सैक कुरियर
SAC COURIER

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In this Issue

Mr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission flagging-off GSAT-5P Communications payload

Chairman ISRO at the SATCOM Integration Lab

View Point Interview with Shri Surinder Singh Rana, Deputy Director, Microwave Remote Sensor Area

SAC Courier (SC): You have been one of the pioneers of Microwave Remote Sensing related Sensor developmental activities ever since joining SAC and have played a vital role in bringing it to its current status. Will you share some of your experiences during this long journey?

Shri S.S. Rana (SSR): When we took up the development of SAMIR payload in mid-1970's, none of us had any previous experience of building highly sensitive Dicke Radiometer receivers at K and Ka-Band with sensitivity (ΔT) of 1°K. Microwave design software, accurate device models and planar circuit technology were also not available at that time and the receiver sub-systems were to be developed by mounting the packaged diodes such as Schottky, Varactor and Gunn inside waveguide cavities. Mechanical design was also very complex because the devices required suitable spring loaded mounts so as to survive the severe vibration testing. Our first experience of Vibration testing of the structural model of the SAMIR payload was really memorable. In order to get the required accuracy and surface finish, all the waveguide components were fabricated using electro-forming process and each of the three channels consisting of independent horn antenna, Dicke switch, switch driver electronics, balanced mixer, Gunn oscillator and pre-amplifier were assembled in a single package. Only CIL, Bangalore had the vibration facility in the country and therefore, we had taken our unit there for testing. However, the engineer at vibration test facility stopped the test during the resonance search itself. One electro-formed E-plane 90° bend broke and the K-band Gunn Oscillator was thrown out which almost hit the CIL engineer. We had similar surprises during Thermo-Vac tests when we used to encounter failures like open contact due to molten solder or short circuit due to fusing of component etc.

Setting up of the sate of art MIC facility at SAC in 1980's for fabrication of planar microwave circuits was a major milestone in revolutionizing the microwave circuit design. The earlier cut and try method was replaced by thorough simulation, sensitivity analysis and optimum design to take care device parameter variations due to aging as well as the extreme temperature variations.

(SC): What were the challenges involved in the realization of RISAT-1 Synthetic Aperture Radar (SAR) Payload and evolution of Core Radar Electronics Concept for future radars?

(SSR): The basic configuration of SAR using 576 TR Modules (10W Pulsed output), each having independent 6-bit amplitude and 6-bit phase control and pulsed power supply for keeping the receiver off during transmission and transmitter off during reception, called for a highly complex architecture. The electrical, mechanical and thermal interfaces therefore posed great challenges.

Regarding the Core Electronics concept, the payload designers of MRSA have evolved a generic design of various sub-systems such as receiver, base-band data acquisition and compression subsystem, digital chirp generator and the payload controller for centralized control of the payload as well as interface with spacecraft BDH and BMU units. A beginning has already been made by using the same electronic hardware for both RISAT-1 as well as Scatterometer payloads. Similarly, the hardware used for the airborne DMSAR is identical to that of RISAT except for the antenna and the transmitter. In fact, the designers have already gone ahead to combine centralized payload controller with digital chirp generator, dual channel data acquisition for V & H receivers and the onboard range compressor for L & S-Band SAR payloads for Chandrayaan-2. This concept will be highly beneficial in reducing the delivery time of the new payloads by implementing minor changes in the hardware and using payload specific onboard software.

(SC): You have been credited with putting untiring efforts and encouraging the indigenous Indian industries and industry participation in Indian Space programme during your tenure. Kindly share your experience regarding the efforts put in by you and your team in pursuit of this goal.

(SSR): The active phased array based SAR payload requires about 1500 packages and in-house development of same is virtually impossible task.

Considering the strategic nature of SAR payload and export restrictions imposed on the foreign vendors to limit the TR module bandwidth to 100 MHz (corresponding to 2-3 m ground resolution), the payload team proposed to develop the TR modules and associated hardware indigenously. This was not an easy decision as no one in ISRO had attempted development, testing and qualification including vibration and Thermo-Vac testing in such a big way in the industry till then. MRSA engineers along with teams from SAC Facilities, QC and R&QA put tremendous efforts in enabling the Indian industry to evolve a system to design, develop, fabricate and qualify space grade hardware. The teams also had to work with several third party vendors for developing certain special processes required. The process at the industry printing sarees was qualified for printing 100 x 30 cm duroid sheets for planar antenna, a small unit in Hyderabad indulging in gold plating of bangles was qualified for gold plating of TR Module housing and other RF components, a vendor in Bangalore making aluminum furniture and anodizing aluminum cookware was qualified for anodizing aluminum alloy and magnesium alloy packages and an industry in Gandhinagar making diamond cutting/polishing machinery helped us in building special fixtures to fabricate multi-layer planar antenna tiles.

The support we got from the industry too was commendable. It may not be easy for ISRO engineers to believe that the GAETEC which is 700 nm foundry (current foundries are using 70nm) set up around 1990 could deliver 5000 fully qualified six types of Monolithic Microwave Integrated Circuits (MMICs) after getting the foundry certified for space grade devices. The foundry qualification itself required about 4,13,200 device testing hours at chip surface temperature from 175°C to 225°C. ASTRA Microwave, Hyderabad also delivered 700 TR Modules after full qualification in just 15 months Similarly, the Bombay Machines, a small unit in Peenya Industrial Estate, Bangalore could develop fully computer controlled 2-D scanner for the planar near field facility for the evaluation of the integrated RISAT payload with deployed 6m x 2m antenna, at a fraction of cost of the imported unit.

