



## 극초음속 및 희박 유동 연구실

지도교수 : 김 규 홍

Tel : 02-880-8920

E-mail : aerocfd1@snu.ac.kr

Homepage : hypersonic.snu.ac.kr

Address : 40동(풍동실험실) 100호

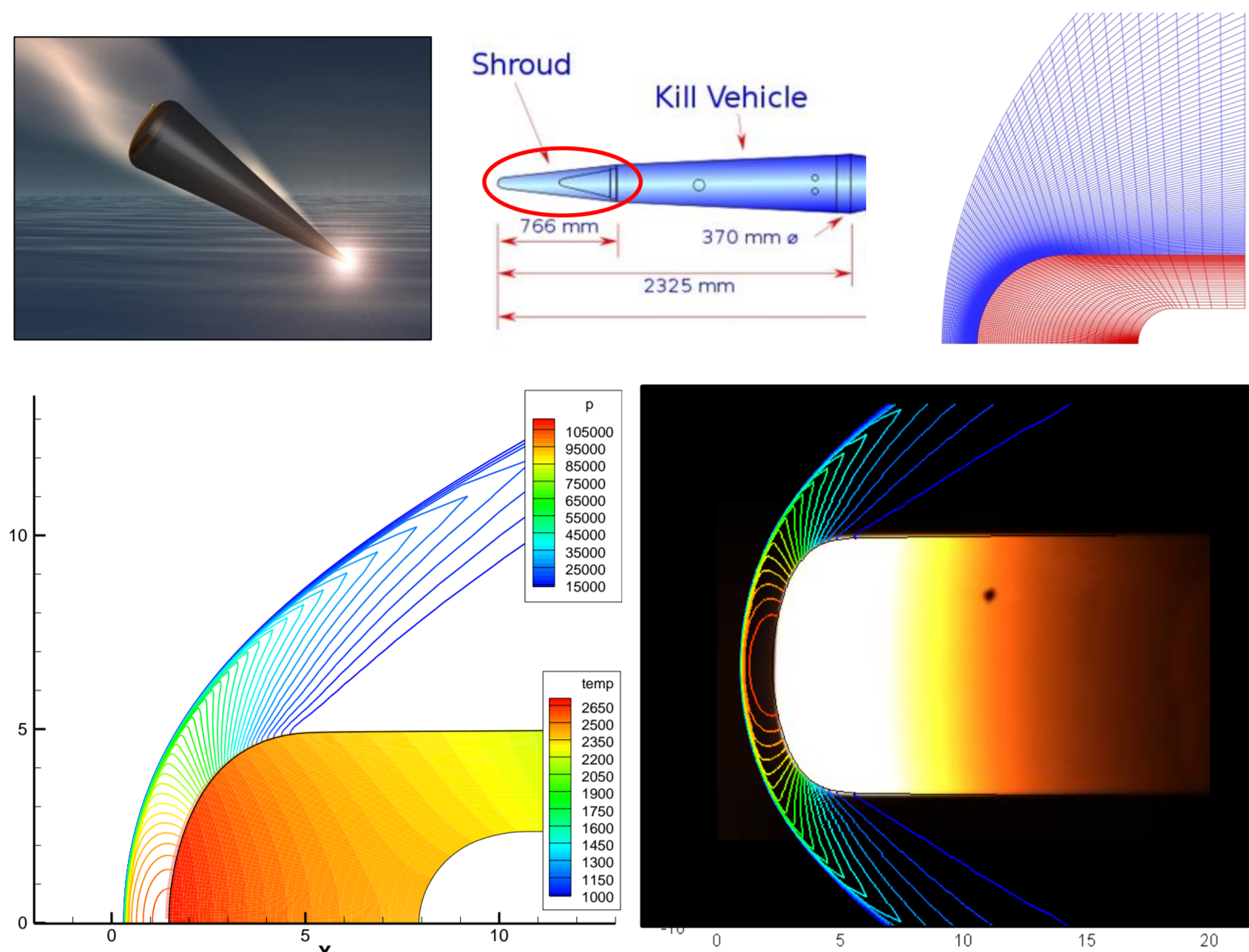


