Dr P Nilakantan (1910-1964)
Citation read out at the special NAL Foundation Day function held on 18 Jul 1997

National Aerospace Laboratories is privileged to posthumously honour its first Director,
Dr Parameswar Nilakantan at today's special Foundation Day function to commemorate the Golden Jubilee of Indian Independence.

The NAL Wind Tunnel Centre was set up because of the vision, commitment and untiring efforts of Dr Nilakantan.

In 1959, Dr Nilakantan was invited by CSIR to set up a supersonic wind tunnel centre at Bangalore. It was a mandate which would have severely tested the finest engineer of the time. Starting with a clean slate, Dr Nilakantan was asked to deliver one of the best wind tunnels in the world.

Dr Nilakantan all but achieved this miracle. Sadly, he did not live to see the wind tunnel in operation. Today, 33 years after his demise the 1.2m trisonic wind tunnel is still the jewel in the NAL crown.

On the occasion of the Golden Jubilee of our Independence, NAL joins a grateful nation in paying homage to a great engineer, visionary and patriot.

34 years after Nilakantan's demise the 1.2m trisonic wind tunnel is still the jewel in the NAL crown

***Dr S R Valluri* (1964)**
Citation read out at the special NAL Foundation Day function held on 18 Jul 1997

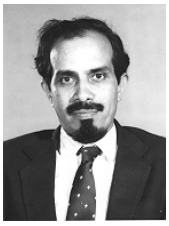
National Aerospace Laboratories is privileged to honour Dr Sitaram Rao Valluri at today's special Foundation Day Function to commemorate the Golden Jubilee of Indian Independence.

Dr Valluri was a leading aeronautical consultant in USA, with a promising and prosperous career ahead of him, when he took a conscious decision to give it all up for the sake of his country. As Director, National Aeronautical Laboratory for an incredible 19 years, Dr Valluri contributed his best years to the development of India's premier aeronautical establishment. Building on the strong foundation created by Dr Nilakantan, Dr Valluri transformed NAL into a potent and remarkable force in Indian aeronautics, making it one of the country's best high science high technology laboratories with all-round capability in every aeronautical discipline.

As the first Director-General of Aeronautical Development Agency, Dr Valluri laid the strong foundations required for the successful design and development of India's Light Combat Aircraft.

As we complete 38 years of existence, all of us at NAL gratefully acknowledge the contributions of this indomitable visionary, unwavering patriot and crusading colossus.

Valluri transformed NAL into a potent and remarkable force in Indian aeronautics, making it one of the country's best high science high technology laboratories.



Professor R Narasimha (*1984*)
Citation read out at the special NAL Foundation Day function held on 18 Jul 1997

National Aerospace Laboratories is privileged to honour Professor Roddam Narasimha at today's Special Foundation Day Function to commemorate the Golden Jubilee of Indian Independence.

As a researcher at Indian Institute of Science, Caltech and Cambridge, Professor Narasimha has made outstanding contributions to fluid mechanics, aerospace engineering and atmospheric sciences. As a thinker and teacher, Professor Narasimha has always pointed towards something new and exciting, be it technology forecasting, advanced computing, engineering education or the design of a new fighter aircraft.

As Director, NAL from 1984 to 1993, Professor Narasimha transformed an already excellent Laboratory into superb, self-confident and effective R&D Laboratories making their mark in civil aviation, parallel processing, aerospace electronics, surface technologies and computational fluid dynamics. In doing so he also demonstrated how a gifted scientist, engineer and teacher can become a very effective administrator and organiser, providing visionary leadership to every major aerospace programme in the country.

On the occasion of its 38th anniversary, all of us at NAL are delighted to greet one of the country's most creative scientists who also happens to be a truly cultured person and a much-loved leader and friend.

As a researcher, Narasimha has made outstanding contributions to fluid mechanics, aerospace engineering and atmospheric sciences; as a thinker and teacher, he has always pointed towards something new and exciting.

***Dr K N Raju (*1995)**
Citation read out at the special NAL Foundation Day function held on 18 Jul 1997

National Aerospace Laboratories is privileged to honour Dr K Keshava Narayana Raju at today's Special Foundation Day Function to commemorate the Golden Jubilee of Indian Independence.

Dr Raju is one of India's best aeronautical scientists and engineers. In a glittering career spanning nearly four decades, Dr Raju has made remarkable contributions to practically every facet of aerospace science and technology. He led aircraft fatigue and fracture activity at NAL and was the principal architect of the full-scale fatigue testing facility. As Leader of the CFC National Team, he successfully undertook the responsibility to design, develop and fabricate carbon fibre composite wings for the Light Combat Aircraft.

Dr Raju capped an outstanding career at NAL, which began when Dr Nilakantan invited him to join the Laboratory in 1960, by becoming its fourth Director in 1993. As Director he provided extraordinary momentum to NAL's contributions to national aerospace programmes even as the Laboratories' revenues soared to unprecedented heights.

