



भारतीय प्रौद्योगिकी संस्थान खड़गपुर
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Advertisement No.: R/06/2019, Dated - August 30, 2019

Call for Applications/Nominations for Hindustan Aeronautics Limited Chair Professor

Applications/Nominations are invited for ONE (01) Chair Professor Position designated as the "HAL Chair Professor" at IIT Kharagpur. The aim of the Chair is to promote research and academic activities in emerging areas in radar and communications industry as mentioned in Annexure-1 (attached).

The tenure of the Chair shall be initially for a period of three years and may be renewed on a yearly basis up to a maximum of five years. Nominations/Applications are invited from:

- Existing regular and visiting faculty members of the Institute in relevant disciplines.
- Distinguished academicians/researchers from outside.

Remuneration/Compensation: As per regular Professor of the Institute with additional top-up, if applicable.

Job responsibilities: The HAL Chair will be responsible for conducting research & development in various areas related to radar and communications technologies, facilitating technical consultancy, training programs and addressing other mutually agreed activities relevant to the HAL. The HAL Chair Professor will also initiate new academic / training programs, develop training modules for mentoring/ coaching of HAL personnel for knowledge update and capacity building. The Chair will facilitate annual conference of defence related industries and make efforts to conduct short-term courses by international faculty for the students of the Institute and engineers/professionals of HAL in new and emerging areas of the radar and communications domain.

The applications/nominations may be sent to asregre@adm.iitkgp.ac.in as soft copy (PDF) after obtaining the consent of the person being nominated. An individual can also directly send his/her CV.

The hard-copy of applications/nominations needs to be sent to the address below:

Assistant Registrar (Recruitment), Establishment Section, IIT Kharagpur - 721302 in a properly sealed cover marked "**NOMINATION/APPLICATION FOR HAL CHAIR PROFESSOR**".

Last Date for receiving nominations/applications is 18-10-2019.

For any clarification or further information, please contact: Assistant Registrar, Recruitment Section, IIT Kharagpur, email: asregre@adm.iitkgp.ac.in


कुलसचिव / Registrar

Annexure-1

1. PRIMARY RESEARCH AREAS

1.1 Radar related technologies & processes, involving

- Active Electronically Scanned Array (AESA) Antenna System
- Ultra Low Side-lobe Antenna System for AESA Application
- Transmit/Receive (T/R) modules for AESA Antenna System
- Radar Beam Shaping, Switching & Steering
- Signal & data processing for target detection and tracking
- Low observable Radar Cross-section (RCS) and Stealth techniques
- RCS simulation and Prediction algorithms
- Detection & tracking of stealth targets and targets during jamming.
- Air-to-Air, Air-to-Ground & Air-to-Surface modes of operation for Radar
- Multi-core processor, High-speed Field programmable gate array (FPGA), High speed data bus and System on Chip (SOC) based data processing
- Algorithms for various military radar applications – fire control, maritime patrol & surveillance, air defence, secondary surveillance, synthetic aperture radar (SAR), inverse SAR, space, radar signature analysis etc
- Technologies associated with detection and search radars, threat radars, missile guidance systems, battlefield and reconnaissance radars, air traffic control & navigation radars, space and range instrumentation radars and weather sensing radar systems

1.2 Integrated Electronic Warfare technologies and techniques, involving

- Passive use of electromagnetic (EM) spectrum for gaining intelligence about adversary to find, identify, locate & intercept potential threats or targets - Electronic Support Measure (ESM)
- Active use of EM spectrum to deny its use by an adversary by jamming/ incapacitating adversary operation(s) or causing EM deception to avoid harm from potential threats – Electronic Counter Measures (ECM) like communications jamming, Integrated Air Defence System (IADS) suppression, Directed Energy Weapon/ Laser attack, expendable decoys like chaff & flares and radio controlled improvised explosive devices
- Techniques to foil/ defeat ECM actions in order to protect own personnel, facilities, equipment or mission – Electronic Counter Counter Measures (ECCM) like frequency hopping, spread spectrum & crypto-security; emissions control; low observability or stealth; and self-protection suite having directed infrared countermeasures, Infrared counter measures & Flare (for IR guided missiles) and Chaff (for radar guided missiles) etc
- EW using Infrared, ultraviolet, electro-optical and other less used portions of the EM spectrum; EM compatibility & deception; EM hardening, interference, intrusion & jamming; electronic masking, probing, intelligence & reconnaissance; electronics security; EW reprogramming; emission control; and spectrum management

1.3 Spread spectrum techniques, involving

- Mode-5 reply encryption & decryption of Identification of friend or foe (IFF) signals
- Direct sequence data spreading for interrogation & despreading of WALSH encoded data in IFF system
- Error detection and correction techniques covering Reed-Solomon techniques of interrogation/reply data sequence.

1.4 Terrain Simulation techniques for,

- Frequency modulated continuous wave (FMCW) type Radio Altimeter operating in 'C' band 4.2 to 4.4 GHz.
- Terrains with different reflectivity coefficient and scattering parameter (Sand, Grass, Water, Ice, Marsh land, concrete etc).

1.5 'L' Band Power Amplifier for,

- Airborne pulsed transmitter for IFF, Tactical Air Navigation (TACAN), Distance Measuring Equipment and Traffic Alert & Collision Avoidance System (TCAS) applications
- Active wave shape control with low power consumption for airborne applications.

1.6 Airborne Antenna Radiation pattern analysis tools & techniques

1.7 Compression/ decompression algorithm and Image processing techniques for on-board video, audio and data recording and replay applications

2. OTHER RESEARCH AREAS

2.1 Airborne System Simulation, Design algorithms, Technologies related to,

- Embedded conformal/ small size antennae for MHz range
- Graphic processing for high pixel & low data latency
- Open architecture system with high speed data bus/fibre-optic link
- Active Matrix Liquid Crystal Display (AMLCD) based colour display systems
- Vehicle Control and Guidance System – algorithms, techniques
- Electrical Power Generation & Controls – drives, techniques, technologies
- Electro-Magnetic Systems – technologies
- flight path reconstruction based on longitude & latitude inputs recorded in recorder and overlaying the flight path on terrain map

2.2 Airborne System Analysis & Design Validation using,

- CAE Analysis of mechanical systems for environmental stresses
- Stress, Thermal & Fatigue Analysis of airborne components
- Computational Fluid Dynamics Analysis
- Computational analysis for aero foils of different size & shape
- Acoustic Noise level measurement of aircraft on ground and flight.