서울대학교 극초음속연구실

Hypersonic & Rarefied flow Laboratory

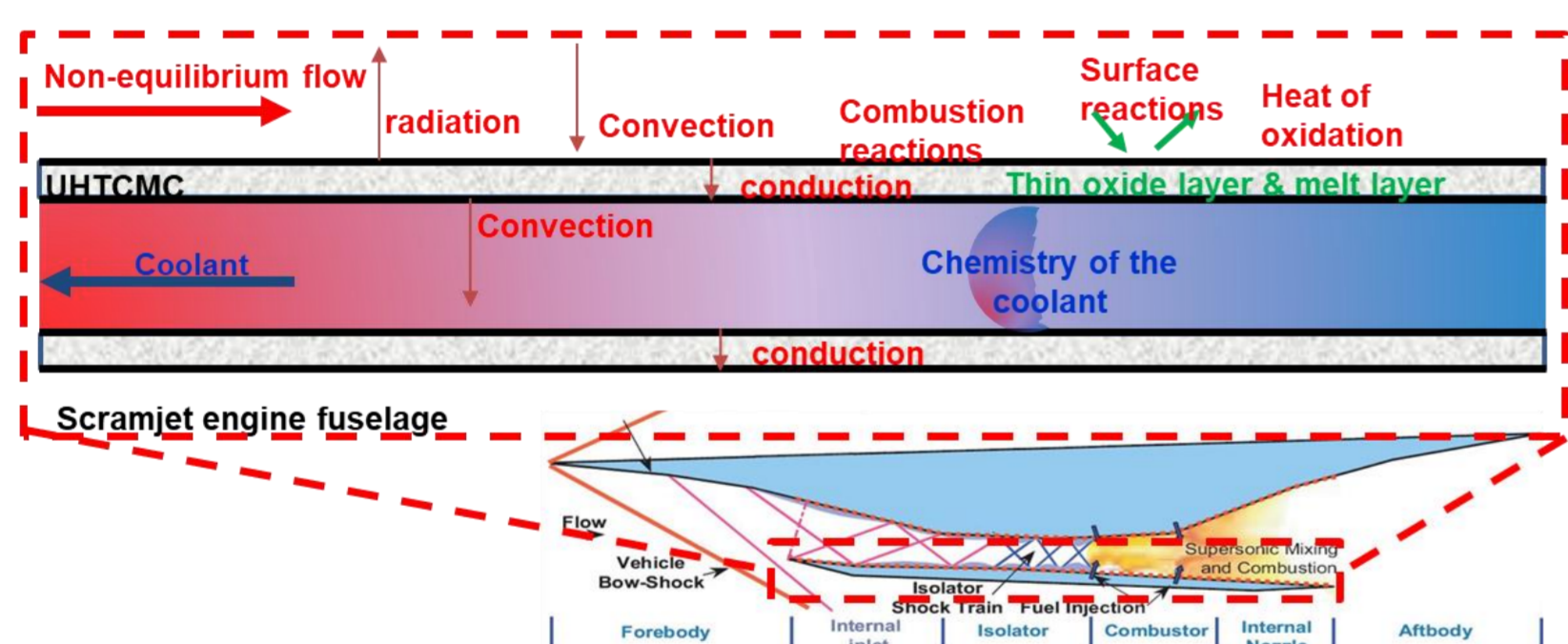
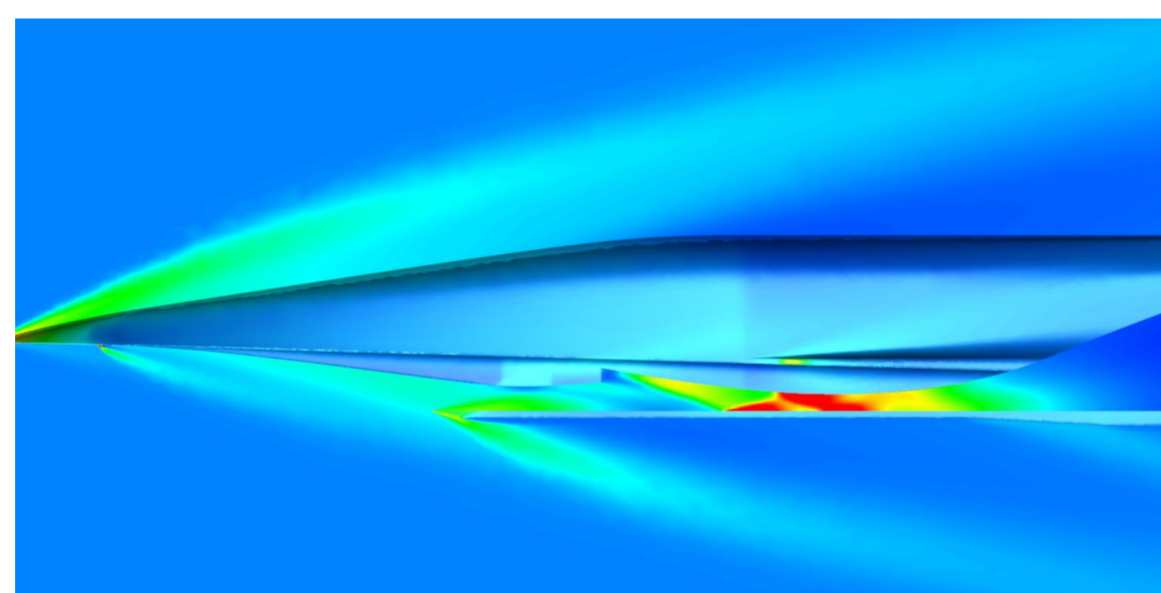
## Research Topics