It is with special pleasure that NAL honours Dr Raju not just for his outstanding leadership and achievement, but also for his loyalty, dedication and endearing human qualities

In a glittering career spanning nearly four decades, Dr Raju has made remarkable contributions to practically every facet of aerospace science and technology.

Dr Panchagam Ramamoorthy
Tribute by S S Desai and P N Shankar on the eve of Dr Ramamoorthy's retirement in June 1997

Dr Panchagam Ramamoorthy, Scientist F, CTFD Division, is retiring after a fruitful career of over 30 years in aerospace at the National Aerospace Laboratories, Bangalore.

Born on 1 July 1937 at Adoni, Andhra Pradesh, Dr Ramamoorthy career spans a wide area of aerospace, interestingly in areas of aerodynamics, optimisation, aircraft design, parameter estimation and flight mechanics, all of which make him stand out as a mathematician with an engineer's attitude. His latest interest has been in computers, especially in the field of information systems and multimedia.

What distinguishes Dr Ramamoorthy from most others is his untiring energy for and attachment to whatever he undertakes, whether scientific or philosophical. This he has demonstrated in his studies on optimisation, in the development of laminar airfoils, in the development of information systems for airfoils, aircraft and missiles, in the development of a multimedia system for aircraft identification or in his short time stint with Sai Baba and Rajneesh. Dr Ramamoorthy's pride is unbounded when he says that he has contributed two airfoils to the world of aeronautics: the Sunya and the Osho airfoils (see *Journal of Aircraft*, May 1997 and *Current Science*, August 1996). He has contributed an interesting method for the design of natural laminar flow (NLF) airfoils; one of the three airfoils that he has designed has shown good correlation with experiment.

Basically a happy person, he has kept himself young at mind and heart always choosing to work with and nurturing young students. His philosophical bent of mind has helped him considerably in coming to terms with the matters taking place in Indian science and technology.

There are two aspects of Dr Ramamoorthy' s personality, one to do with his technical work and the other to do with life in general, which will be especially fondly remembered by his friends and colleagues. Dr Ramamoorthy, perhaps because of his career as an engineer from a maths background, always insisted that, unless a calculation was validated or confirmed by experimental or flight data, it would be of little interest or use. On the other hand when such agreement was found his joy was unbounded and was a pleasure to behold. The other aspect is his genuine and lifelong interest in the problem of the human condition. In this he is unusually open-minded, ever willing to hear and study a new point of view; if this new point of view has some real worth it would be incorporated into his philosophical framework. It is this attitude that has helped Dr Ramamoorthy to stay young, to come to terms with life and be and stay happy.

Dr Ramamoorthy stands out as a mathematician with an engineer's attitude.

Dr B R Somashekar
Citation read out at the special NAL Foundation Day function held on 18 July 1997

Dr B R Somashekar has been so much a part of NAL for about 35 years that it is hard to conceive of NAL without him. I vividly remember the day when I requested him to take over as the Head of the Structures Division when his predecessor left for UK on deputation. He was at that time a Scientist 'C' and not the seniormost person. From what little I had observed of him till that time, I had the gut feeling that he had all the makings to be a good administrator; he had, by then, already established the record of being a capable scientist.

Developments in the Structures Division since then, and the way Somashekar built up the Division over the years, more than justified the trust I had reposed in him. It is now considered the best run Division of NAL. Perhaps Somashekar's most important contribution to the Division is the development of capability, both for analysis and fabrication, in composites structures. The contributions being made by this group to the LCA programme (in carbon fibre wing and centre fuselage fabrication) are well known. The Division's contributions under his broad leadership in the other fields of structures such as vibration, aeroelasticity and computer based analytical techniques for tackling complex problems in structures have won rich accolades for Structures Division, and the reputation of being one of the best in its field of scientific and technical endeavour. I can't think of a more fitting tribute to an outstanding leader like Somashekar!

What many people do not know is the role Somashekar played from behind the scenes in running NAL effectively: whether it involved lending a helping hand in tackling innumerable problems of day to day management or becoming a sounding board to evolve policy on a number of issues ... Somashekar proved to be a valuable ally of every NAL Director, particularly after 1977. It is all too easy for a Director to make mistakes. Disinterestedly interested advice from well-intentional people can be very valuable in such situations and Somashekar played this role superbly.

With his self-effacing manners, his ability to give thorough attention to detail and his gift to get along with one and all, Dr Somashekar became, over the years, an indispensable part of NAL management, particularly in the last few years. All of us who have known him have come to admire him with a feeling bordering on affection. He will be missed in NAL, but we his friends and admirers wish him the very best in the years to come.

Dr B R Somashekar has been so much a part of NAL for about 35 years that it is hard to conceive of NAL without him.

Mr K Venkatachalam
A tribute by R V M Chokkalingam on the eve of Mr Venkatachalam's retirement in August 1996.

My first contact with Mr Venkatachalam goes back to the early 1970's when I was at VITM (then under CSIR) and Mr Venkatachalam, as a member of several VITM advisory committees, was actively involved in the Museum's activities. I can hardly believe that this active and youthful gentleman is already 60 and retiring this weekend. I see no difference in the K Venkatachalam of the 1970's and now: the attitude, attire, cordial disposition and outspoken nature have not changed one bit!.

