INTRODUCTION

The number of countries possessing nuclear weapons is large, but the number of countries having the knowhow for making stealth aircraft is limited. Hence, *Stealth Technology*, provides a quantum leap in military power and will shape future warfare. Stealth technology is kept as a closely guarded secret by the countries possessing it. There is a dearth of information in the open literature, which has resulted in several schools of opinion and consequently misconceptions also. Therefore, there is a need for a consolidated and comprehensive course, aimed at demystifying this topic. Also, the proliferation of Infra-Red (IR) guided MAN Portable Air Defence Systems (MANPADS) including with terrorist groups, have emerged as a major cause of aircraft and helicopter loss in tactical warfare and skirmishes.

COURSE OUTLINE

- Principles of Stealth – camouflage, conceal, deceive;
- Active vs. Passive detection;
- Mission Attainment Measure, Aircraft Survival rate, Measure of Mission Success, & Mission Goal;
- Survivability, Susceptibility, Vulnerability of Aircraft & Helicopter in Human-made Hostile Environment;
- Precision Guided Weapons & Role of Stealth Aircraft;
- Introduction to Aircraft Signatures – radar (Radar Cross-Section & its reduction), IR, Visual, Aural;
- Introduction to Materials for Stealth;
- Stealth related to air-intakes;
- Stealth related to UCAV design;
- Basics of high frequency RCS of aerospace & naval targets;
- Extremely low frequency electric field modeling & reducing signatures;
- RCS computations for realistic geometries - issues & challenges;
- Design synthesis & modeling of Radar Absorbing Materials;
- Aero-acoustic field & its modeling;
- Simulation & mitigation of laser lethality;
- Principles of IR Radiation – basic laws (Planck’s, Wien’s Displacement, Kirchhoff’s), Grey Body spectrum of Solid Surfaces vs. Line & Narrow Band Emission from Unsymmetrical Gases [e.g. CO₂, H₂O (vap.)];
- IR Signatures in 2–3 μm, 3-5 μm, 8-12 μm;
- IR Signatures from Internal Sources – engine heated casing, engine exhaust plume, aerodynamic heating of air-frame in supersonic aircraft;
  - Simulation of plume for IR signature;
- IR Signatures from External Sources – reflection of earth-shine (in 8-12 μm), sunshine (in 2–3 μm followed by 3-5 μm), & sky-shine (in 8-12 μm);
- Role of Atmosphere – attenuation of IR-signature by intervening atmosphere & atmospheric background radiance;
- Relation between IR-Signature and Aircraft / Helicopter Susceptibility – lock-on envelope & lethal envelope for air-to-air combat in horizontal plane;
- IR-Signature Suppression (& its Penalties) – optical blocking, cooling, emissivity optimization;
- IR Countermeasures (IRCM) for point IR-detection – decoys / flares;
- IRC²M – imaging IR-detectors.

WHO MAY BENEFIT

Target Audience: Indian Army, Indian Navy, Indian Air Force, Indian Coast Guard, DRDO, ADA, HAL, Rolls-Royce, GE, Airbus, Boeing, Honeywell, & all other organizations, establishments, & companies working on Stealth related problems.

Format of the Course: The course is intended to educate the target audience on the basic aspects & details of Aircraft & Helicopter Stealth Technology. The course will include several fundamental & specialized lectures, each will be followed by ample opportunity for Q&A also among the participants. This will enable cross-flow of knowhow between academicians, service officers, & defense scientists, which is expected to synergistically evolve in to a unique learning experience.

Skills to be Developed:

- Understanding of basic & probabilistic aspects of modern technical warfare
- Clarity on different aspects of aircraft / helicopter observabilities & their reduction

VENUE FOR CLASSES

Lectures will be in the Seminar Hall, Jal-Vihar Main Guest House, IIT Bombay.

FACULTY

The faculty instructors in this course include Prof. Shripad P. Mahulikar (course coordinator), Prof. G.R. Shevare, Prof. N. Ananthkrishnan, Prof. Ramnath P.R.C. Aiyar, Prof. Avijit Chatterjee, Prof. P.J. Guruprasad.
COURSE FEES
Per day per participant = Rs. 5,200.00 + 18% taxes (= Rs. 6136.00).
This CEP course is available in the following two modules:

Module-1 (1st 3-days) = Introduction & Basics
Following will not be available in Module-1: RCS computations for realistic geometries - issues & challenges, CAD of Radar Absorbing Materials, Solid Angle Estimation for IR-Signatures, IR-Suppression without Active Cooling, Guided Tutorials on IR-Radiation.

Fee = Rs. 18,408.00 (= 3 x Rs. 6136.00)

Module-2 (all 5-days) = Module1 + Additional Details

Fee = Rs. 30,680.00 (= 5 x Rs. 6136.00)

The above fee does not include accommodation charges. On-campus guest-house accommodation currently cannot be guaranteed; hence, participants are encouraged to make their own arrangements, e.g. in other Government Guest-houses.

The fee should accompany the registration form as Demand Draft in favor of “Registrar IIT Bombay” & payable at Mumbai. Click here for Online Payment.

IMPORTANT DATES
Deadline for submitting Application: Oct 25th, 2017
Notification of Acceptance: Oct 30th, 2017
Course Dates: November 10 – 14, 2017
Participants will be awarded ‘CEP Course Completion Certificate’.

Completed registration forms should be sent at the following address:

CEP Office, CE & QIP,
Attn. CEP Course: “Aircraft Stealth Technology”
2nd Floor, Main Building
Indian Institute of Technology Bombay
Powai, Mumbai 400 076
Phone: (022) 25767006, 25726199
Fax: (022) 25726199
REGISTRATION FORM
5-days CEP Course on
Aircraft Stealth Technology
November 10-14, 2017

NAME (BLOCK LETTERS): _______________________________________________
______________________________________________________________________
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Gender: M / F
DESIGNATION: ________________________________________________________
ORGANIZATION: _______________________________________________________
MAILING ADDRESS: _____________________________________________________
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TELEPHONE: ____________________ (O) ____________________ (R)
______________________________________________________________________
FAX: ____________________________ MOBILE: ____________________________
EMAIL : ________________________________________
HIGHEST EDUCATIONAL QUALIFICATION: _______
SELECT COURSE "MODULE BY ENCIRCLING: MODULE-1 / MODULE-2"
BANK DRAFT DETAILS: No. ___________________________
AMOUNT = RS. ___________________________
NAME OF BANK = _____________________________________________________

Date: ____________________________ Signature of Applicant

PHOTOCOPY ADDITIONAL COPIES OF THIS FORM, IF NEEDED