

## Lecture 4: System Concepts

K S Rajan  
IIIT, Hyderabad

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- System engineering requires development of a strong foundation in understanding **how to characterize a system, product, or service** in terms of its attributes, properties, and performance.

### System Concepts

- Attributes, Properties and Characteristics
- Roles and Stakeholders
- Life Cycle

### How to Characterize a System?

- Attributes
  - The term *attributes* classifies *functional* or *physical* features of a system. Examples include gender; unit cost; nationality, state, and city of residence; type of sport; organizational position manager; and fixed wing aircraft versus rotor.
- Properties
  - The term, *properties*, refers to the *mass properties* of a system. Examples include composition; weight; density; and size such as length, width, or height.
- Characteristics
  - *Behavioral characteristics* examples include predictability and responsiveness.
  - *Physical characteristics* examples include equipment warm-up and stabilization profiles; equipment thermal signatures; aircraft radar crosssections; vehicle acceleration to cruise speed, handling, or stopping.

### Attributes

- refer to the attached PDF

### System Performance

- **Objective Performance**
  - Performance that produces measurable physical evidence of system effectiveness based on pre-defined criteria.
  - For example, the temperature of the water is 108° F.
- **Subjective Performance**
  - Performance indicated by a subjective quality that varies by individual sensory values, interpretations, or perspectives.
  - For example, is the water “warm or hot”?

- Subjective Performance, examples include:
  - Quality—clarity, appearance, and color
  - Affinity
  - Likeability
  - Opinion
  - Smoothness
  - Satisfaction—enjoyment and taste

## System Characteristics

1. general characteristics,
2. operating or behavioral characteristics,
3. physical characteristics,
4. system aesthetics.

## System Conditions

- Prerequisite Conditions
  - System *stability*, *integrity*, and *consistency* of performance
- Initial Operating Conditions
- Static vs Dynamic
- Stabilization
- Balance of Power

## Class Assignment 2

- Take any ONE system of your choice and
  - (a) list out 10 or more of its attributes (refer to the System Attributes Table pdf file)
  - (b) Pick 3 non-functional attributes and explain briefly why they are important to your system
  - (c) Also, list out 3 or more Properties and Characteristics of the above System.
- A group can be 1 to 2
- Marking will be on the Quality of work as group size goes up
- Upload on Portal as CA2\_RollNo.pdf  
(If more than One, put any one's RollNo.)
- Last Date is 12<sup>th</sup> Jan 2012 (Wed)