I must admit that working with the industry was really a thrilling experience and we could develop state of the art system, which could not have been possible even with the imported components/modules due to export control regime imposed on the supply of high bandwidth TR Modules.

> *"ISRO is a strange organization. Here one commits oneself for the goals one doesn't even know how to achieve. So don't hesitate while taking up any challenge. If something is do-able, there is no reason why YOU can't do it"*

(SC): What was your motivation and inspiration in developing a world-class radar payload development and testing facilities?

(SSR): The single motive for taking up this challenge was the development of totally indigenous capability for building advance multi-mode imaging radars required in the country for a variety of civilian and strategic applications.

(SC): What message would you like to give to young breed of Engineers joining SAC/ISRO?

(SSR): ISRO is a strange organization. Here one commits oneself for the goals one doesn't even know how to achieve. So don't hesitate while taking up any challenge. If something is do-able, there is no reason why YOU can't do it.

Retrieval of Ocean Surface Vector Winds from Oceansat-2 Scatterometer

Introduction

Satellite-borne Scatterometers are microwave radar instruments useful in studies of upper ocean circulation, tropospheric dynamics and air-sea interaction. Scatterometer measures the microwave energy backscattered from an area over the earth's surface illuminated by it. In the contest of ocean surface winds the radar backscatter energy depends upon the transmitted energy, incident angle, polarization, frequency and the azimuth-direction dependent sea surface roughness generated by the action of local winds. The wind-forcing generates a spectrum of surface waves with capillary-waves influenced by the local winds leading to the majority of the radar backscatter through Bragg Resonance. The azimuth symmetry of sea surface roughness leads to the directional anisotropy of the radar backscatter. The oceanic backscatter having power-law dependency on the wind intensity varies bi-harmonically with the wind direction besides having a decreasing trend with increasing incidence angle for both the polarizations (vertical and horizontal). Multiple measurements of backscatter are required for the wind vector determination, as there are two unknown variables (wind speed and wind direction) and also due to the bi-harmonic dependency of radar backscatter on wind direction. Scatterometers are designed to realize the same with multiple fan-beam or pencil-beam configurations.

Due to the complex nature of electromagnetic scattering from the wind roughened ocean surface and the system-specific characteristics of the backscatter measurements, empirical relationships, known as Geophysical Model Functions (GMF) are usually established and utilized for the retrieval of ocean surface wind vectors. Ocean surface wind vectors, in general, are derived based on the Bayesian approach (Maximum likelihood Estimator- MLE algorithm) by minimizing the differences of measured backscatter with those simulated using the sensor-specific GMF and the simulated winds over its entire applicable dynamic range. A new efficient algorithm, termed as Normalized Standard Deviation (NSD) of the derived wind speed, has been developed for deriving prioritized wind vector (speed as well as direction) solutions from scatterometer measurements. It converts backscatter from different beams into wind speeds through GMF and determines its NSD used for finding prioritized solutions. The derived multiple solutions of wind vector, caused by the bi-harmonic nature of the backscatter, encompass one direction solution representing the true direction whilst others are ambiguities. In the present scatterometry, the highest priority direction solutions correctly identify the true wind directions only in about more than half of the total wind cases requiring techniques for filtering directional-ambiguities.

An advanced ambiguity-filtering technique termed as Directional Stability and Conservation of Scattering (DiSCS) algorithm with initialization using European Centre for Medium-Range Weather Forecast (ECWMF) model global surface forecast winds has been developed for the operational wind product generation. Moreover, the Ku-band scatterometer measurements are affected by rain and so are the derived winds, thereby necessitating identification and flagging out of such data. Rain-flagging has been performed based on the radar backscatter and the equivalent radiometric measurements from the scatterometer exploiting the characteristics of rain-contaminated derived wind solutions. More over,the sea-ice affecting the backscatter measurements is also flagged based on the spatio-temporal variability of the radar backscatter.

Initial results from Oceansat-2 Scatterometer

Oceansat-2, ISRO's latest satellite mission for oceanographic and meteorological applications, with a two-day repeat cycle, was launched on 23rd September, 2009 from SHAR, Sriharikota, by PSLV-C14. It carried three sensors onboard, viz. Ocean Color Monitor (OCM-2), a Pencil beam Ku-band Scatterometer (SCAT) and 'Radio Occultation Sounder for Atmosphere' (ROSA). Oceansat-2 scatterometer data, presently available for 50 km wind-cell (Level-2A product), for the period from Nov.-2009 to April-2010, with due quality checks and reprocessing, has been utilized for establishing the SCAT specific GMF based on concurrent and collocated Surface Analysis winds

from ECMWF model. Surface wind fields over the global oceanic regions were derived from OSCAT backscatter measurements using the afore-mentioned GMF and the retrieval and ambiguity filtering algorithms.

structure within and outside the cyclonic winds shown in figure (2a). A typical example of sea-ice from OSCAT as a value added product is shown in