### Thermal Protection System



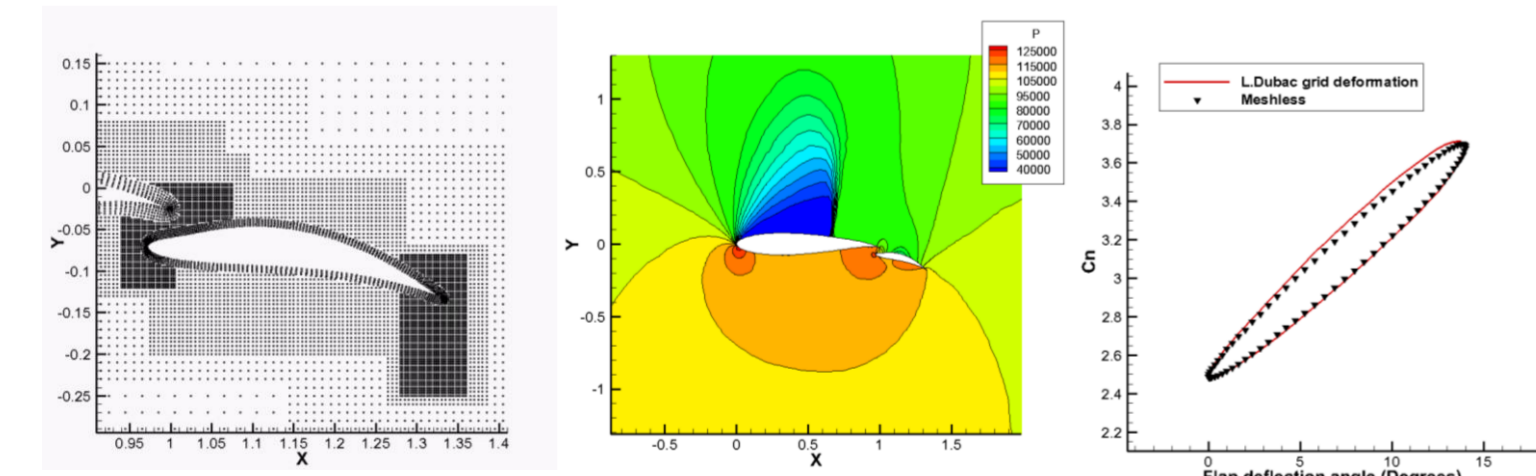
- Materials
  - Carbon-Carbon, Carbon-Phenolic
  - Silicon Carbide, Silica Phenolic
  - Tungsten, Cork, etc
- Methods of Study
  - Ablation Test with Arc Plasma
  - Computational Fluid Dynamics

