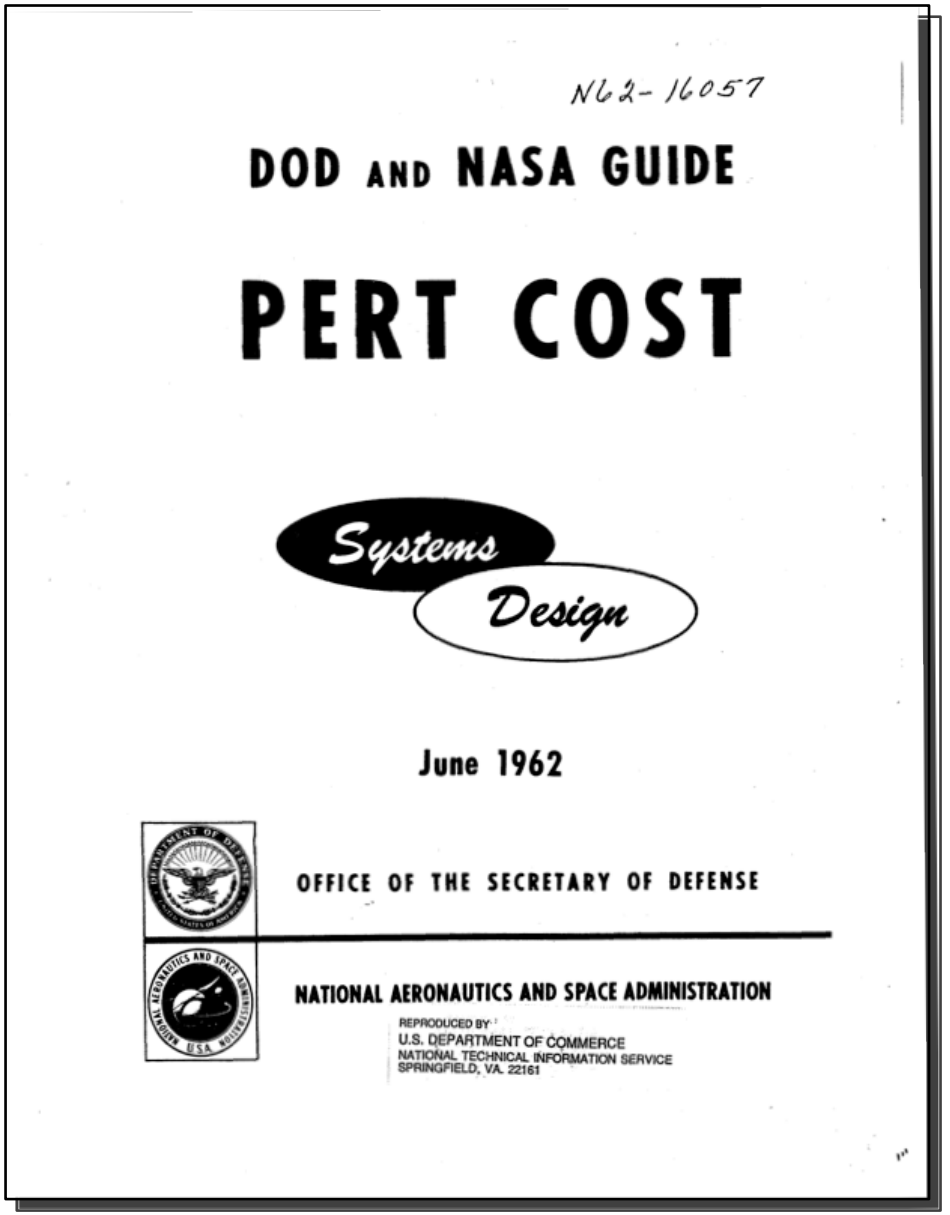
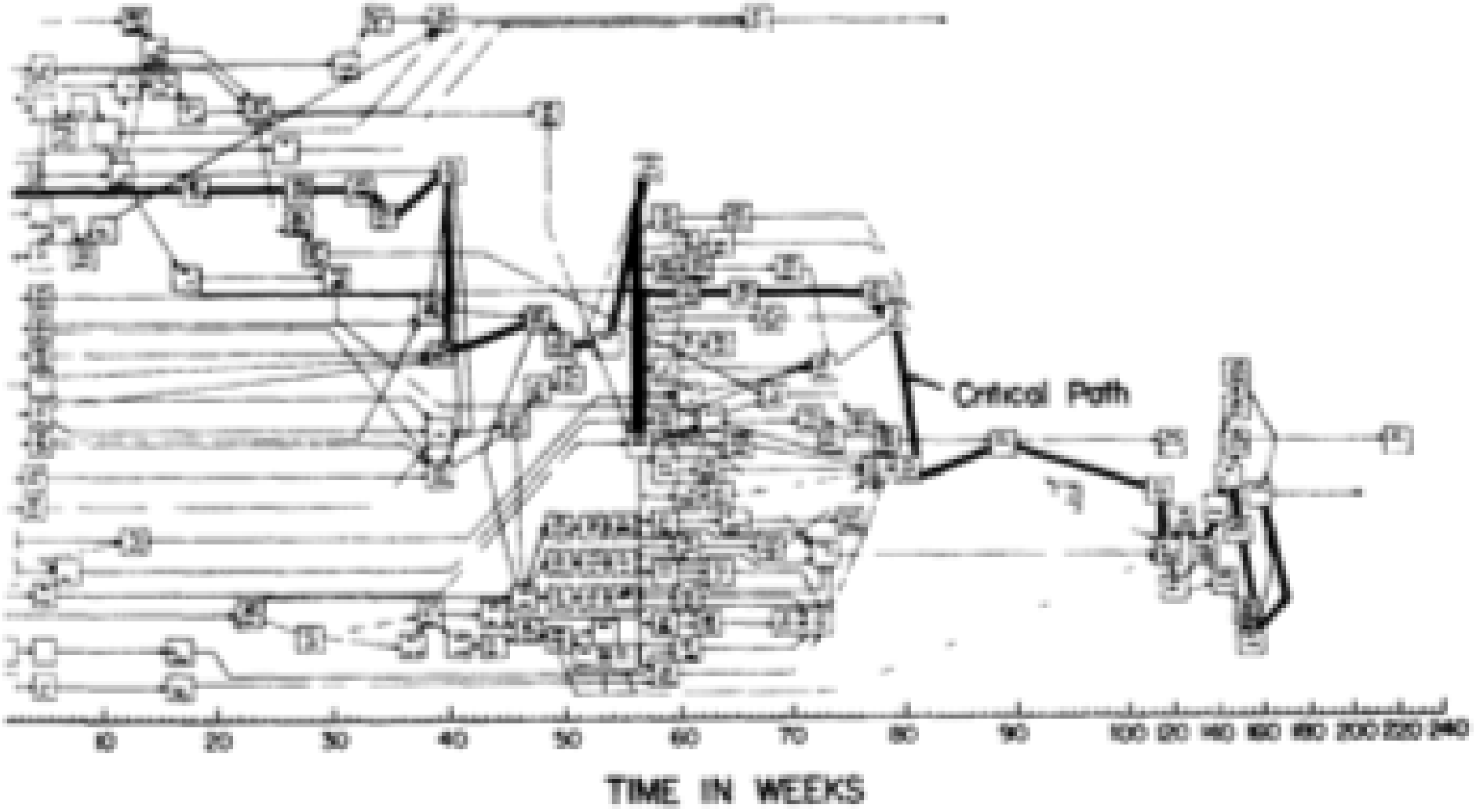
PERT
Program Evaluation and Review Technique