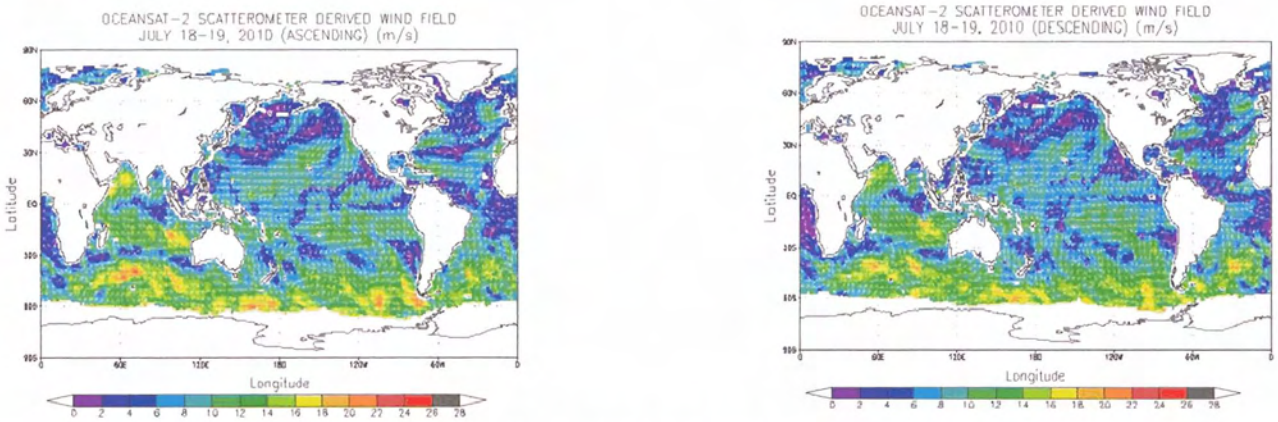


Figure-1: Wind fields derived from OSCAT

Besides the standard products mentioned above, a value added product like high-resolution winds (at ~15 km), planned in near future, is shown in figure (2b) clearly bringing out the fine wind

figure (3) depicting the sea-ice boundary derived from the enhanced resolution backscatter data constructed at 25 km for the four-day period.