### SCRAM Jet Thermal Analysis



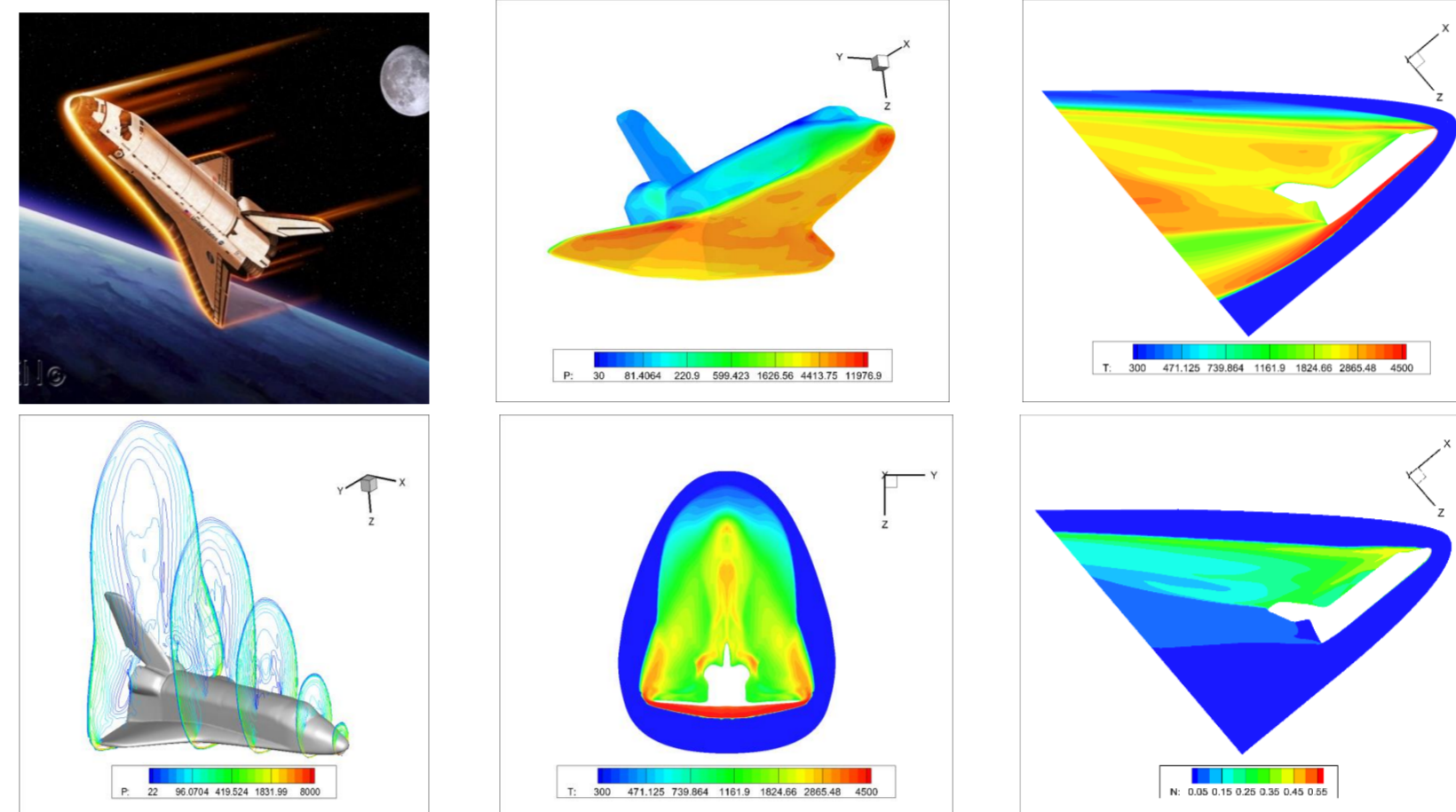
- Non-Equilibrium Flow
  - High Mach Number
  - High Temperature
- Thermo-Structural Analysis
  - Re-generation Cooling System
  - Heat Transfer from High Temperature Air
  - Thermal Protection Structure

### Meshless Method



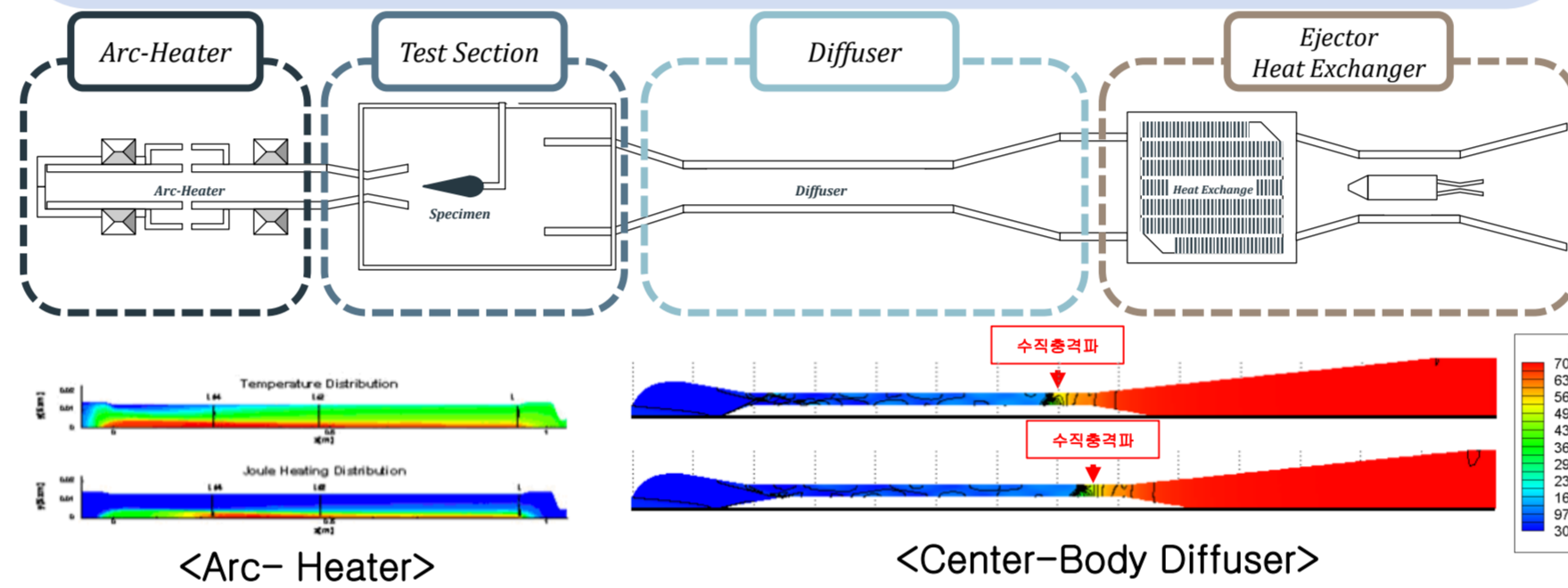
- Meshless Method for Compressible Flows
  - LSM with Geometric Conservation Law
- Complex Flow Analysis
  - Complicated Geometry & Moving Object

