

Engineering a System with Global Reach: The Global Positioning System

muse

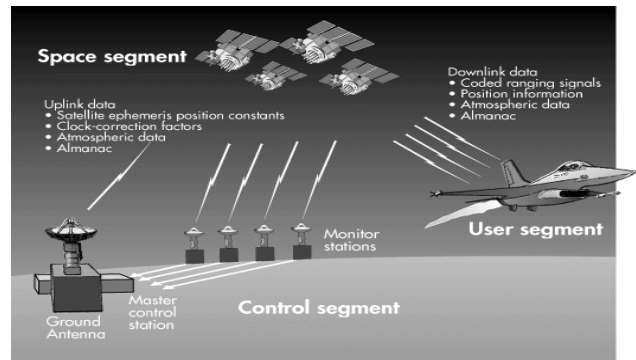
In this module...

- GPS Overview
- Design Questions
- Systems Engineering
- Creating the Global Network
- Wrap Up



GPS Overview

- Primary components: Control + Space + User



- Navigation, tracking, safety & rescue, surveying, etc.
- Military origin but now provides society with unrestricted access to critical information: space and time data

Design Questions

- Frequency, power; satellite design, receiver design (antenna, amplifier, packaging/size), control station design → they all play together; how do they compensate for different climates, etc?

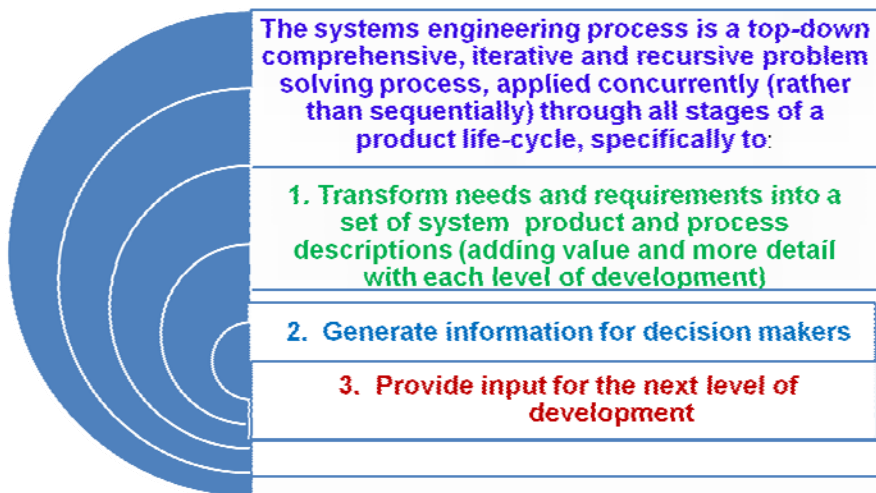


Systems Engineering

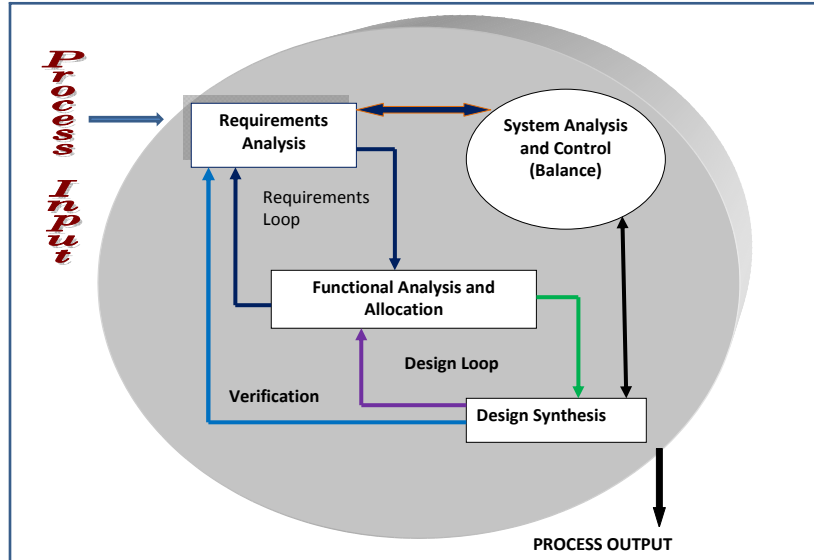
- Dr. Geoffrey Okogbaa,
Professor of Industrial
and Management
Systems Engineering,
USF



Systems Engineering Process



Systems Engineering Process



Designing for the Life Cycle

Designing for the Product Life-Cycle

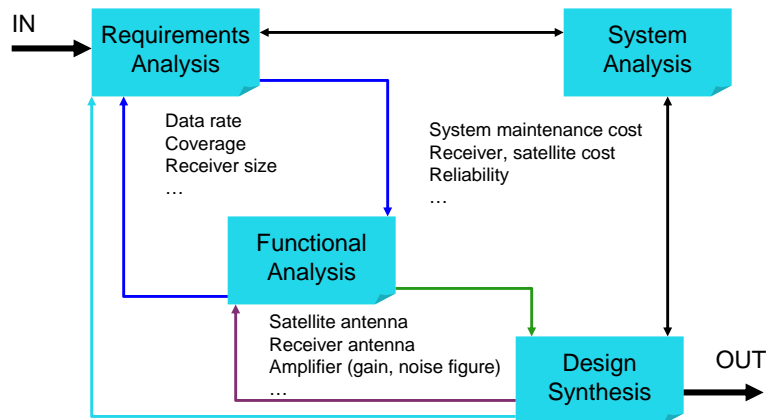
- The life-cycle or concurrent engineering design approach for bringing competitive products into being goes beyond the consideration of the life-cycle itself.
- It must simultaneously embrace,, the life-cycle of the manufacturing processes including that of the product service system

The resulting three concurrent life-cycles progressing in parallel are:

- The need for the product which gives rise to the Conceptual and Preliminary Design
- The need for production which gives rise simultaneously to manufacturing configuration & Operations Design
- The logistics support activities that is often neglected until product and production design is completed. Logistic support is needed to service the product during use and eventual retirement or phase-out

Creating the Global Network

- How might the systems engineering process be applied in terms of frequency selection?



GPS – Wrap Up

- Great example of a complex engineered system that has transformed many facets of society and daily life
- Impossible to conceive without comprehensive top-down systems engineering design process