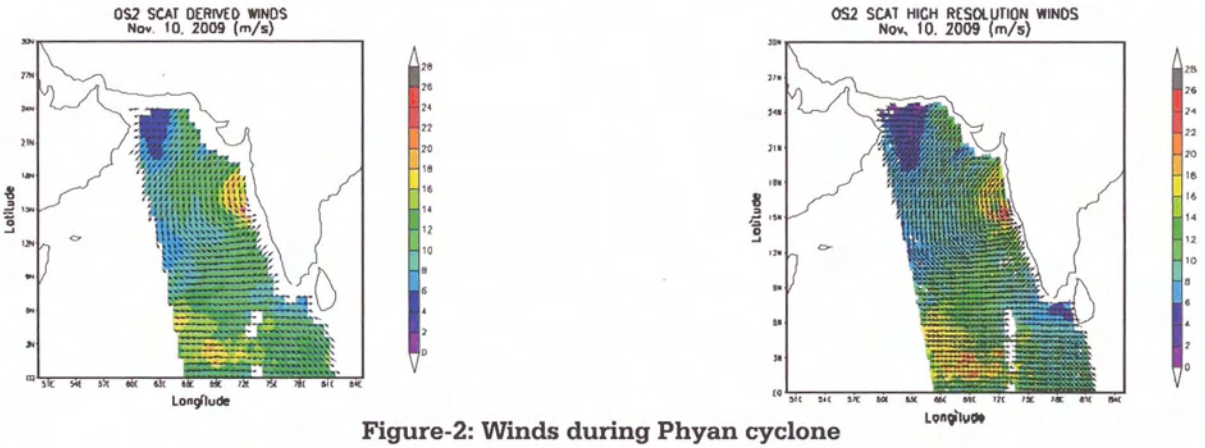


Figure-2: Winds during Phyan cyclone

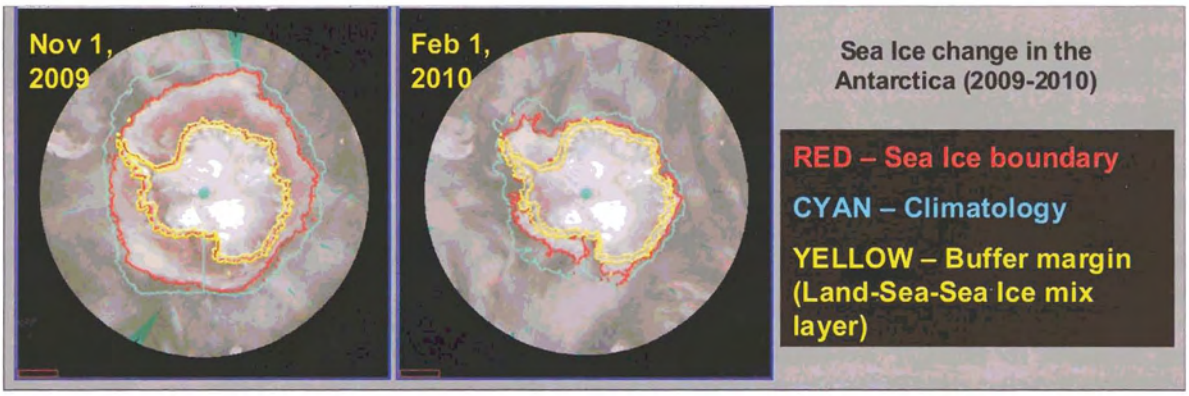


Figure-3: Value-added product from SCAT

-Courtsey inputs from Shri B.S.Gohil, EPSA

Assembly & wiring of Components using Laser Soldering Systems

Laser soldering is a newly emerging method of soldering which provides highly reliable joints for miniaturized devices, thermal sensitive devices, special substrates, leaded devices at difficult-to-reach locations, fine pitch quad flats packs and Area Array Packages. In this method, intensity of heat generated can be varied by adjusting laser power from few watts to 120W according to need and transferring it to the required location by optical-fiber. Most of the time laser operates at a single frequency and hence the total heat absorbed by component remains same all the time, thereby ensuring repeatability of operations. For some components, soldering requires precise heat at a very small location because of small size or fine pitch lead terminations as in passive SMD, CQFP, etc. and for such components, laser can generate heat at a very small spot like 1.7mm circle. For other components like BGA, CGA, PLCC etc. which do not have visible leads and require heating of the whole component body, using a scanner mechanism at output of laser beam, laser can create an oval of 8mmx 8mm. Nowadays, many closed loop systems come with precise IR sensors for continuous monitoring of temperature at the soldering site, thereby enabling adjustment of laser power to provide user defined temperature at required locations.

Laser soldering offers major advantages like:

- Soldering of high-density fine pitch devices and subassemblies with 3-D circuit geometries
- Process controllability, high reliability and ease of automation
- Minimize heat-related damage to surrounding areas or components
- Generation of high-temperature for high melting point and low-lead/ lead free solder (SnAgCu).
- Large amount of heat enables small soldering duration and less inter metallic
- Precise temp. control and single frequency offer repeatability and produce quality solder joints
- Avoids misalignment of components mounted on PCB prior to soldering
- Enables Selective soldering/Desoldering in batch-mode of partially/fully wired PCBs

PFF/ESSA/SAC is now equipped with the state-of-the-art Selective Laser Assembly and Soldering Systems for fine pitch SMD (Figure-1:Spark-400) and Leaded devices (Figure-2:Selectiva-Xi). Both these systems utilize Double heterojunction Laser Diode arrays (TEM00 Mode) to generate high power laser beam which passes through the complex optics and scanner arrangement to deliver highly centred and precisly controlled laser spot. Table below gives the details of these systems.

System	Laser Power	Operations	Mode	Components Covered
Spark-400 (For Fine Pitch & SMD devices)	30 WX 4= 120 W Max	Dispensing (Solder paste, Glue, Epoxy)	Dot	SMD Chips 0402, CQFP-upto 16 mil CCGA/BGA :40 mil
			Line	
		Pick Align & Place as per CAD data	Auto	
		Selective Solder / Desolder	Focus	
			Defocus	
Selectiva-Xi (For Leaded Components)	75 W Max. (Inbuilt Pre-heater)	Soldering	Defocus	Leaded R,C, Diodes, DIP, Connectors (Up to 50 Mil pitch)

Fig-1: Spark-400 Laser System

Fig-2: Selectiva-Xi Laser System

Currently both the laser soldering systems are under process qualification stage for mixed technology PCB assembly. Prequalification cards (Figure-3) have been reviewed by QAED/SRA and Process Identification Documents are under review and qualification cards are under preparation. Similarly, Spark-400 will also be qualified for BGA/CGA packages based PCB assembly.

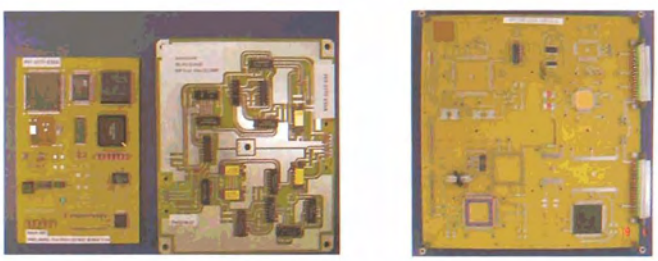


Fig-3: Cards Fabricated on Laser Soldering Systems

Courtesy inputs from Sh. C.N.Joshi & Sh. Shivendra Tripathi & Sh. Asit Bhattacharya, ESSA

Subsequent to 9/11 attacks, US submitted a proposal to International Maritime Organization (IMO) to have an international law to protect against security threat from hijacked ships. Pirates are common threat which may extend to any country's coastal area if not properly protected.

Maritime Safety Committee (MSC) of IMO formed an ad hoc LRIT (Long Range Identification and Tracking) working group, having representatives from all countries, to carry out detailed study and discussions. The LRIT ad hoc group decided that all countries should be able to identify and track their flag ships (300+ tonnage) sailing across countries. Any ship belonging to a Flag country should proactively transmit the identification and position information to a coastal country as soon as it enters into 1000 nm boundary of the country's coastal line. The details should be provided at interval of 6 hrs till the ship leaves the 1000 nm boundary. The coastal country is empowered to demand the tracking information at higher rates (maximum 15 minutes) from the flag country. Each ship should have defined port addresses before departure. Port countries, where a ship is likely to touch, have right to track the ship any time during its voyage. Flag ship should provide this information on demand. Search and Rescue (SAR) operations were also considered as an integral part of the scope of LRIT. Country having SAR responsibility has right to demand current and past positions of all the ships from all the countries within a specified area (square or circular) of ship in distress. LRIT ad hoc group has worked out data distribution plan, information exchange model, technology standards, protocols and performance parameters for various components. Based on inputs from LRIT ad hoc group and MSC recommendations, IMO made an international law under SOLAS (Security Of Life At Sea) for global identification and tracking of large ships sailing across countries.