PERT

- Program Evaluation and Review Technique
- Developed in the sixties
- It is a **methodology** to define and control projects
- Variations exists (e.g. PERT/COST developed by NASA/DOD)



A Motivating Example



PERT Formula

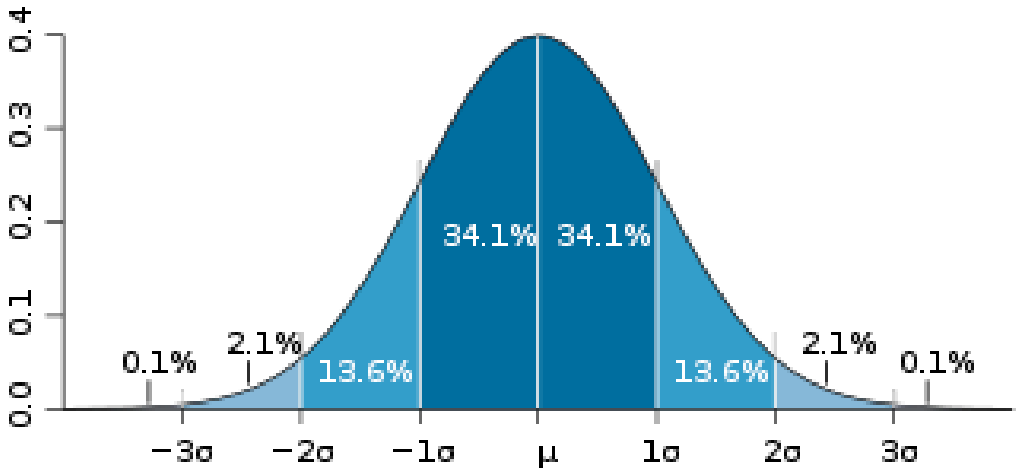
- Estimation in PERT is based on the idea that estimates are uncertain
  - Therefore uses duration ranges
  - And the probability of falling to a given range
- Uses an “expected value” (or weighted average) to determine durations

PERT

- For each task, three estimates:
  - Optimistic
    - (would likely occur 1 time in 20)
  - Most likely
    - (modal value of the distribution)
  - Pessimistic
    - (would be exceeded only one time in 20)

Variance and Standard Deviation

- Variance (σ^2) and standard deviation (σ) measure how spread a population is from the average
- Standard deviation (σ) is the square root of variance
- **Example: normal distribution**: a bell shaped probability distribution function



Source:
http://en.wikipedia.org/wiki/Normal_distribution

Beta Distributions

- Average is given by the formula:

$$t_e = \frac{(a + 4m + b)}{6}$$

- Variance (σ^2) and standard deviation (σ) are given by:

$$\sigma^2 = \left(\frac{b - a}{6}\right)^2 \qquad \sigma = \frac{b - a}{6}$$

PERT Formula

- Task duration is an average of three estimations:

$$t_e = \frac{(a + 4m + b)}{6}$$

t_e = *expected time*

a = *optimistic time estimate (1 in 20)*

m = *most likely time estimate*

b = *pessimistic time estimate (1 in 20)*