### Space Shuttle Reentry



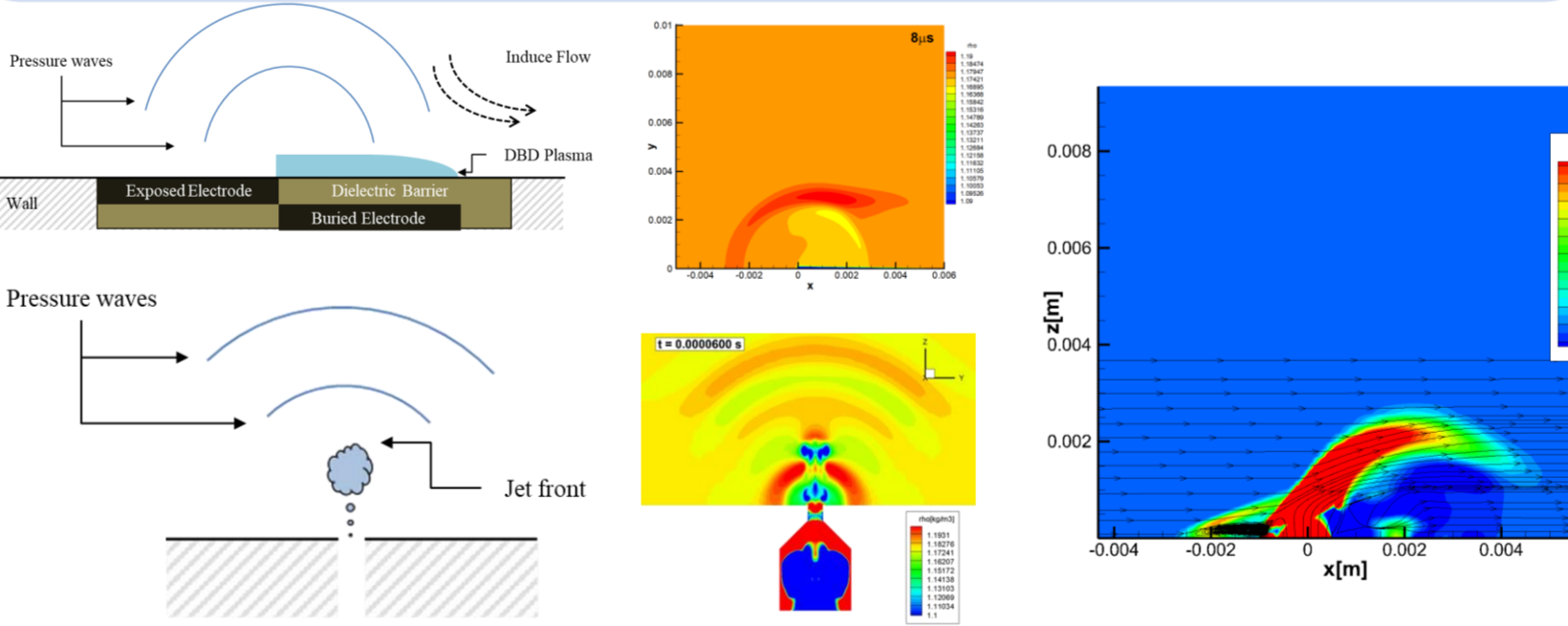
- Hypersonic Region
  - High Mach Number (~25)
  - Aerodynamic Heating with Strong Shock
  - Rarefied Gas Environment

