

# Data Based Decision Making



USAF  
FINANCIAL  
MANAGEMENT  
CENTER OF  
EXPERTISE

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*"Making the most of our dollars and sense"*

- **What is Data Based Decision Making?**
- **What is Data?**
- **Too Much Data?**
- **Way Ahead**

# What is Data Based Decision Making (DBDM)?

## ➤ Thoughts?

Avoiding emotions

Using facts to decide something

Scientifically based

Quantitative data only

Looking at historical performance

No opinions

Irrefutable methodology

Unbiased

# DBDM Defined

- **No standard definition**
- **Most google references relate to school decisions**
- **Working Definition:**  
  
**The use of documented information and explicit methodologies to provide a recommended course of action to decision makers**

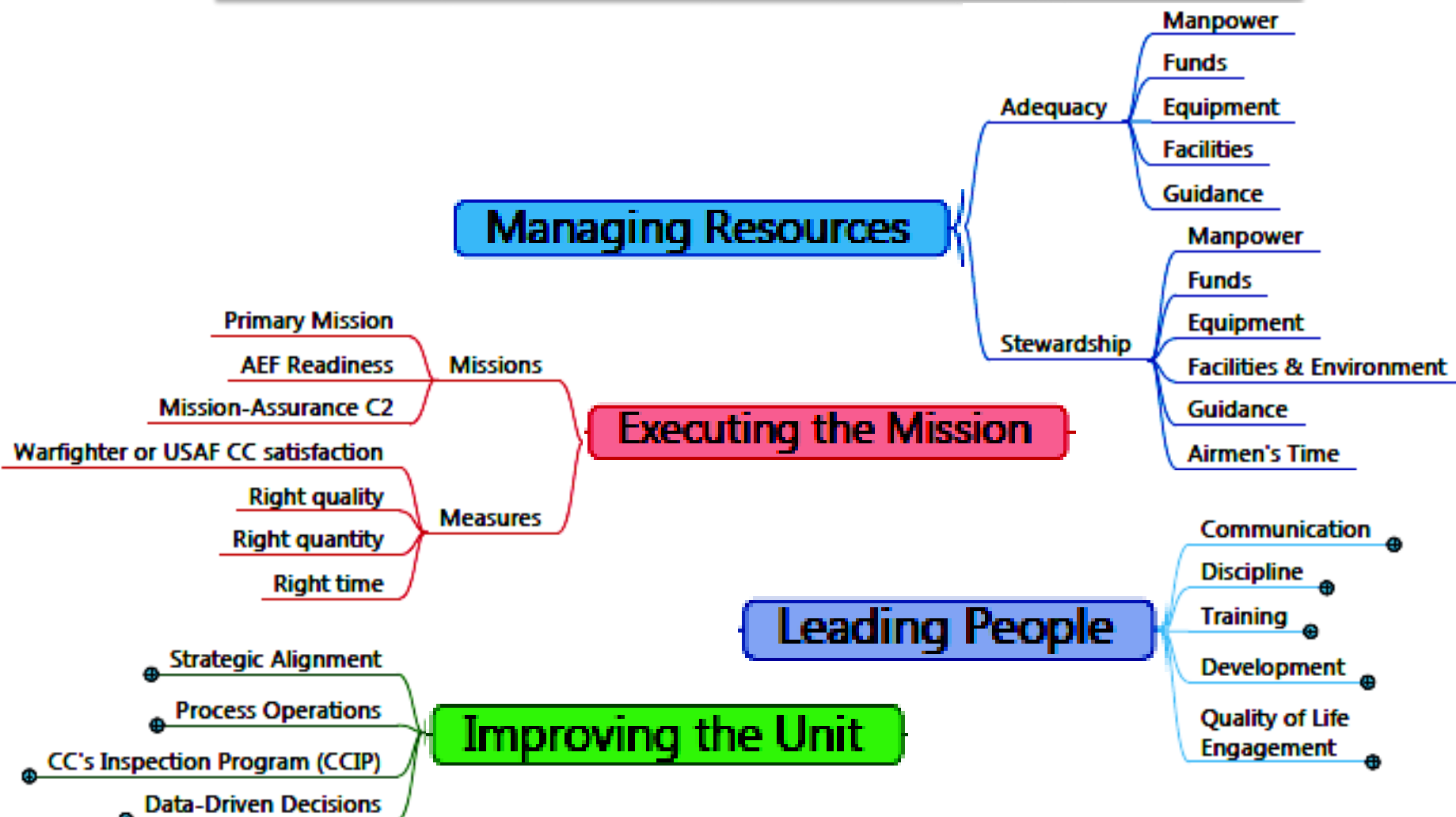
# Why is DBDM an Issue?