As Deputy Director and Head of NAL's Engineering Services Division, Mr Venkatachalam was very much in the thick of things at NAL. His last five years at NAL have been especially eventful; he played pivotal roles in the computer controlled autoclave and other LCA-related projects. Mr Venkatachalam has also been closely associated with projects such as the fullscale fatigue test facility, polar filament winding machine, high pressure lab facilities etc. NAL will also gratefully recall his outstanding contribution in setting up modern fabrication facilities including CNC machines and other CAD/CAM facilities. On the eve of his retirement, Mr Ventakachalam was awarded the title of "Professional Engineer" by the Institute of Engineers; a worthy honour for someone who practised outstanding engineering at NAL for 36 years! We will miss Mr Venkatachalam.

Mr Venkatachalam's last five years at NAL have been especially eventful; he played pivotal roles in the computer controlled autoclave and other LCA-related projects.

Dr K S Yajnik
A tribute to Dr Yajnik by Dr P S Swathi and other colleagues at C-MMACS on the eve of his retirement in March 1996.

It would not be an exaggeration to call Dr K S Yajnik the architect of the CSIR Centre of Mathematical Modelling and Computer Simulation (C-MMACS). While he graciously deflects the praise showered on him in building one of the finest modelling centres in India, those who have worked closely with him will certify that it was his indefatigable energy and enthusiasm which made C-MMACS a dream come true. Dr Yajnik paid considerable attention to every detail; nothing was too trivial. With meticulous care he chose every component that would go into the building of C-MMACS. Today, C-MMACS not only has a contemporary computing environment comprising of world class supercomputing facilities with a host of high performance workstations, but also the required infrastructure.

In spite of the travails of setting up C-MMACS, Dr Yajnik still seemed to have plenty to spare for science. He collaborated actively with all of us, guiding us, coaxing us and on occasions even challenging us to perform.

To Dr Yajnik we say, "We will always cherish our association with you. What you have sown and so carefully nurtured we will reap, but we will always remember that it would not have been possible with out you. Thank you".

It was his indefatigable energy and enthusiasm which made C-MMACS a dream come true

Dr M V V Murthy
A tribute which appeared in the Information Pasteboard on the eve of Mr M V V Murthy's retirement.

Dr M V V Murthy, Scientist G, Structures Division, has just completed his outstanding innings for NAL. When Dr Murthy stepped down on 14 February 1998, he, together with Dr S Nagabhushana, held the distinction of being NAL's longest serving scientist.

The innings began on 3 October 1960 when Dr M V Vedavyasa Murthy (that's his full name) joined NAL as a Senior Scientific assistant (SSA). How did he discover NAL? "Well, actually NAL discovered me. I had obtained the third rank in my BE (Mech) examination from University of Mysore and Dr Nilakantan (NAL's first Director; then on a recruiting spree) was rounding up all rank holders" (Dr Murthy has been a rank holder in every public examination he has faced. In 1954 when he stood third in the Mysore state Matriculation examination, he became a local celebrity in his small town of Kanakahalli; he was even garlanded in the Town Hall!).

Looking back, did he think that it was the right decision to opt for NAL? "Oh, absolutely, although I had a few doubts during my early years. It was a curious dilemma we faced those days. On the one hand, there was the pleasure of working for Dr Nilakantan and participating in his crusade. And yet, with only a BE, we felt inadequate and incomplete. The urge to study more was great. But Dr Nilakantan resolved this conflict by sending me in 1964 to Penn State University in USA for my Masters".

The PhD followed in 1976, but the bug to be a good and inquisitive theoretician has never left Dr Murthy. "I was both famous and notorious for my mathematics", Dr Murthy recalls. The first big success came with his work on the theory of shells in 1963. It was Raju (Dr K N Raju) who initiated me into this business after he saw the work we were doing for the air receiver design, fabrication and erection at the wind tunnel site. And when my paper appeared in *Int J Mech Sci*, Nilakantan couldn't believe that a mere SSA had done it". Dr Murthy went on to work for a whole decade on cut-outs and cracks in shells. Around 1981 came another big success when, while at NASA, Dr Murthy did some seminal work in shear deformation theory (now known as the Levinson-Murthy theory). In 1993 there was another high when Dr Murthy completed some investigations on the 'perennial FE problem'. "I suspect it was this work which earned me my Scientist G", chuckles Dr Murthy.

That in essence sums up Dr M V V Murthy. Unassuming, erudite, loyal and non-controversial, Dr Murthy is also genuinely warm and affectionate. As he packs his books to leave, there is sorrow at the parting of a true friend.

Srinivas Bhogle

Two of Dr Murthy's biggest R&D successes probably were his seminal work in shear deformation theory (now known as the Levinson-Murthy theory) and his illuminating investigations on the 'perennial FE problem'

Dr A C Raghuram
A tribute which appeared in the Information Pasteboard on the eve of Dr A C Raghuram's retirement.

