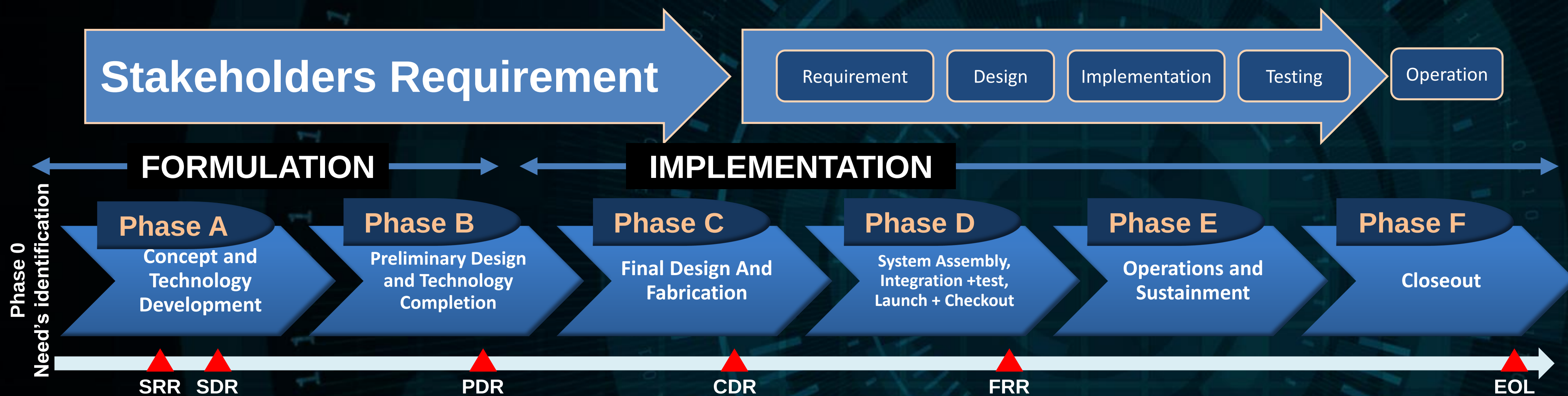


SATELLITE System Engineering

Satellite System Engineering is an interdisciplinary approach and means to enable the realization of successful systems. It focus on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem.

