Aircraft Survivability and Stealth Technology

R. S. Myong, Ph.D.

Research goal

Aircraft survivability disciplines and RF & IR stealth design

Development of multi-disciplinary computation and design method for RF & IR stealth design

- Signature balancing/prioritisation
- Cost, time, performance, maintainability, and supportability
- Specification of RCS budgets for components
- CATIA based multi-disciplinary computation: CFD + CEM, Panel Method + Physical Optics

Developing asymptotic and full Maxwell solvers for RF stealth studies

Development of CFD-based methods

- 1st & 2nd order component buildup method
- Asymptotic method for high frequency range (Physical Optics, hybrid of PO and CEM)
- Multi-zone finite volume Maxwell code in time domain (broadband; fast Fourier transform)
- Radar cross section in terms of frequency, polarization, azimuth & elevation angles

Developing IR signal reduction design methodology for aircraft propulsion system

Development of IR signature reduction schemes for aircraft propulsion components

- Analysis of current IR reduction design methodology for aircraft propulsion system
- Modeling of jet engine and exhaust system
- Computational algorithm of infrared signal radiating from high temperature engine plume
- IR signature measurement and validation
- Susceptibility analysis (IR lock-on range)

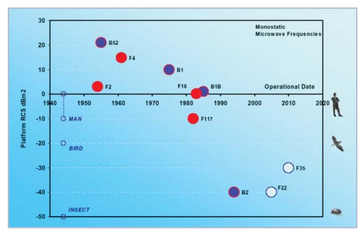
Funding

Domestic

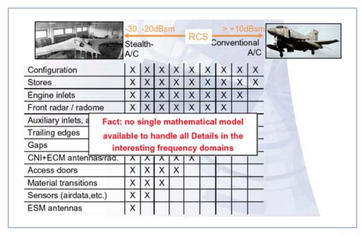
Low Observable Research Center	(2009-2017)
Flight Vehicle Research Center	(2007-2013)
Korea Aerospace Industries Inc.	(2006-2008)

Milestones

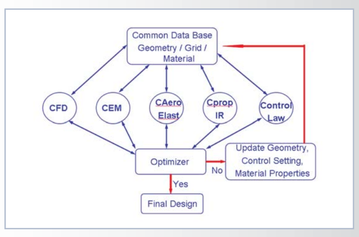
Stealth disciplines in aircraft design



Radar cross section of aircraft

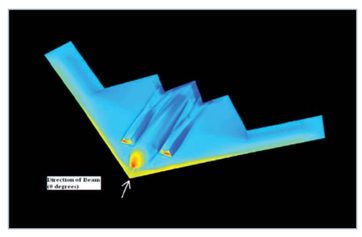


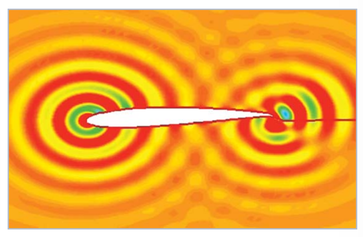
Radar cross section budgets



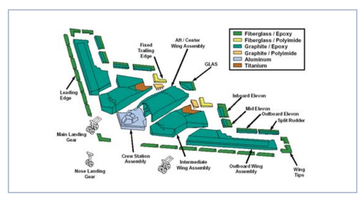
Multi-disciplinary computation

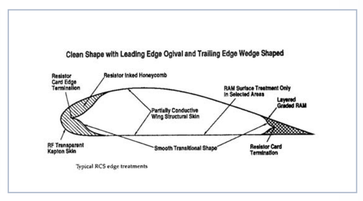
Computational electromagnetics and radar absorbing structure





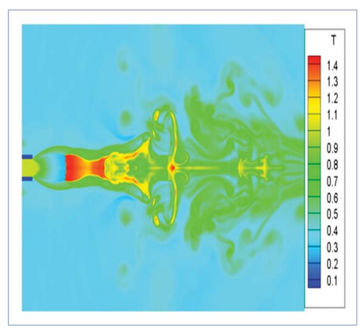
CEM predictions of vehicles in resonant regime



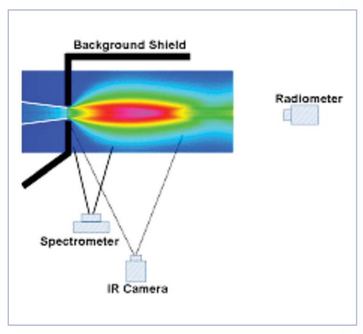


B-2 stealth bomber (surface current, radar absorbing structure)

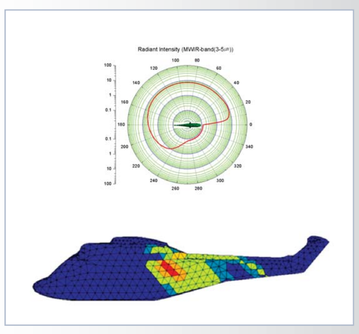
IR reduction technology and modeling of IR signal of exhaust plume



Computation of exhaust plume



IR signature measurement



Prediction of IR intensity level

Dissemination of research outcomes

Progress in Electromagnetics Research B (MIT; 2009)
Journal of The Korean Institute of Electromagnetic Engineering and Science (JKIEES; 2008)
Korean Society for Aeronautical & Space Sciences Journal (KSASS; 2005, 2008)
Lecture Note "Aircraft Survivability and Stealth Technology" (GNU Graduate School; 2007, 2009)

Collaborators

Prof. A. Chatterjee
(Indian Institute of Tech. Mumbai, India)
Prof. S. P. Mahulikar
(Indian Institute of Tech. Mumbai, India)
Profs. C. G. Kim and S. W. Baek (KAIST, Korea)
Profs. S. M. Choi and M. Y. Kim
(Chonbuk Nat' Univ., Korea)

Aerospace Computational Modeling Laboratory http://acml.gnu.ac.kr
Gyeongsang National University
Department of Mechanical & Aerospace Engineering