Dr A C Raghuram retired from NAL on 30 November 1999 upon attaining the age of 60. "I can't believe 27 years have passed by; it seems just the other day that I joined NAL!", he said. It is a wonderful innings that Dr Raghuram has played at NAL -- essentially with the Failure Analysis Group; but with occasional (exciting) forays in other domains too, especially powder metallurgy.

What would he miss most at NAL, I asked him. "Most of all my friends; I have such wonderful friends here. I will also miss the corridors of the Technology Block".

How did he plan to spend his retired life? "First, I will be able to wake up a little later -- but, more seriously, I am very keen to support social causes. Society has given me a lot, I want to repay this debt".

We too will miss Dr Raghuram at NAL; and are greatly reassured by his promise to stay in touch. I don't know of another colleague who is so affectionate and has such immense personal charm.

Srinivas Bhogle

It is a wonderful innings that Dr Raghuram has played at NAL -- essentially with the Failure Analysis Group; but with occasional (exciting) forays in other domains too, especially powder metallurgy.

Dr Indira Rajagopal
A tribute which appeared in the Information Pasteboard on the eve of Dr Indira Rajagopal's retirement.

Dr Indira Rajagopal retired this week as Head of NAL's Surface Engineering Unit. It has been a remarkable innings, spanning an incredible 42 years, at CSIR (before joining NAL around 1970, she was with CECRI, Karaikudi for 12 years) and studded with achievements and successes too numerous to enumerate here. It is NAL's good fortune that Dr Indira Rajagopal will continue to be associated with us as a CSIR Emeritus Scientist. In a future issue of the Pasteboard, I hope to carry a detailed appreciation of Dr Indira Rajagopal's work -- in fact, I am hoping that I can persuade Dr S R Rajagopalan to give me his objective assessment of his wife's best contributions to materials science and surface engineering.

This week I would simply like to comment on, and marvel at, the tremendous energy that drives the lady. I have been privileged to have had many long conversations with her (often over an excellent cup of coffee): money or worldly possessions mean practically nothing to her -- but talk to her about solar selective coatings, or polishing mirrors for INSAT satellites or descaling loco engine components and her face lights up! I suspect that Dr Indira Rajagopal's sole raison d'être is the relentless search for technologies which could contribute to the country's wealth. I wish her many more successful years in the pursuit of this noble endeavour.

Srinivas Bhogle

It has been a remarkable innings, spanning an incredible 42 years, at CSIR (before joining NAL around 1970, she was with CECRI, Karaikudi for 12 years) and studded with achievements and successes too numerous to enumerate here.

Dr M Shivakumara Swamy
A tribute which appeared in the Information Pasteboard

Dr Shivakumara Swamy, who retired from NAL on 31 May 2001 after spending over 30 years with the Lab., could be described as the quintessential aeronautical engineer. Starting with his M.Tech in 1960-62 (when he was one of Prof Satish Dhawan's favourite students), Dr Swamy's career first took him to HAL (1962-70) and then to NAL (1970-2001) when Dr S R Valluri invited him to help the Lab in its aircraft projects. There were also a few breaks from NAL when Dr Swamy worked abroad, notably with Lockheed in USA.

Dr Swamy's distinguished career has had several remarkable highs: valuable data generation on the MiG aircraft in 1971-73, involvement with the remarkable HS-748 aircraft investigations during 1972-75, some amazing improvisations with G Rajendra and others in the 1.2m wind tunnel in the 1980's to study missile trajectories -- leading to the development of the captive trajectory rig, the challenge of developing the LCA 1/4 scale highspeed air intake model in record time (and in the face of a severe foreign exchange crunch) in the early 1990's and, finally, (through the 1990's) leading NAL's twin civil aviation programmes, notably the HANSA project involving design, fabrication, structural testing, weight reduction, test flying and type certification.

I find it most remarkable that every project that Dr Swamy participated in, or led, was successful; this must doubtlessly be due to his unique mix of engineering and managerial skills. I have also never seen Dr Swamy unduly perturbed even in the face of serious personal or professional crises. He has battled diabetes for three decades and, a few months ago, won another battle with a heart ailment. We wish Dr Swamy a happy retired life -- at least for a few months! He should soon be back to advise NAL on its SARAS programme.

Srinivas Bhogle

I find it most remarkable that every project that Dr Swamy participated in, or led, was successful; this must doubtlessly be due to his unique mix of engineering and managerial skills

Dr S Nagabhushana
A tribute which appeared in the Information Pasteboard

It was a very touching moment for me on the last day of the last year when I had to bid goodbye to Dr S Nagabhushana.

Our close association began in the early 1980's when we started establishing wireless radio stations for telemetry. SN gave me a couple of files containing the correspondence with the Wireless Adviser to the Government of India and asked me to "carry on". I soon noticed that he had already undertaken a very detailed study of the various frequency bands that are allotted for telemetry, the sources of supply, the location of the antennas etc. .. and all this is in his inimitable and thorough style and in his beautiful handwriting! (most of us envy his handwriting and his wonderful ability to take down handwritten notes with the minutest details).