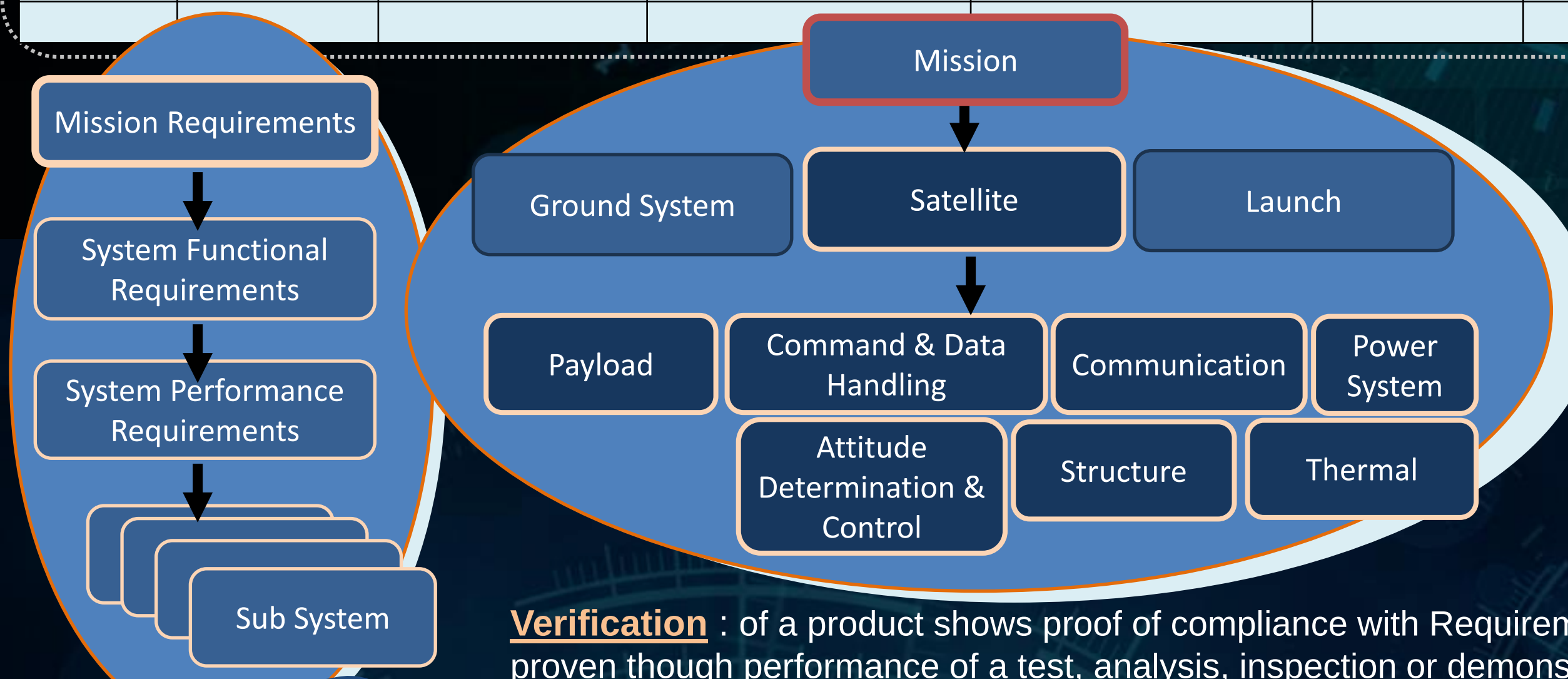


Traceability Matrix

All performance + functional specification shall be able to trace to the initial High level requirement through the specification Identify number.

Science Goal	Science Objectives	Scientific Measurement Requirement		Instrument Functional Requirements	Projected Performance	Mission Functional requirement (Top Level)
		Physical Parameter	Observables			

SRR : System Requirement Review
SDR : System Design Review
PDR : Preliminary Design Review
CDR : Critical Design Review
FRR : Flight readiness Review
EOL : End Of Life



- Describe what needs to be done.
- Drive schedule and cost
- What need to be tested to ensure the product performs as planned.
- Communication with stake holders is key!

Verification : of a product shows proof of compliance with Requirements – that the product can meet each “shall” statement as proven though performance of a test, analysis, inspection or demonstration (or combination of these).

Validation : of a product shows that the product accomplishes the intended purpose in the intended environment – that is meets the expectations of the customer and other stakeholders as shown through performance of a test, analysis, inspection or demonstration.

Methods	To verify each requirement
Analysis	Use of mathematical model or analytical technique to verify a requirement
Demonstration	Basic Confirmation of performance capability, without detailed data gathering
Inspection	Visual examination of each end product or records
Test	Detailed data gathering to verify performance

Level	Technology Readiness Level (TRL)
TRL 1	Basic principles observed and reported
TRL 2	Technology concept and/or application formulated
TRL 3	Analytical and experimental critical function and/or characteristic proof-of-concept
TRL 4	Component and/or breadboard functional verification in laboratory environment
TRL 5	Component and/or breadboard critical function verification in a relevant environment
TRL 6	Model demonstrating the critical functions of the element in a relevant environment
TRL 7	Model demonstrating the element performance for the operational environment
TRL 8	Actual system completed and accepted for flight (“flight qualified”)
TRL 9	Actual system “flight proven” through successful mission operations

Model Philosophy → Qualification and Testing method

STM : Structural –Thermal Model
EFM : Electrical and Functional Model
EM : Engineering Model
EQM : Engineering Qualification Model
QM : Qualification Model
PFM : Protoflight Model
FM : Flight Model

Space Environment Consideration

Earth Gravity
Earth Magnetic Field
Electromagnetic Radiation
Earth Atmosphere
Earth Plasma and energetic particles radiation
Space Debris and meteoroids
Contamination

