Class List Of Characteristics (CLOC)

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Class List Of Characteristics (CLOC) Definition:

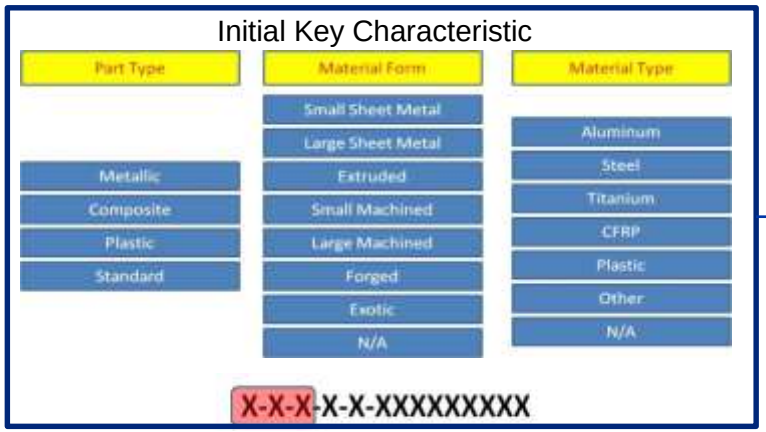
CLOC (Class List Of Characteristics) coding is a way to identify a part or activity by the attributes it has that are useful in the process of designing, estimating, procuring and improving upon a product. The CLOC code is blindfolded to model, instance, program, genre and any other form of bias that doesn't ***integrate value into it*****.**

The CLOC code doesn't replace the Part Number or Activity Name,
Like the description it provides added information about the Item.

What is CLOC … Class List of Characteristics

What is CLOC?

- A process to collect design and build attributes and generate a code for each part/activity
- Funnel shaped structure based on characteristics
- Supported by Binary rules for each character
- Code supports Engineering, Estimating, Finance and Supplier management (to name a few) through out the lifecycle of a part/activity



CLOC creates a Universal Language

Why remove Bias from code?

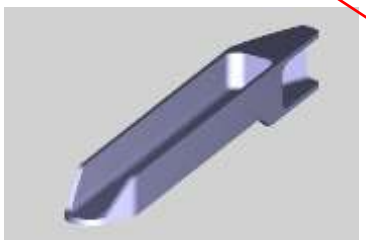
- **Bias IS important, but must not be part of code**
  - Qty. / Price / Title / Time period / Platform
- **Without Bias code becomes pure static artifact**
- **Bias used in conjunction with code**
  - Explains outliers
  - Enables data driven variance analysis
  - Identifies Cost down opportunities
  - Identifies commonality opportunities

Bias is used as a powerful tool rather than a hindrance that must be normalized

Removal of Bias to Expose Cost Drivers

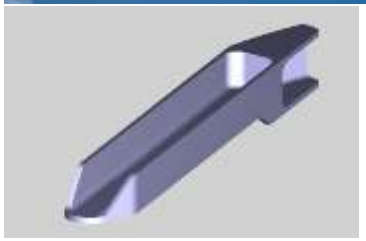
Example of Similar parts only exposed by the CLOC

Part Number Only Clarifies Model and Specific Location



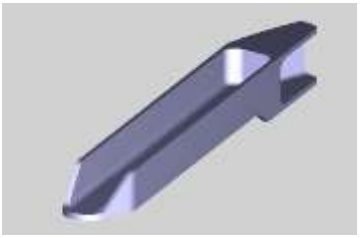
Model 787
Pax Floor Strap Sec 46

Currently, these 2 part would never meet even though they are similar



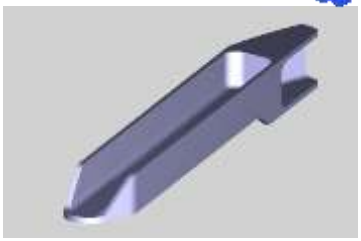
Model 777
Pax Floor Strap Sec 43

CLOC Code shows Cost driving Information



M-4-A-3-A-7050-T7451
Metallic Part
Small Machined
Aluminum
3 Axis Milling Required
Simple Complexity