### Arc Plasma Wind Tunnel



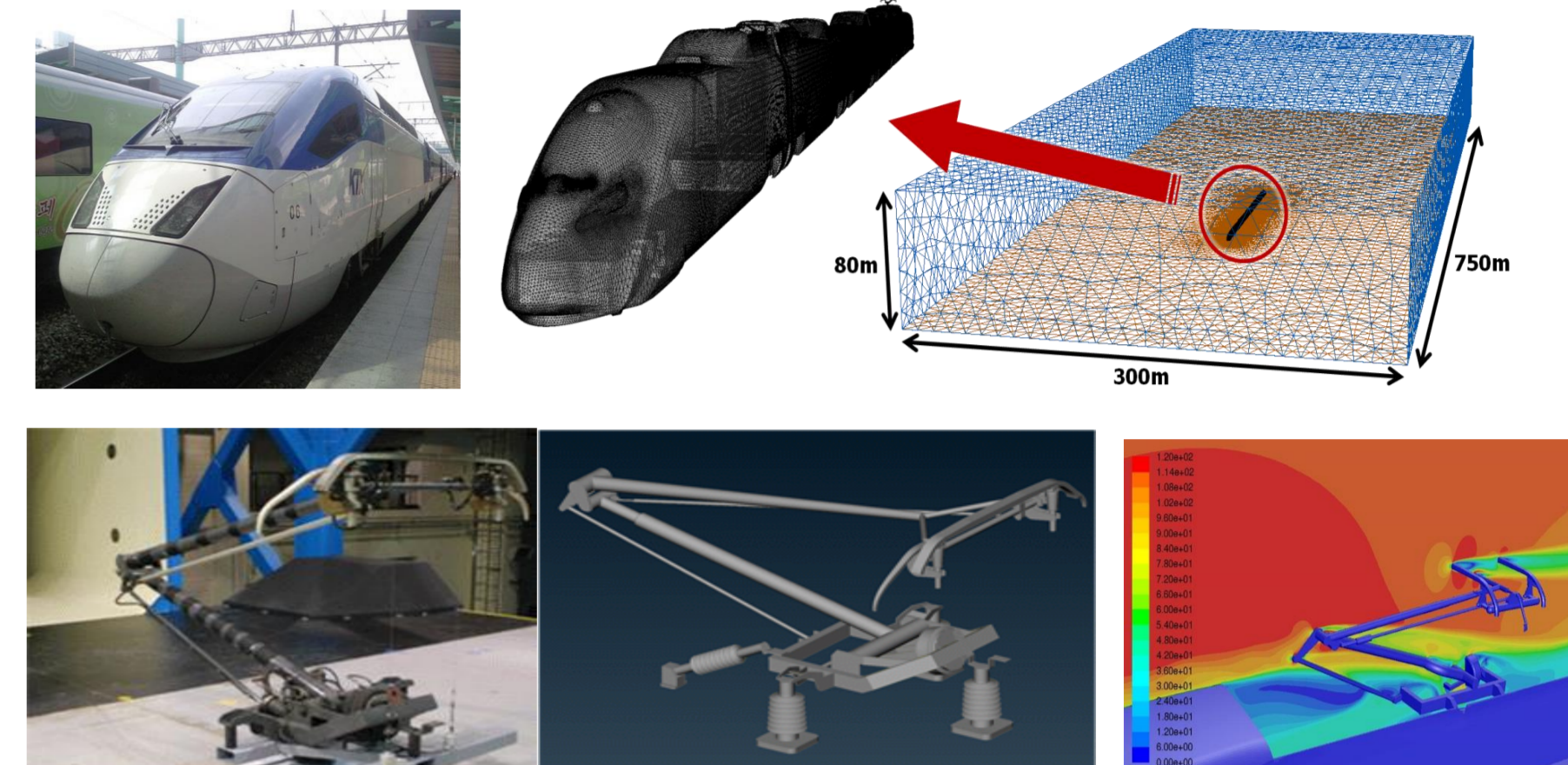
- Design & Performance Evaluation
  - Arc-Heater, Nozzle, Test-Section, Diffuser
- Flow Analysis
  - Supersonic/Hypersonic Internal Flow
  - Arc Plasma, Shock Train Analysis
  - High Temperature & Turbulence Analysis

