ARE YOUR TECHNOLOGICAL ASSETS YIELDING THEIR FULL POTENTIAL???????

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TECHNOLOGY TRANSFER GROUP

INDIAN SPACE RESEARCH ORGANIZATION
(ISRO)

Consultancy Services

The Resources

As a well-informed executive, you are of course aware of India's space programme. Rather less conspicuous is the fact that of 37 years, the agency which executed this programme, namely the Indian Space Research Organisation (ISRO) has built-up a wide spectrum of technological expertise and experience, with an effective blend of range and depth in nearly all the major disciplines of science and technology. This expertise and experience is now embodied in the 16,000 people of ISRO including world class PhD's in engineering and science, post-graduates in engineering and science and graduates in engineering who are backed by auxiliary scientific and technical staff and support services.

The facilities that ISRO technical personnel draw upon include the largest digital computing facility in the country, an array of well-calibrated test-and-evaluation facilities for electronic and electro-mechanical equipment; precision engineering workshops, explosive processing and handling facilities, chemical/polymer/propellants /composite/special materials development and engineering laboratories; and sophisticated facilities for remote sensing data processing and analysis using state of the art technologies.

The Offer

ISRO is pleased to offer this experience and expertise to the Indian industrial and technological sectors by way of Technological Consultancy Services, described more fully herein.

The Objectives

In today's world the technological assets that you have invested in and nurtured could well be the central power-house that drives your corporate activities towards their goals. Naturally you want these assets to yield their full potential. Consultancy Services from ISRO can contribute significantly to your efforts to maximize the returns from your technological assets.

These services from ISRO can initiate, catalyse, support or lead corporate activities that:

* Critically assess scientific and technological options in key areas of corporate endeavor
* Identify areas of R&D that will most contribute to corporate goals
* Reduce the lead-time of in-house or sponsored R&D
* Maximize use of indigenous technology and expertise
* Rapidly adapt, and reduce continuing dependence on imported technology, which carries high economic, social and political costs
* Improve productivity

The Services

Consultancy Services from ISRO include without being limited to:

* Definition of R&D programmes & Technology Forecasting
* Vetting and review of corporate scientific and technical programmes & projects, including technology assessment and choice
* Utilization of specialized test facilities, analysis, interpretation and validation of test results and data
* “Trouble-shooting” and related problem-solving
* Independent analysis and advice on scientific and technical proposals and projects submitted to the client by third parties
* Literature survey and state-of-the-art reports in different scientific and technological fields.

R&D project planning and programming:

* Advice on planning and setting up of specialized facilities
* Technological and Application Software

In each area of endeavour that you consider technologically significant, corporate effort may well be multifaceted, covering different interlocking activities requiring several of the above services. We will be pleased to assemble a team of experts to cater to these requirements.

Fees & Charges

These are very moderate. Apart from travel expenses, actuals are charged for documentation, minor experimentation and testing and bought-out services. Clients are encouraged to arrange, at their cost, for ISRO consultants to be provided accommodation and board of a reasonable standard; alternatively, these expenses are charged for at moderate rates. Fees per man-day of services rendered vary from Rs._____ for public sector and large private-sector enterprises down to Rs._____ for tiny or cottage-scale industries, in whose case these fees may be altogether waived in selected cases.

Modalities

You will find a list of list of technology areas in which ISRO offers Consultancy Services. Upon recognizing the broad characteristics of your problem area that could benefit from ISRO's Consultancy Services, contact us at:

TT&IC Program Office
Indian Space Research Organization (ISRO)
'Antariksh Bhavan'
New BEL Road,
Bangalore – 560 231

Ph: +91-80-2217 2185
Fax: +91-80-2341 8981

Under this scheme, ISRO has rendered consultancy services to a large number of Public & Private sector industries and industrial research organisations in diverse areas. These include the Indian Railways, Bharat Heavy Electrical Ltd,, Electronics Corporation of India Ltd., Bharat Electronics Ltd., Naval Physical & Oceanographic Laboratory, Electro Zincs Pvt Ltd., Kirloskar Pneumatic, Gujarat Communications & Electronics Ltd., National Institute of Design, Defense Research & Development Laboratory, Indian Institute of Tropical Meteorology, Hindustan Lever Ltd., etc o name a few.

Following your first enquiry as above, our Technology Transfer Team (TTG) team will respond with a suggested course of action which might include a preliminary discussion and a factory or site visit. Once the areas of expertise, the services and the man-days estimated/to be required are determined, a letter-contract, or a more formal Agreement, will be executed between ISRO and your enterprise, on the basis of which the consultancy services are rendered.