CLOC code sees them no differently similar to the Supply Chain



M-4-A-3-A-7050-T7451
Metallic Part
Small Machined
Aluminum
3 Axis Milling Required
Simple Complexity

CLOC code contains cost driving information rather than defining where is fits on the Airplane

CLOC in use
Working Example

- Over 10,000 Parts Coded over 3 sections of A/P
  - Added Bid Results to Metric

Part Number	Class List	Total Setup	Total Run	Hours Per Part	Processing Per Part	Matl. cost per part	NRC	Total Recurring Cost Per Part
	M-4-A-3-B-7075-t7351	2.58	22.13	0.82	$ 23.00	$ 126.61	$ 5.50	$ 240.21
	M-4-A-3-B-7075-t7351	2.58	22.13	0.82	$ 23.00	$ 126.61	$ 5.50	$ 240.21
	M-4-T-4-A-6al4v	2.58	28.54	0.62	$ 7.00	$ 44.80	$ 3.67	$ 120.28
	M-4-T-4-A-6al4v	2.58	26.04	0.57	$ 7.00	$ 91.39	$ 3.67	$ 161.37
	M-5-T-3-C-6al4v	2.58	128.08	6.53	$ 40.00	$ 3,043.04	$ 5.50	$ 3,801.71
	M-5-T-3-C-6al4v	2.58	128.08	6.53	$ 40.00	$ 3,043.04	$ 5.50	$ 3,801.71
	M-4-A-4-B-7075-t7351	2.83	18.17	0.53	$ 4.00	$ 21.01	$ 3.67	$ 82.76
	M-4-T-4-C-6al4v	4.08	30.63	1.16	$ 20.00	$ 474.37	$ 737.00	$ 621.63
	M-4-T-4-C-6al4v	3.58	30.63	1.14	$ 20.00	$ 474.36	$ 737.00	$ 619.79
	M-4-T-4-C-6al4v	3.58	30.63	1.14	$ 20.00	$ 403.52	$ 737.00	$ 548.95
	M-4-T-4-C-6al4v	3.58	30.63	1.14	$ 20.00	$ 403.53	$ 737.00	$ 548.96
	M-4-T-4-C-6al4v	3.58	30.63	1.14	$ 20.00	$ 355.44	$ 737.00	$ 500.87
	M-4-T-4-C-6al4v	3.58	30.63	1.14	$ 20.00	$ 355.44	$ 737.00	$ 500.87
	M-4-S-3-A-15-5PH	2.58	61.88	1.29	$ 23.00	$ 65.45	$ 372.17	$ 230.26
	M-4-S-3-A-15-5PH	2.58	61.88	1.29	$ 23.00	$ 64.05	$ 372.17	$ 228.86
	M-4-S-4-A-15-5PH	2.58	33.63	1.21	$ 8.00	$ 16.69	$ 3.67	$ 157.45

Study Performed by SM PFA's 4Q12-1Q13

CLOC in use
Working Example

- Filtering on specific codes shows Power of CLOC Code
  - Amazing Correlation and Estimating Power
  - Exposes Outliers and Opportunities