### Plasma Actuator



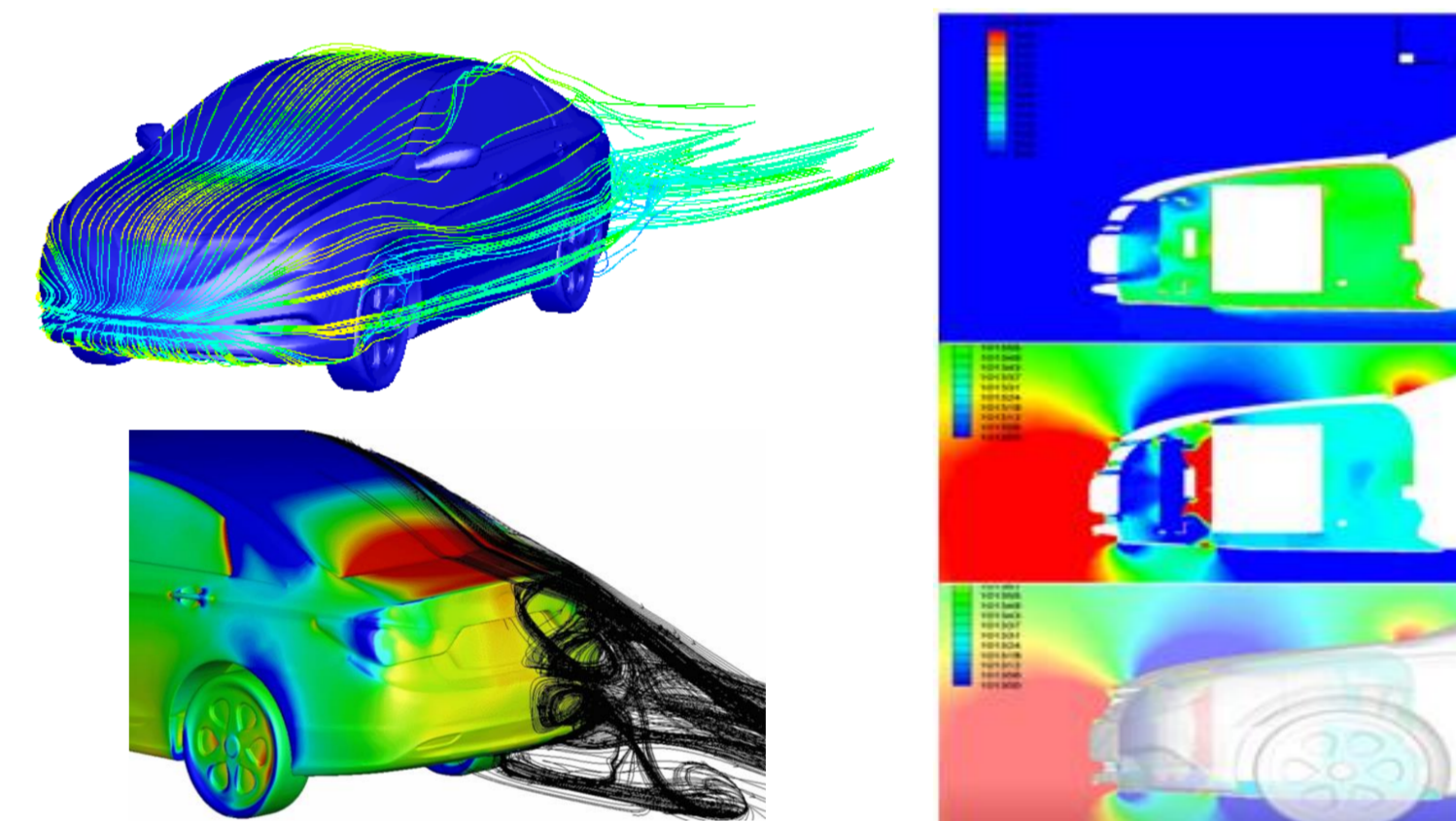
- DBD Plasma Actuator
  - Chemical Reaction & Joule Heating Model
  - Flow Control & Stealth
- Sparkjet Plasma Actuator
  - Orifice Boundary Condition Model
  - Subsonic & Supersonic Flow Control