- **Less money for defense in recent years**
- **Efficiencies desired**
  - **Need to validate “savings”**
  - **Must balance cost, benefits, and risks**
- **Increased scrutiny in decision making process**
  - **HQ oversight, Congressional queries, etc...**
- **Part of the AF IG inspection criteria**

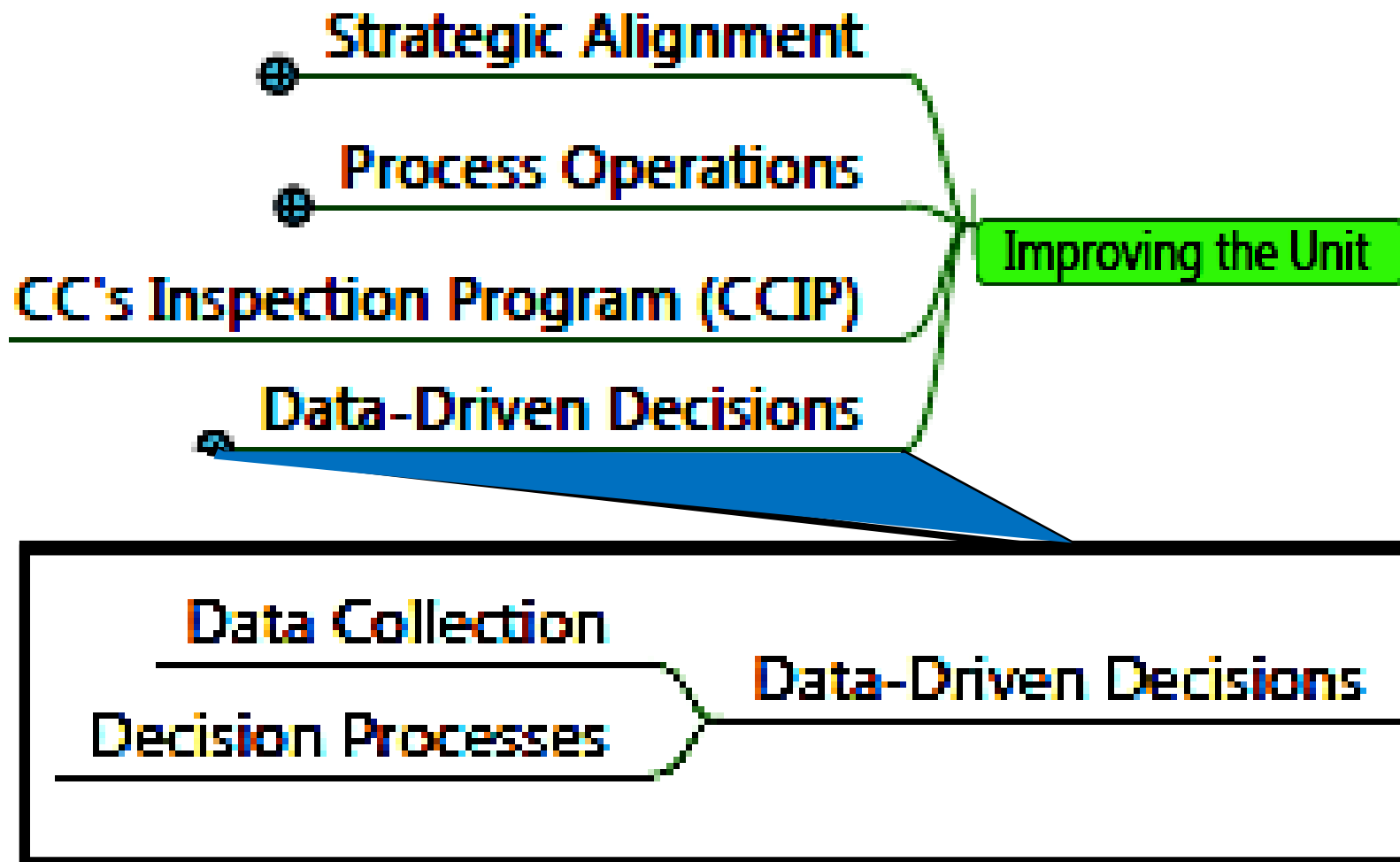
**Bottom line: The right thing to do**

# Now Part of the AF Inspection Program

These are the 4 Major Graded Areas in the AF Inspection Program