Class List	Total Recurring Cost Per Part
M-4-A-3-A-7050-T7451	$ 706.54
M-4-A-3-A-7050-T7451	$ 706.54
M-4-A-3-A-7075-t7351	$ 144.39
M-4-A-3-A-7075-t7351	$ 144.39
M-4-A-3-A-7075-t7351	$ 57.30
M-4-A-3-A-7075-t7351	$ 57.30
M-4-A-3-A-7075-t7351	$ 40.88
M-4-A-3-A-7075-t7351	$ 40.88
M-4-A-3-A-7075-t7351	$ 33.50
M-4-A-3-A-7075-t7351	$ 33.50
M-4-A-3-A-7075-t7351	$ 33.50
M-4-A-3-A-7075-t7351	$ 33.50
M-4-A-3-A-7075-t7351	$ 30.48
M-4-A-3-A-7075-t7351	$ 30.48
M-4-A-3-A-7075-t7351	$ 30.69
M-4-A-3-A-7075-t7351	$ 30.69
M-4-A-3-A-7075-t7451	$ 94.93
M-4-A-3-A-7050-T7351	$ 56.66
M-4-A-3-A-7050-T7351	$ 56.66
M-4-A-3-A-7050-T7451	$ 36.03
M-4-A-3-A-7050-T7451	$ 36.03
M-4-A-3-A-7050-T7451	$ 39.16
M-4-A-3-A-7050-T7451	$ 39.16
M-4-A-3-A-7050-T7451	$ 58.41
M-4-A-3-A-7050-T7451	$ 58.41
M-4-A-3-A-7050-T7451	$ 46.96
M-4-A-3-A-7050-T7451	$ 46.96
M-4-A-3-A-7050-T7451	$ 46.68
M-4-A-3-A-7050-T7451	$ 46.68
M-4-A-3-A-7050-T7451	$ 42.13
M-4-A-3-A-7050-T7451	$ 48.71
M-4-A-3-A-7050-T7451	$ 48.72

Ability to Estimate Future Cost Using CLOC

CLOC in use
Working Example

- Further Uses Comparing Multiple Codes
  - Property Changes (matl./Features/etc.)
  - Requirement Changes (Test Types/Duration/etc.)

M-4-A-3-A-7050-T7451	$	59.23
M-4-A-3-A-7050-T7451	$	60.33
M-4-A-3-A-7050-T7451	$	60.33
M-4-A-3-A-7050-T7451	$	46.35
M-4-A-3-A-7050-T7451	$	46.35
M-4-A-3-A-7050-T7451	$	72.15
M-4-A-3-A-7050-T7451	$	72.15
M-4-A-3-A-7050-T7451	$	72.61
M-4-A-3-A-7050-T7451	$	72.61
M-4-A-3-A-7050-T7451	$	83.25
M-4-A-3-A-7050-T7451	$	83.25
M-4-A-3-A-7050-T7451	$	83.25

This Part Type in Aluminum Avg. ~70$

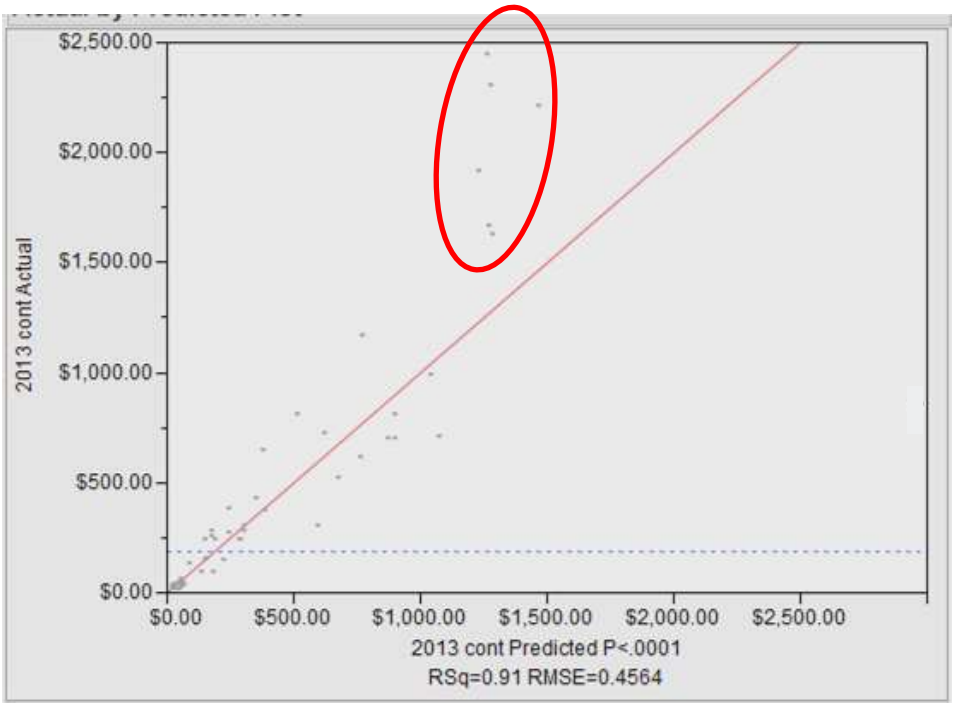
M-4-T-3-A-6al4v	$	364.28
M-4-T-3-A-6al4v	$	364.28
M-4-T-3-A-6al4v	$	477.00
M-4-T-3-A-6al4v	$	477.00
M-4-T-3-A-6al4v	$	353.75
M-4-T-3-A-6al4v	$	353.75
M-4-T-3-A-6al4v	$	279.76
M-4-T-3-A-6al4v	$	280.08
M-4-T-3-A-6al4v	$	262.82
M-4-T-3-A-6al4v	$	262.82
M-4-T-3-A-6al4v	$	324.29
M-4-T-3-A-6al4v	$	324.29
M-4-T-3-A-6al4v	$	324.29
M-4-T-3-A-6al4v	$	324.29
M-4-T-3-A-6al4v	$	324.29