Many of us believe that the best among SN's many remarkable contributions to NAL was the effort to establish an acoustic test facility in collaboration with the Department of Space in the 1980's. He has often talked to me about the trials and tribulations he went through as he carried the project to its final execution.

SN has the great gift of probing into the details of functioning of every system and quickly understanding their "design and engineering internals". Recently we were discussing how to measure engine torque in a certain situation. SN did not seem very convinced with some of my answers. I was not at all surprised when, two days later, he came back to me with a complete (and masterly) insight into its measurement!

Another SN quality which we all admired was his cool handling of very tricky situations in the Division. I have rarely seen him perturbed or being harsh to anybody under any situation. He had the winning way of getting exactly what he wanted: very politely, diplomatically and without ruffling too many feathers. He used these skills exceptionally as an administrator. SN was also the Secretary of NAL's Research Council for a record number of years and the chairman of innumerable technical and welfare committees; NAL colleagues are especially grateful for his initiatives in improving NAL's medical services.

Very few among us probably know of SN's excellent command on the Vedas. When we returned home together from work late in the evenings, it was a pleasure to listen to SN reciting slokas on different facets of life and existence. I also vividly recall our visit to Trivandrum on an official visit some years ago. SN had asked me to join him at the Anantha Padmanabhaswamy temple early in the morning. When I reached the temple SN seemed nowhere in sight! His mysterious absence bothered me till I encountered a group of very senior people reciting slokas with great fervour and devotion. Right in the middle of this group, and reciting with the greatest fluency, was Dr S Nagabhushana.

We wish him a very happy retired life. I am sure SN will now get much more time to pursue his studies on the Vedas and the Upanishads.

Mr N N Murthy

SN has the great gift of probing into the details of functioning of every system and quickly understanding their "design and engineering internals".

Dr Srinivas Bhogle

'Loss of another rare talent' was an often repeated title in these columns in the recent past, due to the high attrition rate of both voluntary and superannuation retirements. Today it is sad that the author of many such articles himself is a victim, loss of rarest of rare talent!

Dr Srinivas Bhogle, known to most of NAL's colleagues as Dr Bhogle was the last 'anmol khoj' of the talent hunter - Dr S R Valluri. Dr Valluri, who brought many pool officers to NAL and India, sighted this rare talent in Paris in 1983 and persuaded him to join NAL to serve this great nation. Dr Bhogle joined the then Project Monitoring Cell of NAL in 1984.

Dr Bhogle was always ahead of his time. He introduced the concepts of PERT and CPM in management, right in 1984 at NAL, but unfortunately NAL was not ready for this! He moved on to documentation which is his greatest strength. He created Documentation Cell which became Information Services and later blossomed to become Information Management Division.

His penchant for writing was phenomenal. IMD under his leadership brought out a few beautiful publications like *Glimpses of Flora and Fauna*, *History of NAL – A Pictorial Account*, *Sadhana – NAL showcase* and *Flosolver – Twenty Years of Parallel Computing* these were appreciated not only in NAL and CSIR but by other organization too!

He was a visionary and an artist. He was instrumental in the creation of NAL's intranet and internet web pages. The contents of these are so beautifully organized that it has become NAL's window to the outside world. His contributions to NAL are aplenty. The web based payroll system is very popular as the staff can see the payslips the day it is created.

The leave management module was another excellent contribution to the staff. It was so user friendly that the staff always admired the thoughts behind the whole implementation. Another feather in his cap was the successful implementation of the online purchase indent. Summing up, Dr Bhogle introduced NAL to an excellent computerized management information system.

Dr B R Pai during his tenure as Director asked him to design and develop an online recruitment process which he readily accepted as he is of the view that the recruitment process should be completed within a shortest possible time to catch talent. Since last two years, NAL is recruiting through the software developed for this purpose popularly known as 'Khoj'.

All these attracted attention of other CSIR labs - NCL, Pune, CFRI, Dhanbad, and RRL, Jorhat have requested NAL to implement these MIS in their labs.

His best weapon is his pen. He can write on anything within shortest possible time. He is loved by his staff for his simplicity and free and frank speaking. He is the only Head in NAL and probably in the whole of CSIR who did not have a separate room. He always liked to be with his staff. He was the guiding force behind each and every successful project that IMD had undertaken. NAL in general and IMD in particular will miss him and his services for ever.

It was these accolades, that got him the praise of being a pillar of NAL (Dr Prahlad, former Director, NAL, during the farewell function spoke … Dr Bhogle is one of the strong pillars of NAL …. The Information Pasteboard was his most coveted creation, popular in NAL and outside. (refer previous weeks IP). It is through this NAL salutes and bids adieu to the great Dr Srinivas Bhogle.

Ranjan Moodithaya with M A Khan

Dr Raj Iyengar Seshadri

It is with extreme grief that I have to write about Dr R Seshadri, a senior scientist of Materials Science Division and a very dear friend, who left us on 11 November 2006.