### High Speed Train Aerodynamics



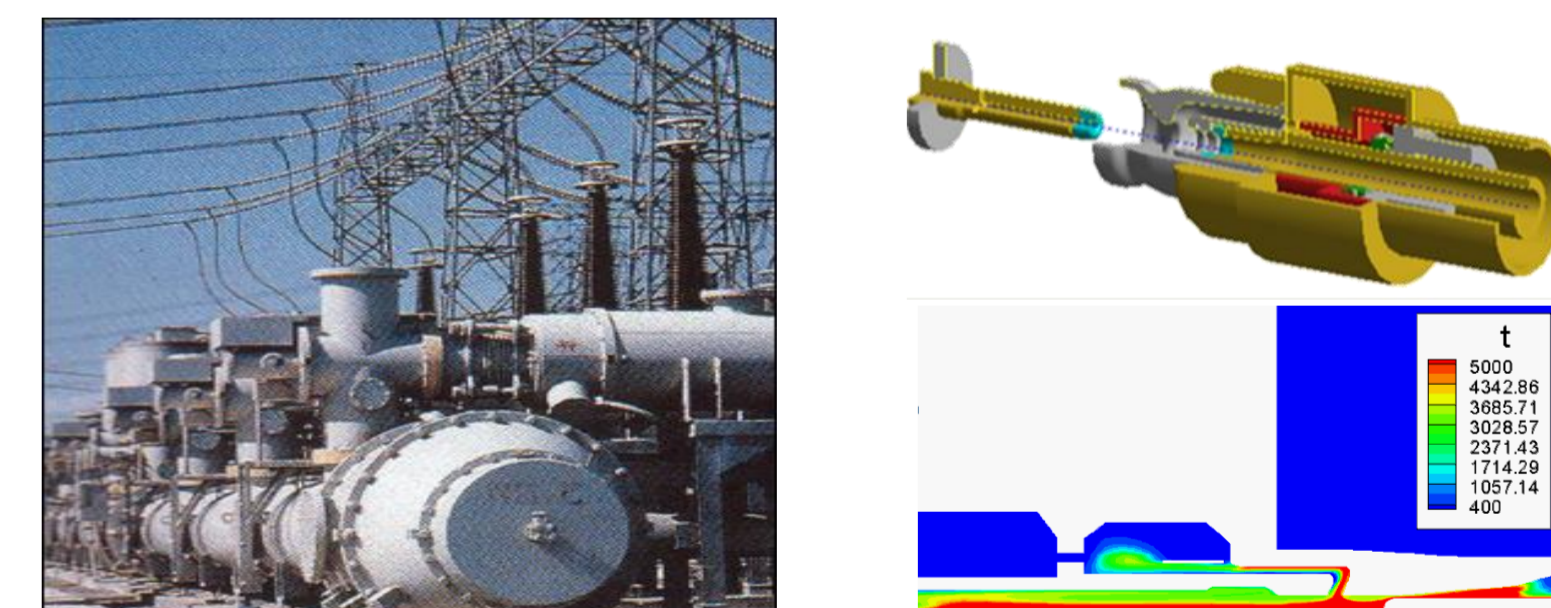
- Simulation on Pantograph System
  - Aerodynamic Performance & Noise
  - Panhead Shape Optimization
- Great Train Express
  - Compression Wave Propagation
  - GTX System Initial Design

### Automobile Aerodynamics



- Internal and External Flow
  - Engine Room Analysis
  - Aerodynamic Drag Reduction Device
  - Shape Parametric Study

### High Voltage Circuit Breaker



- Plasma Flow
  - High Temperature (20,000K) Heat Gas
  - Electric Field & Radiation Analysis
  - Unsteady Moving Analysis

## About Lab

### 보유 장비 현황

- 아음속 풍동
  - 타입 : Closed Type
  - 최대풍속 : 75m/s
- 초음속 풍동
  - 타입 : Intermittent Blowdown
  - 시험속도 (Mach No.) : 2.0/3.0/3.8
  - 최대측정가능시간 : 30sec
- 클러스터
  - 윈도우/리눅스 기반 클러스터
  - ~1700 Threads

### Members

- 총원 : 23 명
  - Post Doc. : 2
  - Ph.D. Course : 15 (Full Time : 13, Part Time : 2)
  - Master Course : 6
- 졸업생 현황 (석사 : 17, 박사 20)
  - 연구소
    - 항공우주연구원, 국방과학연구소
  - 산업체
    - 삼성전자, LG전자
    - 현대중공업, 삼성중공업, 효성중공업
    - 현대자동차, 현대모비스
    - 한국항공우주산업
    - 국외/국외 박사 후 연구원 및 국외 박사과정 진학