Same Part in Titanium Avg. ~340$

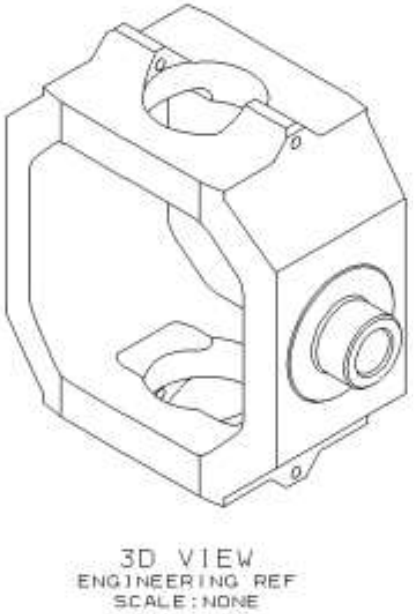
Enables more Accurate Future State Estimating by Looking at Cost Driving Effects

The Ultimate compliment to a CER

- CLOC CER Implementation
  - Ensures “Good in Good out”

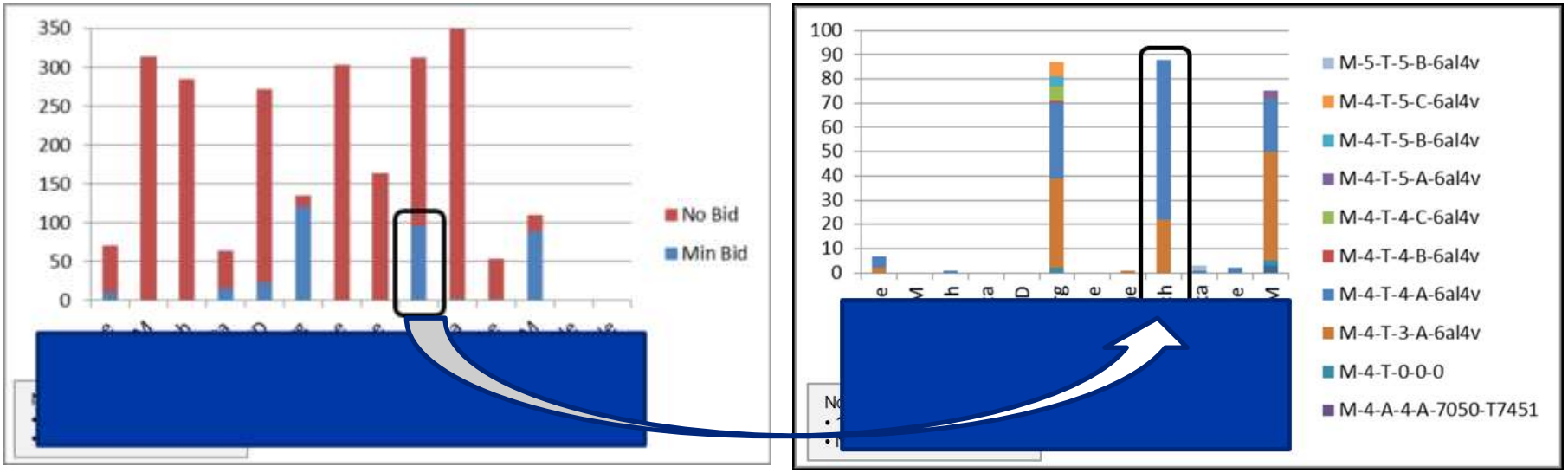


Ti Plate Actual vs Predicted



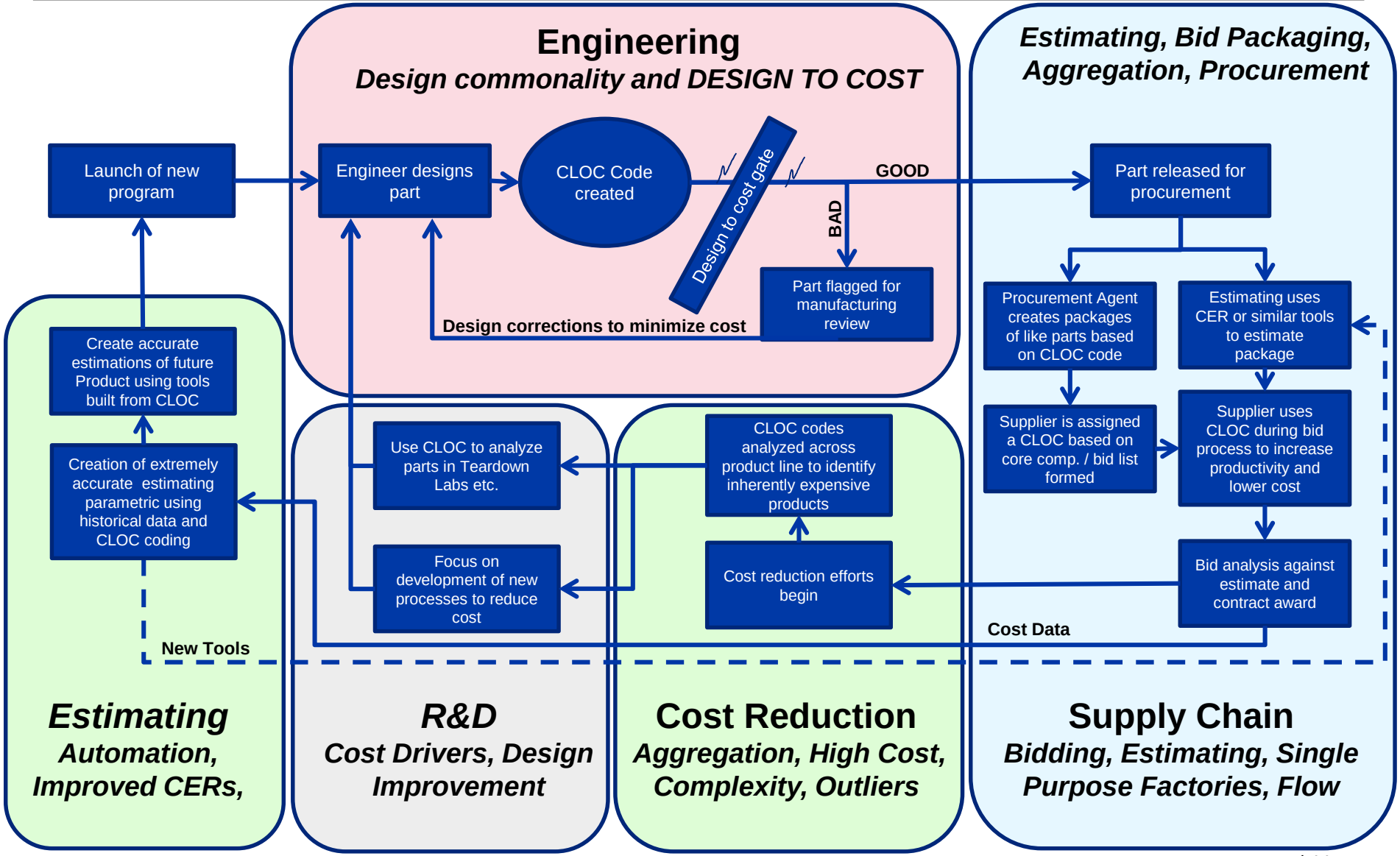
Part 1	M-4-T-5-C-6al4v
Part 2	M-4-T-5-C-6al4v
Part 3	M-4-T-4-C-6al4v
Part 4	M-4-T-5-C-6al4v
Part 5	M-4-T-4-C-6al4v
Part 6	M-4-T-4-C-6al4v