Dr Seshadri joined Materials Science Division as Scientist A1 on 17 January 1973 and rose to the level of Scientist F. As a brilliant mechanical engineer, he had made significant contributions to different areas of materials science in his 34 years of dedicated service. In his early years he played a key role in the design of several mechanical systems for the Division.

Actually he started the ceramic activity in the division in 1975 itself, when he developed spray drying process which was acclaimed by none other than the Nobel Laureate Peter Kapitza.

Recently he had taken a major project from DRDL on developing high temperature ceramic inserts for applications in rocket thrusters. He was obsessively passionate about this project, which is his brainchild where in he developed a novel material processing technique to produce a high temperature material capable of withstanding temperatures up to 3000K. In spite of his ill health he took it as a challenge and completed this work successfully, made live tests at DRDL about a month back. This significant achievement was well appreciated from the user agency DRDL, where the tests were done. This was the moment he was waiting for and shared his excitement with all of us.

Taking this project to its logical conclusion was upper most in his mind and he shared his feelings with some of us just before the inevitable happened.

As a person, Dr Seshadri was always willing to help others whenever his expertise was sought. He was a well-known cricketer and sportsman in his yester years.

The laboratory has really lost an individual scientist par excellance and a wonderful human being and the best tribute, we in the division can pay to his memory is to complete the unfinished task with the same dedication.

T G Ramesh

Dr Sunil Kumar Chakrabartty (SKC)

Dr Sunil Kumar Chakrabartty (SKC) belongs so much to our CTFD division that it is something impossible for all of us to accept that our SKC – a source of great inspiration and energy for our division will stop coming to office from 1 December. SKC always meant much more to all of us than his mere physical presence. He is really the ***Big C*** of our CFD community – ***Chakrabartty***, the ***Champion***of ***CFD***. Regarding scientific achievements, this friend of ours has undoubtedly reached the peak at both national and international level today. His long list of research publications in reputed peer reviewed journals and his recent monograph on CFD, of course, speak volumes of his great achievements in a long innings of more than three decades. SKC just loves to meet challenges and eventually to go beyond them. The maiden challenge of his professional career was the computation of complex transonic flow and that too using the grossly inadequate computing facilities in 1970's when a term ***CFD*** was not in use. His in-depth knowledge of applied mathematics fused with his untiring efforts to understand the typical aerodynamics problems, his enormous energy to inspire the young scientists around him for the last two decades and finally his great love and passion for CFD gave birth to the JUMBO and JUEL series of Navier Stokes and Euler codes in our division for analysis of aircraft aerodynamics. The aerospace community of the country are proud of our colleague SKC and his brain-child - the JUMBO code used extensively today.

SKC is always our true friend in need. In any problem whatsoever, he is the first person to stand beside as a Big Brother. Amongst his friends, he enjoys the reputation of being straight-forward nature. He always calls a spade a spade. We all will really miss his exciting high decibel remarks and cross-arguments in our seminars. It takes a while for one to understand this highly emotional and sensitive man of large heart, SKC. The CFD community of the country will forever remember the enormous contribution of our SKC and his charismatic personality. We all wish SKC, his wife and their loving son Subrata and daughter Shreya, a very happy, healthy and peaceful life for many more years to come.

Dr. Sekhar Majumdar, Head CTFD Division

Mr S Gopala

A dependable colleague, a good tax advisor, a deep commitment to culture and traditions, an effective organizer, an active co-operator, a passionate sportman and always prepared to lend a helping hand. A winsome smile with an infectious optimism radiating happiness and cheer all around. Last but not the least a very committed worker. This is Mr S Gopala who has hung his gloves on 31 May 2007.

Knowing Gopala very well, we know he is not the one to relax. He will certainly venture out into larger platforms and avenues to serve and find happiness. All the very best to you dear Gopal. We wish you joy, happiness, peace, good health and prosperity in your retired life.

Shailaja Menon

Mr M Ramaiah

Mr M Ramaiah, Assistant (S & P) Grade I retired on superannuation on 30 June 2007. He joined NAL in 1977. As stores supervisor he worked at receipt wing, coordinating with the suppliers, transporters, indentors and also purchase sections. He managed the task, of receipt of the items like material handling, handing over DD to suppliers, preparation of inspection reports and obtaining issue slip etc., very efficiently. In fact, he functioned as an ideal interface between the actual buyer and the seller. He carried out his day to day activities with utmost integrity and devotion. He maintained a cordial relation with all user's divisions and was highly appreciated by one and all.

Siba Prasad Hota

Mr S Nagaraj

Mr S Nagaraj joined NAL in 1966 in the erstwhile Mathematical Sciences Division. He had the privilege of working with NAL's first computer "Ferranti SIRIUS". He started his career by writing programs in AUTOCODE and FORTRAN for scientific applications. In the 80's NAL acquired the first major main frame system SPERRY 1100 system and Mr Nagaraj was made the System Administrator.