Figure 1 shows a typical LRIT architecture. Every Country can have individual option and strategy to track its own ships. Currently only INMARSAT provides the technology to track any ship globally.

An INMARSAT tracking instrument or Terminal is mounted on a ship which transmits its identification and position at regular intervals to

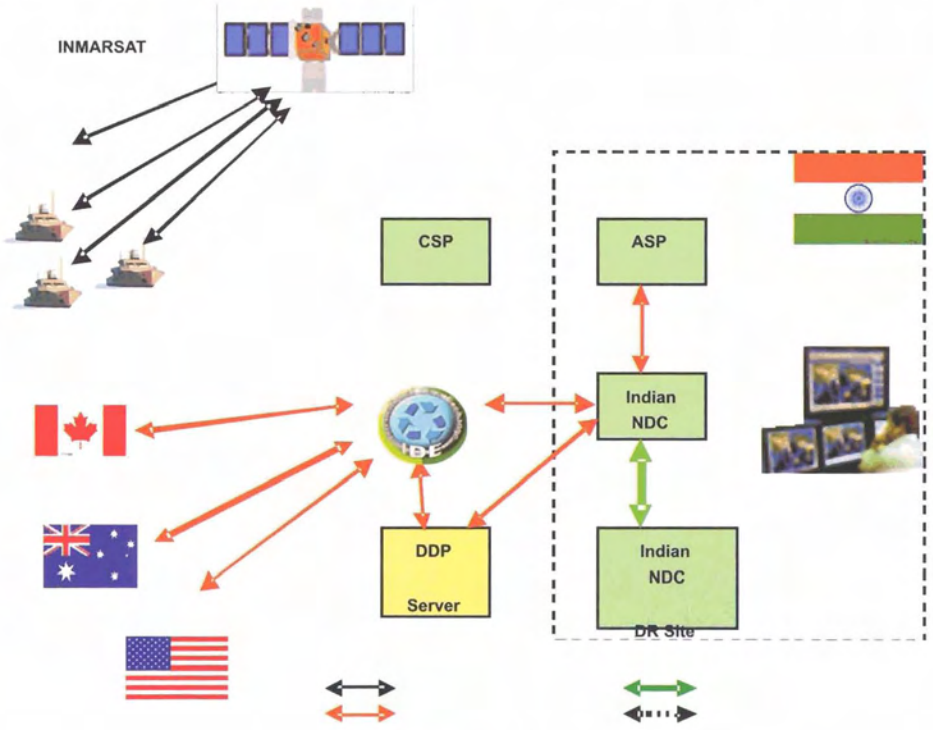


Fig 1: LRIT architecture

Communication Service Provider (CSP) through INMARSAT. CSP hands over the information in INMARSAT format to Application Service Provider (ASP). ASP converts the INMARSAT information into LRIT format and also adds auxiliary information as required by LRIT specification. ASP hands over this information to National Data Centre (NDC) which processes the information with respect to IMO Data Distribution Plan (DDP) as well as entitlement of position requests from all countries. In case ship is found within any country's boundary it will transmit its position to the country as per IMO DDP. The complete data distribution will be carried out through International Data Exchange (IDE) in a secured manner.

Each country submits its Coastal boundary as well as LRIT boundary (≤ 1000 nm) details on IMO DDP server. Each Country can change these boundary definitions at any time. IMO DDP will broadcast change in information at every hour to all countries through IDE. On receipt of the broadcast message, each country downloads the modified boundaries from IMO DDP server and updates the complete plan.

Port or Coastal country may send special request for tracking any ship at higher rate to NDC through IDE. On receipt, NDC will check the entitlement. Entitled requests will be placed in queue of position information processing. Incase demand is for higher frequency than the ship currently configured, NDC will send configuration change information to ASP. ASP will form commands in INMARSAT format and transmit to ship through INMARSAT.

We have established Indian NDC and ASP. India is the first country to declare readiness for NDC testing and IMO certification. Currently Indian NDC and ASP is operational since 1 year. 500+ Indian ships are being monitored by the NDC. It is being used by DG Shipping, Navy and Coast Guard for Tracking Indian Ships all over the globe, Tracking Foreign Ships entering Indian LRIT boundary (700 nm) and Search and Rescue Operations. A typical screen shot of NDC GUI is given in Fig.2. It shows all the ships in Indian LRIT boundaries at given point of time. Inset view shows the global view covering complete world.

Fig 2: Typical screen shots showing Ships in Indian LRIT boundary along with world view in Inset.

-Dr. HS Bhatt, Mr.Praful Patel, Mr. PB Shah, Mr. DI Bhansali & Mr. HJ Kotecha

NOSTALGIA

Preparing the launch of tathered baloon flight from SAC campus during late seventies

Communications Payloads Flag-off Ceremony

GSAT-12 communications payloads was flagged-off to ISITE, Bangalore by Dr. K. Radhakrishna, Chairman, ISRO on April 22, 2010 for further integration with spacecraft. Director SAC was also present during the ceremony. Alongwith this the East & west deployable antennae (FM) were also flagged-off to ISAC, Bangalore.