CLOC Accuracy
New approach to partnering with our suppliers.



- **Highlights the ability to focus on SOW's that suppliers are most proficient in.**
- **Reduces Fee on Fee overhead from sub-tier Estimating**
- **The ability to have data driven conversations with the supply chain about profit driven business decisions.**
  - Fact based discussions based on historical pricing

CLOC Affects All Phases of Product Lifecycle
Global View



BACKUP

Case Study

Bid Pkg. XXXX

Std. Method

- 1 Bid Pkg. of 364qty. P/N's
- Multiple Materials
- Multiple Size Envelopes
- Multiple Complexities
- Multiple Capability Requirements

CLOC Method

- 10 Different Pkg. Categories
- Single Material Type Per Pkg.
- Single Size Envelope Per Pkg.
- Single Complexity per Pkg.
- Single Capability Requirements Per Pkg.

Because of MPA Method Many Suppliers didn't even finish bidding the complete package

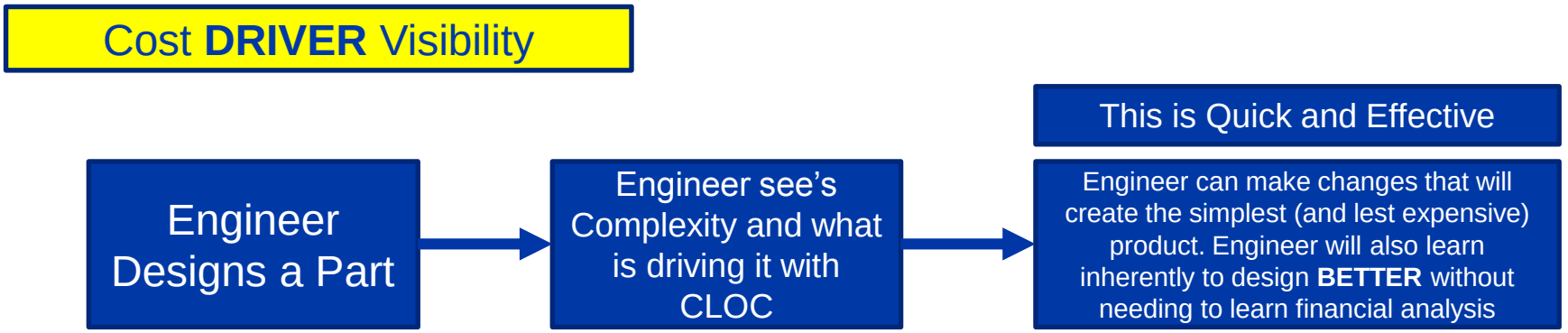
Some Examples From the Bid Results

- Company X was Low Bid on many 3&4 Axis Simple parts
  - No Bid or not competitive on anything With complexity or 5 axis
- Why did Company X get High Complexity and 5 Axis parts to Bid?