# Improving The Unit



**Data Collection is only one part of the DM effort**

# DBDM Status

- **Aren't we already doing this**
- **Decision Makers don't just flip a coin**
- **Many corporate processes data based**
  - **Acquisitions**
  - **Budgeting**
  - **Future Planning**
  - **Hiring/Annual Appraisals**
  - **Operational Decisions**

**Real issue is the “Correctness” of the data**



# Data Based Decision Example

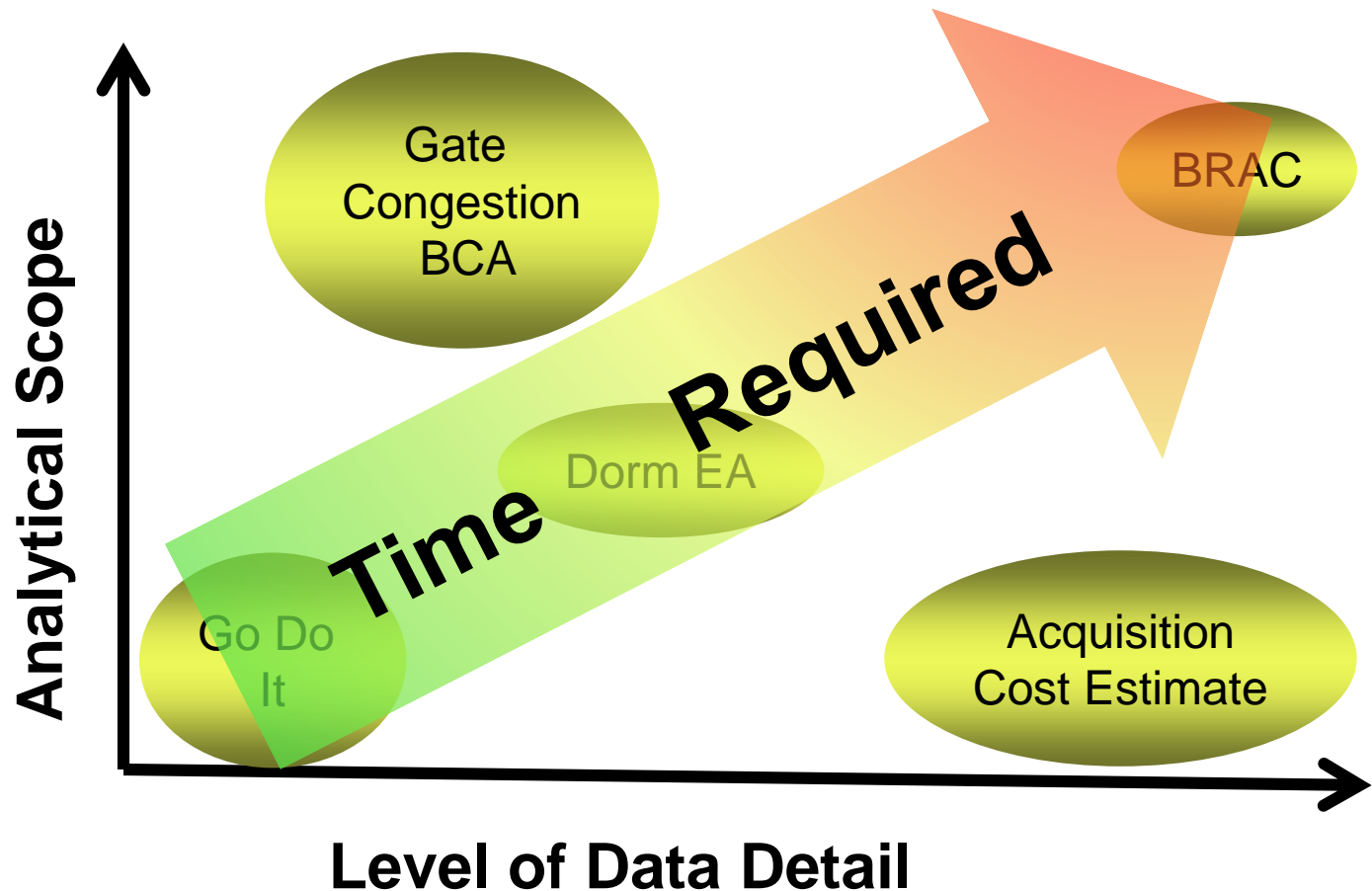
- **What data did you use to be here today?**
  
