Thermomechanical effects

Material selection
- Heat shield
- Shock absorber

Design/specification
- Stack up optimization
- Thermomechanical shielding

Development of
- Hydrodynamic codes

Implementation of new
- Equations of state
- Material behaviour
- Damage models

Specific model development
- Multiscale modelling
  (microscopic, mesoscopic and macroscopic)

Engineering & Hardening solutions

Modelling and computation

Tests and measurements

R&T

Physics

Modelling and computation

Use of
- Hydrodynamic codes
- Finite element codes

Computation of
- Shock waves generation and propagation
- Thermostructural response
- Material and structure damage

Threat levels
- Mission analysis

Characterization of materials by measurement of
- Impulse (ballistic carriage recoil)
- Free surface velocity (VISAR)
- Stress (Quartz gauge)
- Strain (Strain gauge)

Numerical model validation
- Spalling and delamination observation
- Melting / vaporization detection
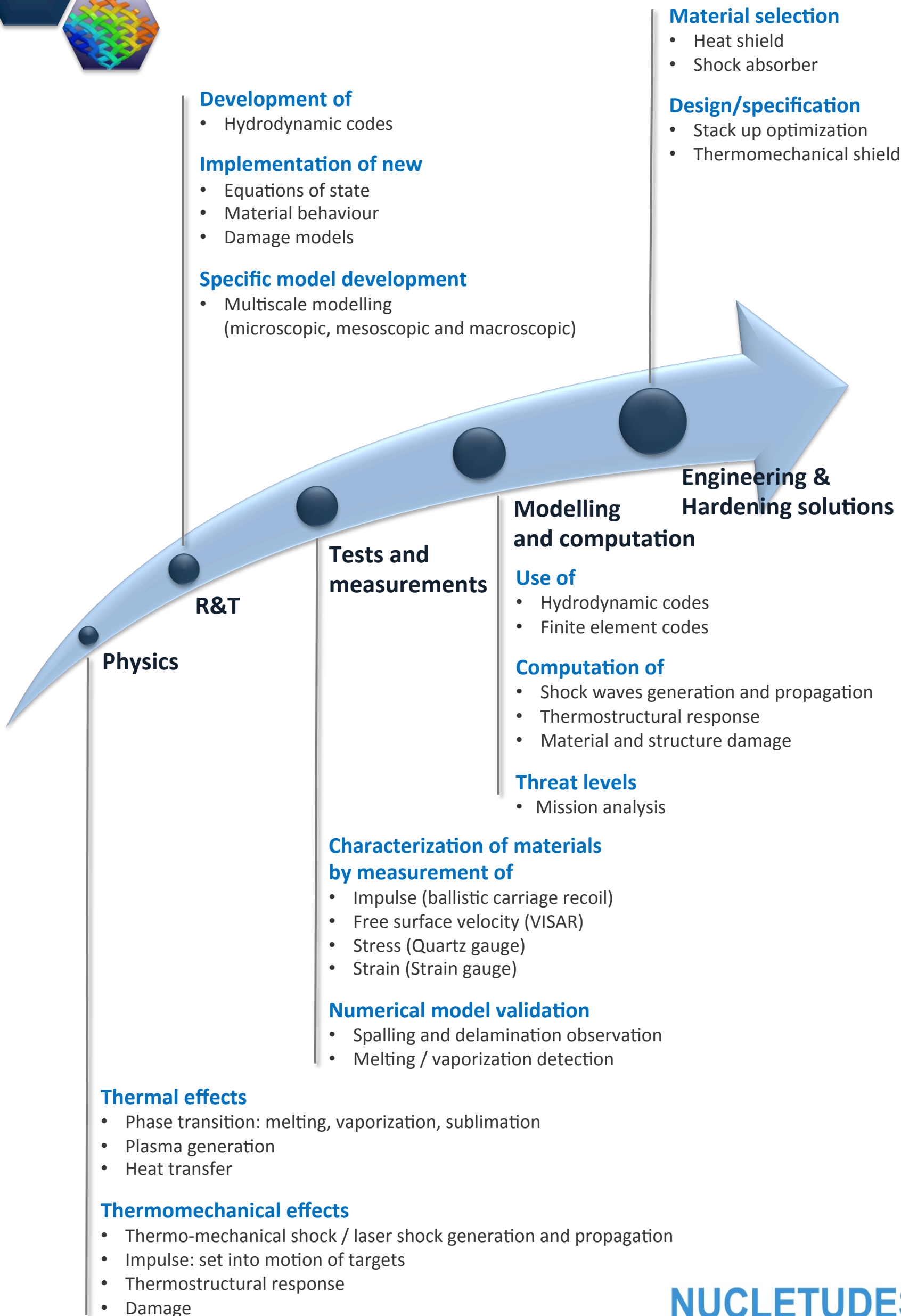
Thermal effects
- Phase transition: melting, vaporization, sublimation
- Plasma generation
- Heat transfer

Thermomechanical effects
- Thermo-mechanical shock / laser shock generation and propagation
- Impulse: set into motion of targets
- Thermostructural response
- Damage

NUCLETUDES