GSAT-5P' Payload flagged-off to ISITE, for further integration with spacecraft on May 7, 2010 by Mr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission. Dr. K. Kasturirangan,Member of planning commission and Former Chairman, ISRO & Dr. K . Radhakrishnan, Chairman ISRO and Director SAC were also present on this occasion

GSAT-6 communication payload was flagged-off to ISITE, Bangalore by Dr. R. Navalgund, Director, SAC on June 01, 2010 for further integration with spacecraft.

CMD ACHIEVEMENTS

SAC is actively involved in rain water harvesting.'Rain Harvesting Project, Phase-ll' was completed in May 2010. This has led to an increase of ground water level by 8m.

Vikram Sarabhai Space Exhibition

Students from the local schools & colleges interacting with the Scientists of SAC during the lectures organised at VSSE,SAC

RESPOND & Research Coordination Division (RRCD)

RRCD of Projects & Planning Group launched a new website "Research" on SAC intranet. The website contains information on Respond at SAC, TDP/R&D activities and Remote Sensing Applications Projects.

TTID/ PPG conducted Management Training Program on Market study

Summer Training projects for conducting Market study & exploration of know-how transfer potential for technology developements at SAC was organised by Technology & Transfer Interface Division of PPG at SAC

These Studies were carried out by management trainees selected & nominated by ISRO – HQ for this purpose. Three PGDIM (first year) students carried out the studies at SAC. Projects of SAC were coordinated and assistance provided was on market survey related guidelines & know-how transfer aspects by TTID / PPG.

ISRO Induction Training Programme (IITP-21)

ASIM-Applications Area module of IITP-21 was organised at SAC during June 18 – July 9, 2010. Forty eight Scientists/Engineers (SAC-26, NRSC-20, ADRIN-01 & SCL-01) attended this program. A few non-academic activities like sight-seeing, heritage walk and cultural event were also included. An on-line test was conducted for the first time during IITP-21 for evaluation of participants. eBook of course materials was released by Shri A.S Kirankumar, Associate Director, SAC.

Programme on Advanced Computational Electromagnetics (Module-I & II)

HRDD organised a Programme on Advanced Computational Electromagnetics in association with Zeus Numerix Pvt. Ltd. Mumbai at SAC Ahmedabad. The programme was organised for the benefit of Antenna System Group (ASG). The programme was organised in two modules. Module –I was organised during June 9 -11, 2010 and Module-II was organised during July 14 – 16, 2010.

In-house ISRO project Assistants' Training program

An in- house Training Program for the ISRO Project Assistants was organized for introducing & updating the participants about new developments.

CSSTEAP SATCOM Course

The Seventh SATCOM Course of CSSTEAP, organised by SAC, concluded on April 30,2010 at Bopal campus, SAC

केंद्र में हिंदी कार्यन्वयन संबंधी क्रिया कलाप

अंतरिक्ष उपयोग केंद्र में केंद्रीय सचिवालय हिंदी परिषद द्वारा मई 2009 में आयोजित हिंदी एवं हिंदीतर भाषियों हेतु अखिल स्तर पर राजभाषा हिंदी में विभिन्न प्रतियोगिताएं एवं आयोजित की गई। हिंदी निबंध प्रतियोगिता/ हिंदी टिप्पण प्रारूप लेखन/हिंदी टंकण/हिंदी आशुलिपि/हिंदी लेख प्रतियोगिताओं में केंद्र के निम्नलिखित कर्मचारियो को पुरस्कृत किया गया :

40 वीं अखिल भारतीय हिंदीतर भाषी हिंदी निबंध प्रतियोगिता		
क्र.सं.	नाम	पुरस्कार
1.	श्री दिलीप सी.महेता (गुजराती भाषी)	अखिल भारतीय हिंदीतर भाषी क्षेत्र -द्वितीय पुरस्कार रु.1501/-
2.	श्री रंजीत कुमार सारंगी	भाषा वर्ग पुरस्कार (केवल हिंदीतर भाषी क्षेत्र के लिए)-रु. 501/-
3.	श्री मनीष वी. पंडया	भाषा वर्ग पुरस्कार (केवल हिंदीतर भाषी क्षेत्र के लिए) - रु. 501 /-
40 वीं अखिल भारतीय हिंदी टिप्पण एवं प्रारूप लेखन प्रतियोगिता		
1.	श्री मुकेश कुमार मिश्र (हिंदी भाषी)	केंद्र प्रथम पुरस्कार - रु. 251/-
2.	श्री मनीष वी.पंडया	केंद्र द्वितीय पुरस्कार -रु. 151/-
41वीं अखिल भारतीय हिंदी आशुलिपि प्रतियोगिता		
1.	श्री पंकज परमार (गुजराती भाषी)	गति वर्ग प्रोत्साहन पुरस्कार-रु. 251/-
44वीं अखिल भारतीय हिंदी टंकण प्रतियोगिता		
1.	श्री वेद प्रकाश	राज्य प्रथम पुरस्कार-रु. 351/-
2.	श्री जी.एल.त्रिवेदी	प्रोत्साहन पुरस्कार- रु. 251/-
27 वीं अखिल भारतीय विज्ञान तथा तकनीकी विषयों पर हिंदी लेख प्रतियोगिता		
1.	श्री कमलेश कुमार बराया	अखिल भारतीय प्रथम स्थान - आचार्य सत्येन बोस पुरस्कार रु.5001/- एवं प्रतीक
2.	श्री राजेश कुमार सिंह, श्रीमती नेहा एवं श्री डी.के सिंह	अखिल भारतीय तृतीय स्थान के लिए पुरस्कार रु. 3001/- एवं प्रतीक