- **To attend this seminar**
  - Content review
  - Past experiences with speaker
  - Cool title
  - Random selection
  
- **To attend PDI in general**
  - Need for CPEs
  - Networking – who else is in attendance
  - Aggregate value of individual sessions

# DBDM is Really Part of the 8 Step Decision Process

- 1. Identify the Issue**
- 2. Analyze the Issue**
- 3. Develop Alternatives**
- 4. Evaluate Alternatives**
- 5. Make Recommendation**
- 6. Make Decision**
- 7. Implement**
- 8. Evaluate**

**Different data is  
needed at each  
step of the  
decision making  
process**

# Must Adapt to the Decision at Hand



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# Dictionary

## Definition of Data

da·ta

/ˈdādə, ˈdādə/

*noun*

facts and statistics collected together for reference or analysis.

*synonyms:* facts, figures, **statistics**, details, particulars, specifics; [More](#)

- **COMPUTING**

the quantities, characters, or symbols on which operations are performed by a computer, being stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media.

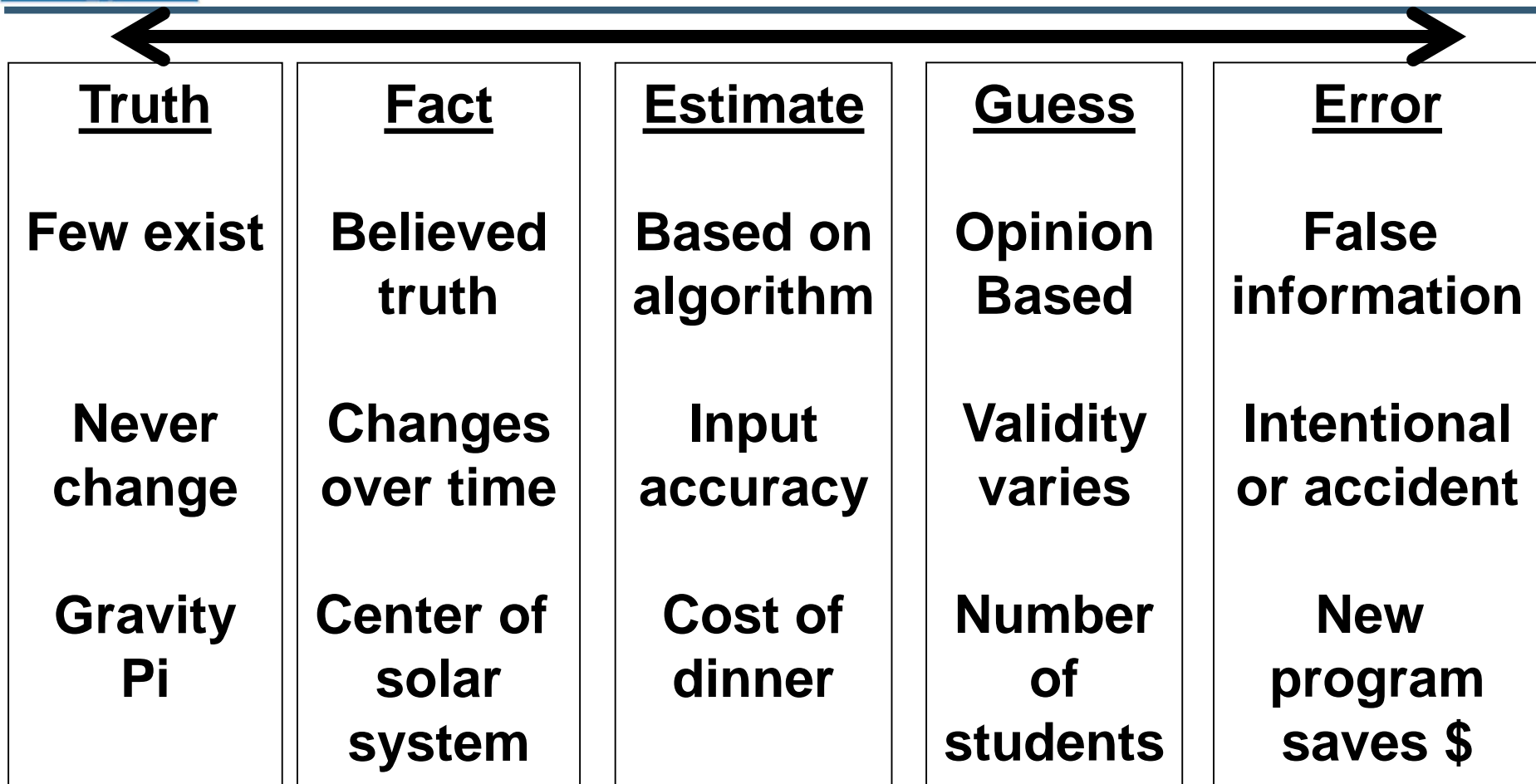
- **PHILOSOPHY**

things known or assumed as facts, making the basis of reasoning or calculation.

➤ **We'll use the last definition**

- **More than just numbers**

# Data Scale



**What types of Data do you use daily??**

# What Type of Data Is This?

Category	Type for You	Type for Me	Probable Type
US population		Guess	Fact, Estimate
Cost of a gallon of milk		Fact	Fact, Estimate, Guess
Calories I ate yesterday		Estimate	All
