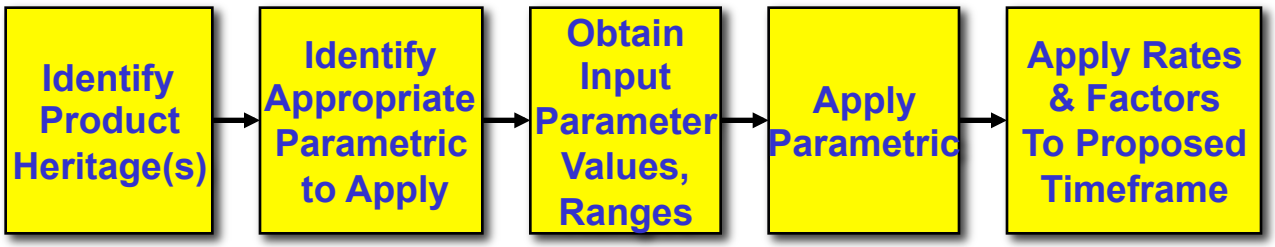
Parametric Estimating

- Statistical approaches that utilize existing historical data bases from several similar products or programs to generate a estimate from product or service description (technical characteristics) input
- Frequently employs a technique using one or more cost estimating relationships for the measurement of costs associated with development, manufacture, and / or modification of a specific end item based on its technical, physical, or other characteristics
- Cost are estimated for future projects based on known historical cost, technical and physical data for completed projects
- Examples of Parametric models include Life Cycle Cost Models, Cost Estimating Relationships (CERs), and the Uniform Allocation System (UAS)
- Need:
  - Historical data band of relevant cost information to use for developing cost estimating relationships (CERs) /parametric cost models.
  - Descriptive differences between projects in the data bank and the project to be estimated.



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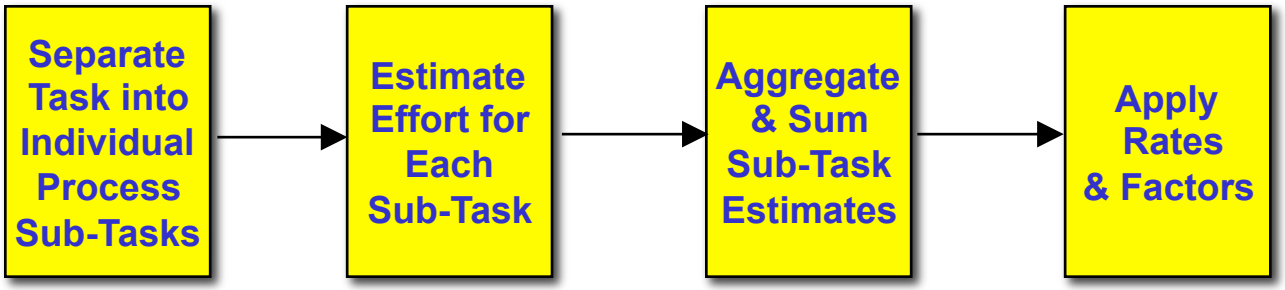
"Level of Effort"

- A Level-of-Effort estimate is used when a level of support is required to perform a function over a given time period rather than delineated tasks
- Task is minimally affected by changes in program quantities
- Identify the time period
- Identify the number of heads and skill mix
- Correlate the estimate to historical costs to justify the number of heads