For a shortwhile he worked in the Inter Process Communication for flight simulation software at FMCD. Later he moved to CSS where the campus network expansion using FDDI was in progress. At CSS he was instrumental in setting up and maintaining all servers like Proxy, SMTP, mail servers, web mail and web servers using LINUX operating system, Antivirus packages for gateway and desktop.. His interaction with users of different divisions was highly appreciated and he was given the NAL award for Technical Support. He guided a large number of B.E and MCA students in their project work.

July 2006 saw the formation of CNSU for maintenance and expansion of all Network Related issues and problems. He was made the Network Administrator and Dy.Head, CNSU . Here he co-ordinated successfully in installing the State of the art United Threat Management Appliance box. This appliance is operational since 3 months successfully.

Mr Nagaraj superanuuated on 30 June 2007, we wish him a very happy and peaceful retired life.

Dr S Sridharamurthy

Dr S Viswanath

Dr S Viswanath has made an outstanding contribution to the design and development of aerospace structures and their analysis. After joining NAL in the year 1973, he made his initial contributions in the area of finite element theory, fracture mechanics and composite structures. During this period, he made significant contributions to the development of HJT-16, canopy stress analysis of HF-24 and static analysis of rotodomed aircraft. Subsequently, he took up the responsibility for the structural design, analysis and certification of the HANSA-3 aircraft and played a leading role in the structural weight optimisation of this aircraft to satisfy the JAR-VLA requirements.

As Head of Structural Analysis and Design Group at NAL, he was responsible for several major projects which included analysis of LCA components, DWR sandwich radomes, ceramic radomes for high temperature applications and FRP nose radomes for Jaguar aircraft. He also carried out analysis of flexible structures like aerostats of various sizes. In the year 2002, Dr. Viswanath took over as the Head of Structures Division at NAL and has contributed significantly to vibration, aeroelasticity and smart structural related developments. He has been responsible for setting up several vibration test facilities in NAL, the notable among them being a 132 channel data acquisition system for MIMO Ground Vibration Testing of aircraft and a 3.5 tonne shaker for Dynamic Qualification of components. He also lead a team that has very efficiently carried out the GVT of HANSA-3 and SARAS prototype aircraft to enable flight clearance from the point of view of aircraft flutter. During his tenure, three major aeroelastic programmes were successfully completed viz., GSLV M3 buffet studies, SARAS T-tail aeroelastic model studies and active flutter control model in flying PZT actuators. As Chairman of the Task Force on SARAS structural testing, he has monitored various test plans, tests and analysis of structural components . He has now initiated two major aerospace projects in the Structures Division on Structural and Aerothermal analysis of re-entry Launch Vehicle (VSSC) and Inflight vibration measurements and thermal mapping of a fighter aircraft (CEMILAC/ IAF).

Dr. S. Viswanath graduated from the University of Mysore in Mechanical Engineering and subsequently completed M.Tech from IIT, Madras. He later obtained his Ph.D in aeronautical engineering from IISc, Bangalore. He has more than 130 publications in various journals, conferences , seminars and as technical documents. He is a Fellow of the Aeronautical Society of India, Life Member of ISAMPE and Member of the Computer Society of India. He received Dr. Roy Biren award from the Aeronautical Society of India in the year 2000 for his outstanding contribution to the design and certification of the all composite HANSA-3 aircraft. He is a distinguished visiting Professor of VTU, awarded by AICTE.

Mr C R Srinivasa

Mr C R Srinivasa joined NAL at Materials Science Division (Central Design Section) in August 1973 and switched over to Structures Division (Mechancical Design Group) during 1998. Mr Srinivasa has now superannuated in June 2007.

His main strength had been in the design drafting. His contributions to the drafting work is outstanding as evidenced in the indigenous development of large polar filament winding machine, 2.4m autoclave and the 4m x 8m HAL autoclave, creep rupture machine, brake pad test rigs, several versions of carbon composite wind tunnel models of TEJAS aircraft and radomes of different class. In recent times, Mr Srinivasa contributed to the development of the test rig for SARAS stub wing structural teting, in addition to participating in the successful testing of stub wings for the PT1 and PT2 versions of SARAS aircraft.

We wish Mr Srinivasa a very happy and active retired life.

Dr S Sridharamurthy

Dr K Yegna Narayan

Dr K Yegna Narayan has made an outstanding contribution to the cause of aeronautics in India as the Chief Designer and as the Project Director of the 14 seater Light Transport Aircraft (SARAS) project in particular and as Programme Director (Civil Aviation Programme) at NAL in general. SARAS is taken up as a national project spearheaded by NAL and the first prototype had its maiden flight on 29th May 2004 and the second prototype had its maiden flight on 18th April 2007. Dr Yegna Narayan has been leading this effort for more than 15 years and has shown a remarkable sense of determination, dedication and tenacity required in such a leadership position.