High temp yesterday (Den)		Guess	Fact, Estimate, Guess
Installation budget		Guess	Est, Guess, Error
My weight		Error	Guess

**Truth, Fact, Estimate, Guess, Error**

# Observations About Data

- **Truth often not available**
- **Truth rarely needed**
- **Don't mistake precision for accuracy**
- **We have data not TRUTH/FACTS in most cases**
- **More is not always better**
- **More accurate is not always better**
- **Balance time, effort, and criticality**



# What is the Cost of an Item?

**Purchase cost – but it changes over time**

- **ROM**
- **Estimate**
- **Government estimate**
- **Bids received**
- **Contract award**
- **Obligation amount**
- **Adjustments**
- **Final expense**

**Other factors?**

# Other Factors to Consider

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- **Time to install**
- **Operating costs**
- **Ancillary items**
- **Facility modifications**
- **Overhead**
  - **FM**
  - **Contracting**
  - **Functional unit**
  - **Other base support agencies**
- **Disposal**

# Another Example

## CE Repair Cost

### What does it cost to replace a door?

- **Direct**
  - Door only
- **Ancillary costs**
  - Bench Stock
  - Electricity
- **Labor**
  - Mil or civilian
  - At what rate?
- **Processing costs**
  - Set/track up work order (paper, time, electric)
  - Functional time to order/oversee repair
- **Infrastructure costs**
  - CE tracking system, electricity
  - Truck to carry door
- **Overhead and indirect**
  - FM time to process billing?
  - Contracting time to buy door
  - Trans time to receive from vendor
- **Others???**