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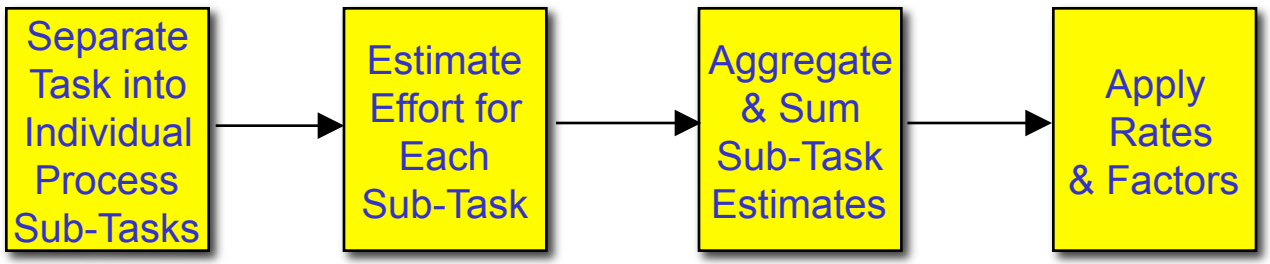
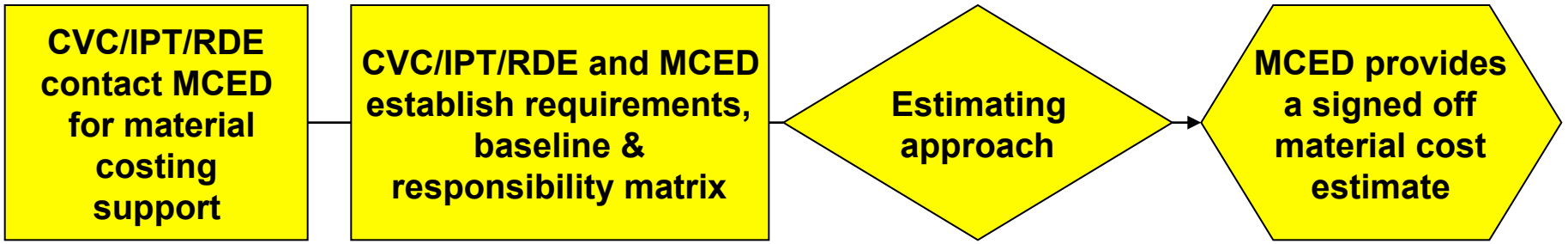
“Engineering” or “Judgment” Cost Estimate

- Use is based on experience and judgment
- Most commonly used when there is little or no cost experience or detailed product information available(e.g., specifications, drawings, or bills of material).
- Judgment estimates must be broken down into reasonable tasks and sub-tasks that can be assessed by a knowledgeable reviewer.
- Clearly document the thought process leading to the estimate.
- Show computations used to quantify estimate
- Provide basis for labor mix used



Material Cost Estimating (MCE)

- **MCE and the Pricing Manager review RFP for material requirements**
- **MCE and the Pricing Manager establish the most compliant and efficient approach for the material estimate**
- **Estimators ensure required material inputs are received per proposal development schedule. Inputs include:**
  - Responsibility matrix
  - Any design changes
  - Assigned complexity factors
- **MCE will work closely with applicable Material Lead to obtain Management approval and Sign-off**



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COST ESTIMATE RATIONALE SCORING

UNSUPPORTED ESTIMATE

GOVERNMENT EXAMPLE OF TYPICAL LANGUAGE:

- **It will take 10 engineers about 100 hours each to build this box.**
- **Our company experience is that it takes 1000 hours to build this box.**
- **John doe says it takes 1000 hours to build a box of this complexity.**

"RED"

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COST ESTIMATE RATIONALE SCORING (CONT.)

BASED ON SPECIFIC EXPERIENCE
(Not Fully Supported)

GOVERNMENT EXAMPLE OF TYPICAL LANGUAGE:

- **We built boxes like this on the ABC program. Our estimate for this program is 1000 hours.**
- **We used a company cost estimating relationship that we developed for this class of boxes to develop an estimate for 1000 hrs. to build this box.**
- **The PRICE H model estimates that it will take 1000 hrs. to build this box.**
- **John Doe, a senior manufacturing engineer who holds an MSIE and has been building similar boxes for 12 years, estimates that it will take 1000 hrs. to build this box. His estimate is based on 20 drawings at 30 hrs./drawing, 300 hrs. for assembly, and 100 hrs. of testing, all by mid-level personnel.**

"YELLOW"

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COST ESTIMATE RATIONALE SCORING (CONT.)

