Abstract
Requirements engineering is one of the systems engineering pillars. In this document we discuss the fundamentals of systems engineering, such as the transformation of needs into specification, the need to prescribe *what* rather than *how*, and the requirements when writing requirements.
### Definition of “Requirement”

<table>
<thead>
<tr>
<th>Requirements describing the needs of the customer:</th>
<th>Customer Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements describing the characteristics of the final resulting product:</td>
<td>Product Specification</td>
</tr>
<tr>
<td>The requirements management process recursively applies definition 2 for every level of decomposition.</td>
<td></td>
</tr>
<tr>
<td>Requirements describing the needs of the company itself over the life cycle:</td>
<td>Life Cycle Needs</td>
</tr>
</tbody>
</table>
Flow of Requirements

- **What**
  - *customer needs*:
    - What is needed by the customer?
  - *product specification*:
    - What are we going to realize?
  - *system design*:
    - How are we going to realize the product?

- **What**
  - What are the subsystems we will realize?

- **How**
  - How will the subsystems be realized?

  - up to "atomic" components
System as a Black Box

- System seen as black box
- Interfaces
- Functions
- Quantified characteristics
- Restrictions, prerequisites
- Boundaries, exceptions
- Standards, regulations
- Inputs
- Outputs

Fundamentals of Requirements Engineering
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REQsystemAsBlackBox
Stakeholders w.r.t. Requirements

- **Customer**
  - (purchaser, decision maker, user, operator, maintainer)

- **Company**
  - Policy and Planning
    - (business, marketing, operational managers)
  - Customer-Oriented Process
    - (sales, service, production, logistics)
  - Product Creation Process
    - (project leader, product manager, engineers, suppliers)
  - People, Process, and Technology management process
    - (capability managers, technology suppliers)
The “Formal” Requirements for Requirements

- Specific
- Unambiguous
- Verifiable
- Quantifiable
- Measurable
- Complete
- Traceable
The Requirements to Enable Human Use

Accessible
Understandable
Low threshold