**Who provides the numbers?**

# Types of Estimates

Type	Strength	Weakness	When to use	Example
Single point	Easy Unbiased	Not relevant Accurate	Default value No info	Lottery
Guess/ROM	Easy	May be biased	Minor items Experts present	Move cost
Anecdote/ example	System based	Similar Relevant	Replicating an existing item	Printer purchase
Grass roots	Detailed	Missing items Hard to build	Complex systems	Aircraft procurement cost
Statistical est	Unbiased Easy to apply	Hard to build May not apply	When causality is present Behavior of masses	Mx cost/sq ft  Retention rates

**Best estimate depends on situation**

# What Type of Data is Needed?

- **Depends on use**
  - Decision Making
  - Budgeting
  - Contracting
  - Payment
- **Depends on scale**
  - Pennies, dollars, thousands, millions
- **Depends on time available**
  - Must be sourced prior to need
  - Late is often useless
- **Depends on scope**
  - Percentage of overall program

# Accuracy vs. Precision

## ➤ Accuracy

- How right your estimate is
- Depends on knowledge of situation and data available

## ➤ Precision

- Level of detail in the estimate
- Not explicitly tied to accuracy

## ➤ Examples

- Pi – accuracy is/can be perfect, precision can vary
- My weight on a scale
  - Precision depends on scale display
  - Accuracy depends on scale design/function

# What to Do If not Accurate Enough?

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- **Spend more time/effort**
- **Hire an expert**
- **Incorporate into Risk**
- **Change requirement/scenario**

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# Fallacy of the Analyst

~~➤ Structure = Thinking~~

- In truth:  $\text{Structure} \supseteq \text{Thinking}$
- Thinking is a larger effort
  - Structure
  - Data
  - Analytical skills
  - Creativity

# Checklist Culture

- **Checklists are heavily emphasized in AF**
  - **Pilots**
  - **Space Crews**
  - **Missileers**
- **NOT a good approach to decision support**
- **Recognize when people are taking a linear approach to decision making**

# How can You Have too Much Data?

- **No time to analyze**
  - Must complete analysis before decision is made
- **Duplicate sources of same information**
  - Historical utility costs, CE estimate, civilian equivalent
- **Extraneous details**
  - Building will be blue and has stainless appliances
- **Irrelevant information**
  - B-52 data when estimating cost to operate F-35

**Do you even have the right problem???**

# Defining the Problem Should Come BEFORE Data Collection

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- **Critical first step**
  
- **Define the purpose of the analysis**
  - What is the problem/scope?
  
- **Identify the decision maker**
  - Who will make the final decision?
  
- **Develop an objective statement**
  - Keeps from solving the wrong problem

# Guidance vs. Direction

- **Understand the difference and ask questions**
  - **Guidance is broader and provides autonomy**
  - **Direction involves following instructions**
- **Parallels decision support vs. checklist**
- **Shift from compliance-based analysis efforts, and increasing workload will likely result in shift toward guidance from leadership**

# Must Have the RIGHT Data

- Relevant to the decision
- Include both quantitative and qualitative data
- From the right source
- Properly analyzed and presented

**More art than science in many cases!!!**

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# Become More Data Driven TODAY!!!!

- **Unfunded justification**
  - What is real requirement
  - Is it in scope of base/unit's priorities
- **Open document review**
  - Is line item justified
  - Can it be supported with DATA
- **End of Year prioritization**
  - Is list based on data or emotions/opinions



# Use Overall Decision Support Framework

- Properly frame issue BEFORE collecting data
- Determine data needed and how used
- NOW collect data
  - Multiple sources?
- Analyze to ensure it's relevant/correct
- Package to decision maker
- Review for future decision

**A subset of the Decision Support process**

# Must Also Consider Structure of Analysis

- **DS a form of argument**
  - Take a position and convince other its correct
  - Must understand how to “win” an argument to avoid being biased in analysis
- **Basic structure of an argument**
  - Premise – think assumptions
  - Conclusion – think recommendation
- **Arguments are not necessarily confrontational**
  - Simply the shifting of someone’s position
- **Not all arguments are true**
  - Bad logic – not valid
  - Bad inputs – not sound
  - Biased interpretation of the data – questionable