SCALED ACTUALS, WORK NOT SHOWN

GOVERNMENT EXAMPLE OF TYPICAL LANGUAGE:

On the XYZ program, it took us 800 hours to build a similar box. This box is 25% more complex, so our estimate is 1000 hours.

"YELLOW"

NORTHROP GRUMMAN

COST ESTIMATE RATIONALE SCORING (CONT.)

SCALED ACTUALS, WORK SHOWN

GOVERNMENT EXAMPLE OF TYPICAL LANGUAGE:

On the XYZ program, contract no. P12345-XX-AB-6789, we built seven similar boxes under charge numbers ABCDE123 and ADEF6789, at an average of 800 hrs. each. This box design requires a new power supply (2 cards out of 10 total cards) and additional heat shielding. The new power supply adds 160 hrs. per box because of the increased manual labor to assemble the heat sinks and rewiring of the motherboard. The heat shielding is a gold-aluminum five-layer fabric that must be installed with a drop of hot glue every square inch. This process has been used before on the ABC program with a measured efficiency of 4 drops per minute. The surface area of the box is 9600 square inches. Thus, our estimate is:

800 hrs. basic box assembly
160 hrs. (2/10 *800) extra assembly of new power supply
40 hrs. heat shielding (9600 sq in*1 drop/min divided by 4 drop/min divided by 60 min/hr)
1000 Total Hours

"GREEN"

COST ESTIMATE RATIONALE SCORING (CONT.)

MULTIPLE SCALED ACTUALS

GOVERNMENT EXAMPLE OF TYPICAL LANGUAGE:

On the XYX program, contract no. P12345-99-6789, we built seven similar boxes under charge numbers ABCD0123 and ADEFG6789, at an average of 800 hrs. each. This box design proposed for this effort requires a new power supply (2 cards out of 10 total cards) and additional heat shielding. The new power supply adds 160 hrs/box because of the increased manual labor to assemble the heat sinks and rewiring of the motherboard. The heat shielding is a gold-aluminum five-layer fabric that must be installed with a drop of hot glue every square inch. This process has been used before on the ABC program with a measured efficiency of 4 drops/minute. The surface area of the box is 9600 sq. inches. Thus our estimate is:

800 hrs. basic box assembly
160 hrs. (2/10 * 800) extra assembly of new power supply
40 hrs. heat shielding (9600 sq in*1 drop/min divided by 4 drop/min divided by 60 min/hr)
1000 Total Hours

Also, on the JKL program, contract no. P12345-99-C-6969, we built 13 boxes using similar design parameters and technology. Three of the boxes, built under charge No. ADET3975, averaged 950 hrs. each. The other 10 boxes, built under charge No. ADET3987, averaged 850 hrs. each. The first three used a power supply design very similar to the one we propose to use on this program but without the additional heat shielding. The latter 10 boxes used the same heat shielding as the ABC program, but not the power supply design. These data substantiate our estimate of 1000 hrs.

During a make/buy analysis, we solicited estimates from three other vendors that build similar types of boxes. Their estimates to build our design were 965, 1025, and 990 hrs. respectively. Thus, our 1000 estimate is realistic.

BLUE / GREEN

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COST ESTIMATE RATIONALE SCORING (CONT.)

MULTIPLE **SCALED** **ACTUALS**

We used the PRICE H model to estimate the costs of this box. We have a database of 8 similar types of boxes from 4 other programs that we used to calibrate the complexity factors for this box. The programs included XYZ, QPR, ZIG ZAG, and BANG BANG. The calibration results are shown on page IV-4-168. The input parameters and results of the price runs are listed on page IV-4-167. Based on this calibration, our estimate for this box is $13,500.

BLUE / **GREEN**

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