केंद्रीय सचिवालय हिंदी परिषद की प्रतियोगिताओं में अखिल स्तर पर अंतरिक्ष उपयोग केंद्र के पुरस्कार विजेता "नेहरू स्मारक संग्राहय एवं पुस्तकालय सभागार" तीन मूर्ति भवन, नई दिल्ली में केंद्रीय मंत्री श्री दिनशा पटेल से पुरस्कार प्राप्त करते हुए।

हिंदी लेख प्रतियोगिता के प्रथम पुरस्कार विजेता श्री कमलेश कुमार बराया

हिंदी निंबध प्रतियोगिता (हिंदीतर भाषा वर्ग) के द्वितीय पुरस्कार विजेता श्री दिलीपकुमार सी महेता

हिंदी लेख प्रतियोगिता की तृतीय पुरस्कार विजेता

राजभाषा कार्यान्वयन का आयोजन

केंद्र में सहायक एवं वैयक्तिक सहायक स्तर के स्टाफ सदस्यों के लिए हिंदी कार्यशाला का आयोजन 21 जून, 2010 को किया गया। इस कार्यशाला में पीआरएल के भी स्टाफ सदस्यों ने भाग लिया। कार्यशाला का संचालन श्रीमती नीलू सेठ, क.हि.अ. द्वारा किया गया। श्री आर.पी.दुबे, ग्रुप निदेशक, पीपीजी, सैक ने हिंदी कार्यशाला का उद्-घाटन कर अपने संबोधन में नामित प्रतिभागियों को हिंदी में कार्य हेतु प्रोत्साहित किया। इस कार्यशाला में कुल 45 स्टाफ सदस्यों ने भाग लिया।

कार्यशाला के दौरान स्टाफ सदस्यों के लिए राजभाषा नीति, हिंदी टिप्पण एवं आलेखन विषय तथा कंप्यूटर पर हिंदी में कार्य करने के लिए उपलब्ध सॉफ्टवेयर तथा उनके उपयोग संबंधी विषयों पर कक्षाओं का आयोजन किया गया। कार्यशाला में निम्न लिखित व्याख्याताओं ने व्याख्यान दिए।

1. श्री बी.आर.राजपूत, *वरि.हिंदी अधिकारी, सैक*
2. श्री आर.एस. गुप्ता, *हिंदी अधिकारी, पीआरएल*
3. सुश्री रजनी सेमवाल, *वरिष्ठ हिंदी अनुवादक*
4. श्रीमती नीलू सेठ, *कनिष्ठ हिंदी अनुवादक*

प्रतिभागियों ने कार्यशाला को बहुत उपयोगी बताया तथा सुझाव दिया कि इस प्रकार के आयोजन अधिक मात्रा में किए जाएं ताकि हिंदी में कार्य की मात्रा बढ़े और आत्म-गौरव की भावना को बल मिलें।

SAC Courier extends a warm welcome to the new entrants to SAC Community

NAME	DIVISION	DESIGNATION	JOININGDATE
SRI. DINESH KUMAR	ADMIN-PURCHASE	P&S OFF	4/1/2010
MS. CHIPADE RADHIKA ANANT	EPSA-MPSG-PMD	SCI/ENG-SC	4/12/2010
MS. MANEESHA GUPTA	SIPA	SCI/ENG-SC	4/12/2010
KUM MADHAVI VIJAYRAO FUKE	SEDA-EOSG-RFOD	SCI/ENG-SC	4/12/2010
SMT. KAMASAMUDRAM LAKSHMI KANCHANA	SRA-EMOD	SCI/ENG-SC	4/12/2010
SRI. A. VISWANADHA RAJU	ADMIN-PGA-P & GA	HEAD P & G	4/12/2010
MS. GUNJAN RASTOGI	EPSA-MPSG-PMD	SCI/ENG-SC	4/13/2010
SRI. RAJESH SINGH	ADMIN-PURCHASE	P&S OFF	4/15/2010
KUM JAIN NIRMALA SUJAYKUMAR	EPSA-MPSG-PMD	SCI/ENG-SC	4/26/2010
SRI. ASHWINKUMAR D LIMBANI	ESSA-EnTF-TTF	TECHNCN-B	4/26/2010
SRI. BIKRAM SINGH YADAV	ESSA-EFTF-ESSMF	TECH ASST	5/5/2010
SRI. ANANDKUMAR MANUBHAI PATEL	MESA-ASMG-AMFID	SCI/ENG-SD	5/7/2010
SRI. SHEO KUMAR	SNPA-APTG-HPTD	TECH ASST	5/10/2010
SRI. PRASANTA KUMAR DASH	DIR-OFF-CMD	SCI/ENG-SC	5/10/2010
SRI. SURESH S.	ADMIN-PGA-P & GA	SR.ADM.OFF	5/26/2010
SRI. BOTADRA CHANDRAKANT CHHAGANLAL	ESSA-EFTF-ECPTF	TECHNCN-B	6/7/2010
SRI. DATANIA NITIN VINODCHANDRA	ADMIN-ACCOUNTS	S.WA A(TR)	6/8/2010
SRI. SHAILESH K. VAGHELA	RESA	S.WA A(TR)	6/8/2010
SRI. DATANIA AJAY DASHRATHBHAI	ADMIN-PGA-P & GA	S.WA A(TR)	6/9/2010
SMT. NIRUBEN B. CHAUHAN	SIPA	S.WA A(TR)	6/10/2010
SRI. RAKESHKUMAR SHARMA	ESSA-MEF	SCI/ENG-SC	6/10/2010
SRI. DAVE NIKUNJ DEVENDRABHAI	ADMIN-PGA-P & GA	SAFAIWAL A	6/11/2010
SRI. VAGHELA HITESH B	ADMIN-PGA-P & GA	S.WA A(TR)	6/14/2010
SRI. PARMAR NARENDRA NAGARBHAI	ADMIN-PGA-P & GA	S.WA A(TR)	6/14/2010