# Types of Logic or Structure

## ➤ Induction

- Expands upon “facts”
- “Truth” may not hold forever

## ➤ Deduction

- Showing causal link to conclusion
- If premise and logic is correct, answer **MUST** be correct
- Type strived for in most cases

**P1: A ball falls when dropped**

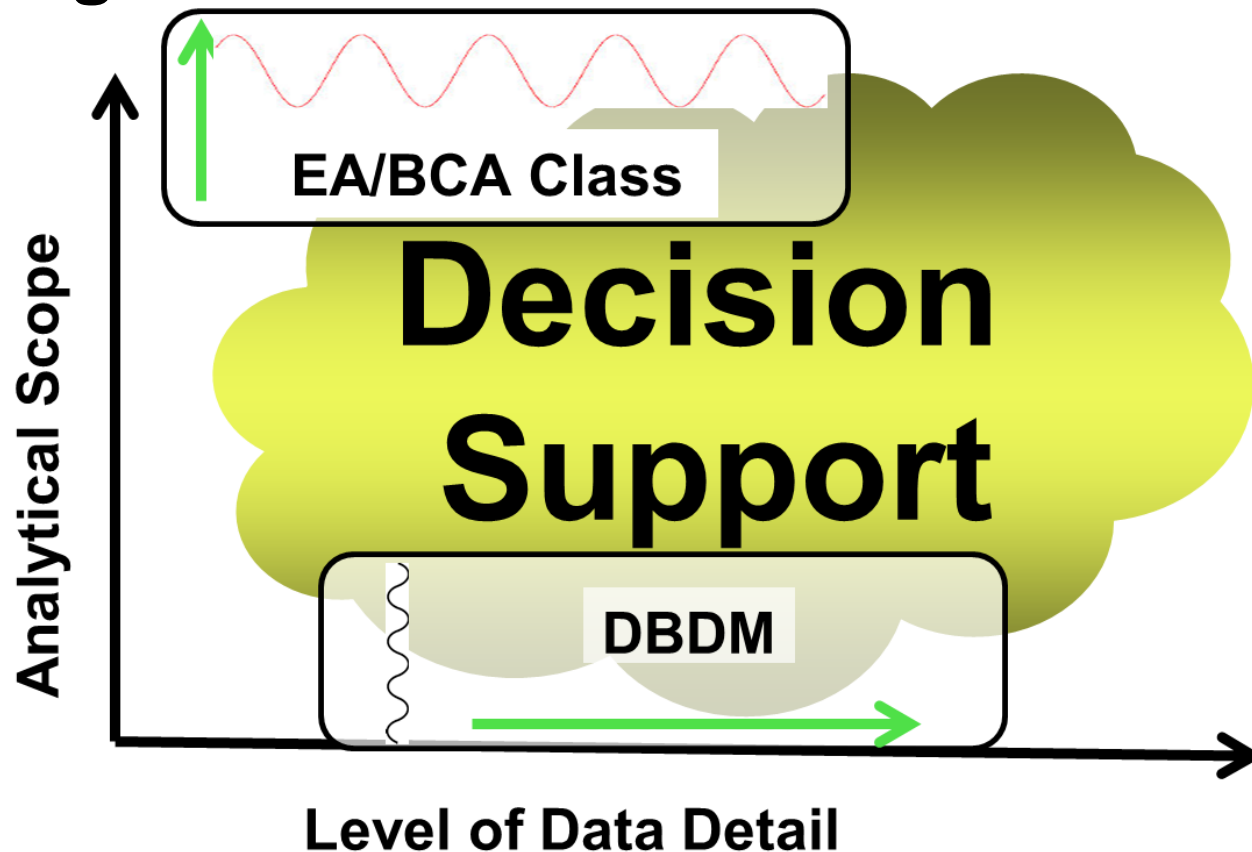
**P2: A balloon is a form of a ball**

**C: Balloons will fall**

**Issue: Helium balloons**

# Where to Learn More

- Training available in several areas



**More tailored DBDM training?? TBD**

# Summary

- **Decision Making is now a focus area**
- **Must have relevant data to support decisions**
- **Need to tailor the data collected and presented**
- **AF is working to expand in this area**

# Estimates & Analysis Matter



# QUESTIONS?



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