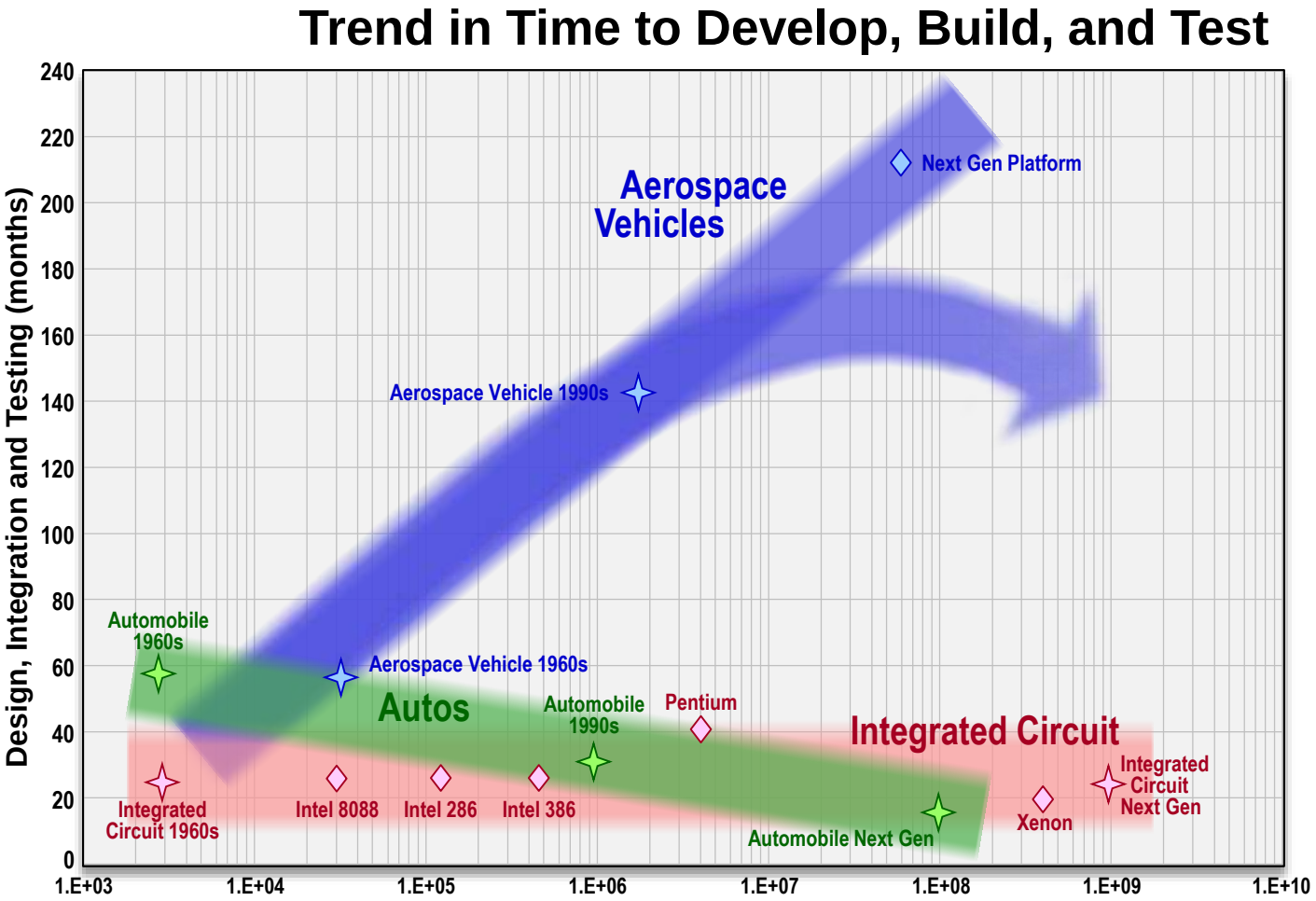
- Company Z was low Bid on many Small 3-5 Axis parts
  - Nothing with High Complexity
  - Titanium Only
- Why did Company Z get Aluminum and High Complexity level parts to Bid?

Engineering Cost Visibility

Cost vs. CLOC



Improving Product Development in a "*More for Less World*"



Reducing development cycle time and cost is critical