframes and responsibilities for each party for resolving Unapplied Cash or Credit Issues								4/30/14				
2. Secure Management Approval of Countermeasures (share benefits and cost savings)	Team						03/11/14					
3. Communicate/Train Staff in Countermeasures and related policies/procedures (share Improved A/Rs processes)	Team									5/30/14		
4. Implement Countermeasures and Pilot	Team										6/27/14	
5. Review Pilot and determine Benefits and adjust as necessary and present results to management	Team										7/31/14	
6. Establish On-going responsibilities and standardize countermeasures into operations	Team											



The team collected indicator data and reviewed results of it's countermeasures

P3 –\$ Accounts Receivable Greater than 90 Days Past Due



The team was encouraged by the results and will continue to monitor the countermeasures.



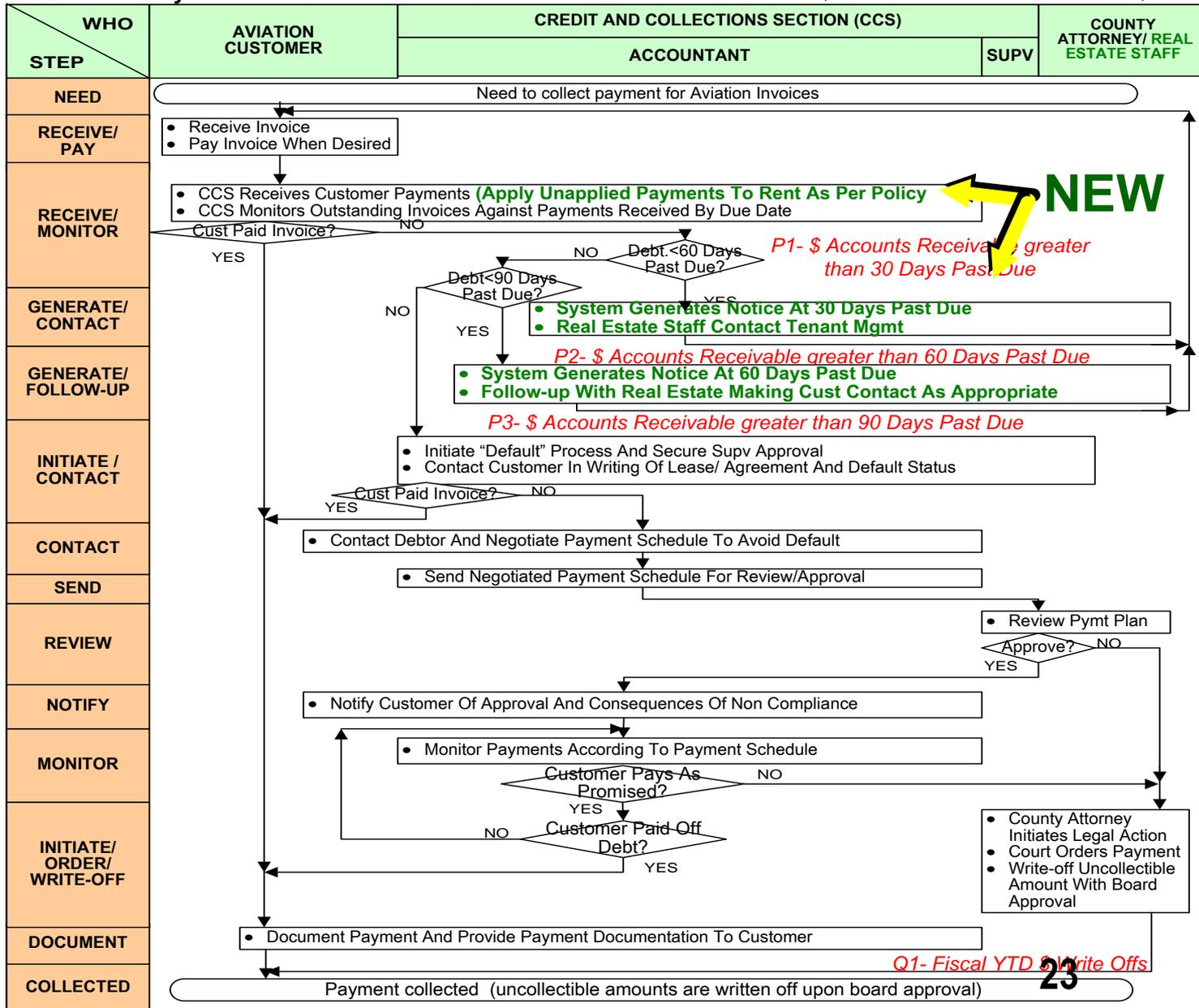
Standardize Countermeasures

21.,22.,23. ✓

The team revised indicators and incorporated the improvements into the Process flowchart.

6L.2 Collect Payments for Aviation Issued Invoices

(Process Owners: Aviation Director)



The team looked to standardize the Indicator monitoring



Standardize Countermeasures

The team Developed a Process Control System (PCS) to monitor the process on-going.

Process Control System					
Process Name: 6L.2 Collect Payments for Aviation Issued Invoices			Process Owner: MDAD Finance & Real Estate Divisions		
Process Customer: MIA Tenants			Critical Customer Requirements: Timeliness of securing Accounts Receivable		
Process Purpose: Collect Past Due Payments from Customers			Current Sigma Level: TBD		Outcome Indicators: Q1
Process and Quality Indicators		Checking / Indicator Monitoring			
Process Indicators	Control Limits	Data to Collect	Timeframe (Frequency)	Responsibility	Contingency Plans / Misc. • Actions Required for Exceptions • Procedure References
And Quality Indicators	Specs/ Targets	What is Checking Item or Indicator Calculation	When to Collect Data?	Who will Check?	
P1	\$ Accounts Receivable greater than 30 Days Past Due	TBD	Outstanding Unpaid Invoices after 30, 60, 90 days	Monthly	CCS Supv • A/R Aging Report
P2	\$ Accounts Receivable Aging for Rental Charges		Outstanding Unpaid rental charges	Monthly	Real Estate Division • A/R Aging Report for Rent
P3	\$ Accounts Receivable greater than 90 Days Past Due	\$16.2 Million	Outstanding Unpaid Invoices > 90 days	Monthly	CCS Supv • A/R Aging Report
Q1	Q1- Fiscal YTD \$ Write Offs	75%	Uncollectible > 90 days (ex. bankruptcies)	Monthly	CCS Supv • A/R Aging Report

Approved: _____ Date: _____ Rev #: _____ Rev Date: _____

The team looked ahead to the future.



Lessons Learned

- 1) The Stratification (drill-down) process using Paretos and Histograms was very important in allowing the data to direct the team to the root cause area.
- 2) The DMAIC Story Process was very useful in assisting the team in a systematic way to identify and address root causes(s).
- 3) It is important to identify Subject Matter Experts (SMEs) early in the process to help the team out in identifying root causes.
- 4) It surprised the team that so much of the 90 day Past Due Invoice amounts were related to MIA Rent.

Next Steps

- 1) Continue implementation and monitor the countermeasures and performance results