The Expertise

CHEMICAL ENGINEERING, POLYMERS & SPECIAL CHEMICALS

- **Development, testing, production of pyrotechnique and explosive systems**
- **Process engineering studies of chemical process and their plant design and engineering**
- **Synthesis of polymers and special chemicals,**
- **Specialty rubber processing and moulding,**
- **Analytical methods including spectroscopic techniques**
- **Teflon coating of components**

COMMUNICATIONS & ELECTRONIC INFORMATION TRANSFER ENGINEERING

- Antenna design & analysis
- Coding and error-correction techniques
- Data Compression techniques
- Design of VHF, UHF and micro-wave communication systems
- Digital & computer communication systems
- Digital techniques
- Electronic data-transfer systems engineering
- High-Speed data transmission and display systems
- Modems
- Phased-array antennas
- Satellite Communications Earth station systems
- Telemetry systems

COMPUTERS, DATA PROCESSING & SIMULATION

- Automatic check-out systems
- Computer networks and data communications
- Data-base management
- Hybrid simulation (with hard-ware in loop) (
- Micro-processor based systems
- Monte-Carlo simulation
- Real-time, quasi-real-time and off-line data
- Processing including related software
- Systems and applications software (selected areas)
- Systems-engineering bench-mark evaluation, operations and management of large computer systems Computer interfaces

EDUCATION TECHNOLOGY

- Design and conduct of studies in the fields of communication, communication planning and technology-society interaction.

- Planning and system design of experimental projects in communication research

- Planning, design and conduct of training, courses/workshops for TV programme production personnel (producers, scriptwriters, cameramen, engineers, etc) and communication researchers
- Production of TV programmes and Films for Education and Development
- System Design, Installation of Operation of Film and TV

ELECTRONIC EQUIPMENT-DESIGN, PACKAGING, PRODUCTION, QUALITY CONTROL

- Calibration of electronic equipment
- Component screening methodologies & protocols
- Electrostatic hazard prevention
- High-reliability soldering including training schemes
- Instrumentation & data acquisition systems
- Packaging production, quality control and quality assurance
- PCB fabrication, QC and QA
- Safeguarding against Electro-Magnetic interference

FIBER-REINFORCED PLASTICS (FRP)

- Design and analysis of FRP structures
- Design of FRP products using glass polyamide and carbon-fibre reinforcement
- Design of machinery for products and processes for FRP MATERIALS

FLUID AND GAS DYNAMICS, HEAT TRANSFER & COMBUSTION

- Combustion dynamics
- Design of heat-transfer equipment

- Design and fabrication of thermal sensors
- Flow-field analysis and related aero thermal studies
- Heat-transfer facility design
- Thermo physical property estimation

INDUSTRIAL BUILDING & FACILITIES –DESIGN & CONSTRUCTION

- Air-conditioning with low-humidity
- Antenna support structures
- Clean-rooms upto 100 class with conventional or laminar flow
- Electrical installations in explosive/hazardous areas
- Handling, safety and storage of explosives
- High rise structures
- Industrial buildings with EOT cranes
- Industrial ventilation system
- Material handling facilities for large-dimension equipment
- Test-beds and block-houses
- Uninterrupted power supply systems

METALLURGY, MATERIALS SCIENCE & ENGINEERING

- Ferrous and non-ferrous metallurgy, foundry techniques and fabrication technology in alloy systems with Aluminium, Magnesium and Titanium.
- Materials testing & failure analysis using instrument-analytical methods
- Powder metallurgy and ceramic technology

NON-DESTRUCTIVE TESTING

- Holography
- Ultra-sonic, acoustic emission
- X-ray

CRYOGENIC SYSTEMS

- Materials compatibility, cryogenics handling, design & testing

REMOTE SENSING SYSTEMS

- Aerial data collection
- Design of Remote Sensing sensors in visible, infrared & microwave bands
- Electro-optic sensors, spectroradiometers
- Evaluating project proposals
- Formulating planning and executing remote sensing projects
- Image processing by computers
- Information Systems design and Planning
- Optical measurement systems
- Reflective, refractive optics, filter, anti-reflection coatings
- Setting up of remote sensing laboratories
- Thin-film coatings, metallic & non-metallic
- Remote Sensing data receptor, photo-processing system (
- Training in Remote Sensing

PRECISION FABRICATION AND PRODUCTION ENGINEERING

- Electron beam welding and special fabrication process
- Inspection and meteorology
- Precision alignment systems and techniques
- Precision fabrication techniques
- Special fabrication technology (e.g. honeycombs)
- Tool design for a variety of special purposes including cutting of explosives

SERVO-CONTROL: ELECTRONIC & HYDRAULIC

- Control system design & simulation

- Flow control components
- Hydraulic and electro-hydraulic-servo-control systems and related sensors
- Digital Servo Systems, DC Servo motors, Antenna servo controls

SPACE SCIENCES

- Atmospheric radars, spectral analysis, techniques, wave propagation and atmospheric modeling

STRUCTURES: DESIGN, ANALYSIS & FABRICATION

- Design and analysis of composite structures
- Design and analysis of light-weight structures using finite-element techniques
- Dynamics of structures (vibration response etc)
- Experimental analysis of elements of structures using photo-elasticity and holographic techniques
- Honeycomb structure design, analysis and fabrication
- Thermal response of structures
- Vibration testing and model analysis

RELIABILITY, QUALITY ASSURANCE(R&QA) AND ENVIRONMENTAL TESTING

- Automatic test systems
- Design & operation of environmental test systems (shock, vibration, acceleration, humidity)
- Design of test systems for special mechanisms
- Design of dynamic balancing facilities
- Special test systems design and engineering
- Thermal vacuum systems
- Formulation of R&QA programmes for specific needs
- Design, construction & operation of clean rooms

- **Failure analysis**
- **Reliability analysis, FMECA analysis and MTBF estimation**
- **Process qualification & certification for high reliability electronic parts**
- **Industrial safety and safety engineering.**