The Following Colleagues Superannuated from SAC during April-June,2010.
Space Applications Centre appreciates the valuable services rendered by all of them during their tenure in SAC. SAC Courier wishes them a happy, peaceful and healthy retired life.

Details indicate the Name, Division and Date of joining

April

Shri. M H PANDYA
DIR-OFF-CMD
02/03/1971

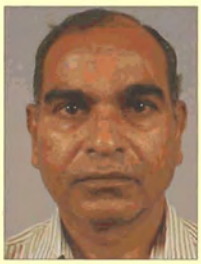
Shri. A N SHAIKH
DIR-OFF-CMD
24/03/1972

Shri. L G BHATI
DIR-OFF-CMD
08/05/1974

Shri. B S PATEL
DIR-OFF-CMD
28/06/ 1978

Shri. P A PATEL
DECU-CGG
24/05/1977

Shri. A B VYAS
DECU-CGG
15/05/1975



Shri. R N PATEL
MESA-MSFG-MFF
16/11/1973

May

Shri. B K THAKORE
MESA-MSFG-MFF
02/06/1972

Shri. K M PARMAR
MESA-MSFG-MFF
25/09/1973

Shri.S M THAKORE
DIR-OFF-CMD
06/05/1964

Shri. N L YADAV
DIR-OFF-CMD
15/05/1974

Shri. P S VAGHELA
ESS-MEF-DAPF
24/09/1973

Shri. M V SHRIMALI
ADMIN-PGA-CANTEEN
30/07/1975

Shri. S N MAKWANA
ADMIN-PGA-CANTEEN
11/08/1975

Shri. P D PATEL
ADMIN-PGA-CANTEEN
25/08/1975

Shri. N L SOLANKI
DIR-OFF-CMD
25/07/1975

May

Shri. K M KARELIA
DIR-OFF-CMD
17/10/1977

Shri. ANANTRAI B POPAT
ADMIN-ACCOUNTS
13/05/1975

Shri. K MATHEW MATHAI
ADMIN-PURCHASE
07/09/1973

Shri. NIRANJAN GHOSH
ADMIN-PGA-P & GA
11/09/1970

Shri. RAMESHBHAI B PATEL
DECU-SFG
06/05/1974

June

Shri. M H KALUBARME
RESA-AFEG-CMD
17/08/1976

Smt. SANTHA RAJAN
ADMIN-ACCOUNTS
01/02/1978

Shri. K BHANUVIKRAMAN NAIR
ADMIN-PGA-P & GA
26/11/1973

Shri. N K VYAS
PPG-MISD
30/04/1981

Shri. G S RATHOD
SRA-QCD
08/08/1978

Shri. R S RAO
RESA-MESG-MCED
14/10/1974

Obituary

SAC courier deeply mourns the sad demise of Shri. Nitinkumar B Vadgama and Shri A.B.Singh

Shri. NITINKUMAR B VADGAMA
SRA-QAED

Shri. A B SINGH
DIR-OFF-CMD

Shri. Montek Singh Ahluwalia, Deputy Chairman, Planning commission, Dr. K. Kasturirangan, Member, Planning-Commision & Former Chairman of ISRO visited SAC, Ahmedabad on May 07, 2010 .Dr. K Radhakrishan, Chairman, ISRO welcomed the dignitaries and gave a brief overview of ISRO's programs. Dr. R R Navalgund, Director, SAC presented an overview of SAC activities. Shri Montek Singh Ahluwalia visited the labs and was appraised about the payload developments and applications activities being carried out in the Centre.

With SAC Council Board

In Carto lab

In MRSA lab

In RS - Application Laboratory

- Prof.Yaspal,Former UGC chairman & Director, SAC visited SAC. During his visit to SAC campus he addressed a gathering of young scientists/Engineers of SAC
- Dr. R. Chidambaram, Principal Scientific Adviser to the Government of India, visited SAC on April 03, 2010 .Shri A.S Kirankumar, Associate Director, SAC made a brief presentation on SAC activities. Latter Dr. R Chidambaram visited some facilities and labs of SAC.
- Prof. S.V. Raghavan, Scientific Secretary to Principal Scientific Adviser to the Government of India, and Shri. Rajesh Gera, Senior Technical Director, NIC, visited SAC on April 23, 2010.

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