As Chief Designer, Dr Yegna Narayan has made very significant technical contributions to overall system studies, system optimization, aircraft integration and aircraft system testing. He has a very good understanding of the multidisciplinary aspects of aircraft design and their complex interactions. Taking an aircraft project from the conceptual study to its first flight is a tremendous achievement for which Dr Yegna Narayan must be given full credit. The Aeronautical Society of India has awarded him the National Aeronautical Prize in 2004 for his contribution to SARAS.

Another area in which Dr Yegna Narayan has made significant contribution to the national scene in Aeronautics is in the preliminary design studies of the Light Combat Aircraft (LCA) as the Technical Secretary to the national level LCA committee. These studies were very important for the LCA programme to proceed further with detailed design and development.

Dr Yegna Narayan has an excellent academic background with his BE in Mechanical Engineering from the Bangalore University (Sir M Visweswaraiah Memorial Prize for standing first in the University), ME in Aeronautical Engineering from the Indian Institute of Science (again first), Ph.D. in Aeronautical Engineering from the University of Cambridge, UK and postdoctoral research at NASA Langley Centre. He joined NAL in the year 1977. He is a Fellow of the Indian National Academy of Engineering. Before taking on the responsibility for the SARAS project, he was a leading research scientist at NAL working on several fluid mechanical problems like delta wing flows, flow separation, configuration aerodynamics of aircraft, heat transfer etc. He has demonstrated a very high level of competence in doing experimental work in fluid mechanics and has published several papers in international journals. He won the Dr Biran Roy Trust Award of the Aeronautical Society of India in 1992 for his work on delta wing flows.

We wish Dr Yegna Narayan a very happy retired life

Mr R Rangarajan

Mr R Rangarajan joined NAL in the year 1968 after obtaining B.Tech from IIT, Madras. Initially he worked on the wind tunnel development projects of NAL. He later developed an expertise for the design and development of wind tunnel balances and worked on the wind tunnel testing of delta wing, AGARD-B, RH 100 and GAF models. He later switched over to software development in aerodynamics and worked on panel methods, shock free aerofoil design, small perturbation methods, full potential and Euler solvers. In the year 1987, he obtained his degree of Master of Science (Engg.) in Aerospace engineering from Indian Institute of Science, Bangalore.

Mr Rangarajan then joined the HANSA project team at NAL under Prof. Damania and has contributed immensely to the design, development and certification of the HANSA-3 aircraft. He took over as the Project Director of HANSA in the year 2001 and has significantly contributed to the limited series production of HANSA-3 aircraft for DGCA and in providing the requisite product support to the various flying clubs operating the HANSA-3 aircraft. He and his team have lent admirable support to these flying clubs to keep the HANSA-3 aircraft airworthy. He has also periodically organized training programmes at NAL for the pilots, ground and inspection crews of these flying clubs Mr Rangarajan and his team were instrumental in the successful participation of the HANSA-3 aircraft at the air shows held in Bangalore over the last decade. Under his guidance, the HANSA-3 aircraft also participated in the Australian air show held at Avalon in Melbourne in March 2007. He has established strategic partnership with RMIT, Australia for the development of composite landing gear and for certification of the HANSA-3 aircraft in Australia.

Mr Rangarajan undertook a study of methodology of advanced airfoil and wing design, under the NAL – DAAD bilateral exchange programme, in 1989. He is a Fellow of the Institution of Engineers (India) and Aeronautical Society of India. He has received NAL foundation day award for research in 1987 and for design and development in 1994 and also has received the NAL technology shield in 1998 for outstanding achievement for integration and flight testing of HANSA aircraft. He has more than 40 publications in the area of wind tunnel testing, strain gauge balances and design of advanced aerofoil and in software development for aerodynamics.

We at NAL, wish Mr Rangarajan a very happy and peaceful retired life.

Dr Jitendra Ratansinh Raol

Dr Jitendra Ratansinh Raol relinquished the office as the Head of Flight Mechanics and Control Division on 31 July, 2007. Hailing from a small town in Gujarat, he graduated in Electrical Engineering (BE) in 1971 and obtained his Masters in 1973 specializing in Automatic Controls. He completed his doctorate from McMaster University, Canada in 1986. Dr Raol began his innings at NAL in Sept 1975 as a Senior Scientific Assistant (SSA) and rose to the position of Sc G / Head, FMCD through sheer hard work and perseverance. The passion and commitment with which he served NAL for 27 long years is difficult to express in words.

He successfully led several projects in the area of system identification, parameter estimation and multi sensor data fusion as a Group Head of Modelling and Identification at FMCD. He has to his credit the development of novel approaches for parameter estimation using recurrent neural networks (RNNs) which won him the distinction of a reviewer for several international journals. He conducted the first ever NAL-UNI course on "Theory and practice of parameter estimation for aerospace dynamical systems**"** with great élan. Under his leadership the FMCD was awarded the CSIR Shield for Engineering Technology for the year 2003. He had a penchant for encouraging academic excellence and guided eight Masters and six Doctoral theses.

For us who have been closely associated with him, working under his guidance has been an enjoyable and enriching experience due to his untiring enthusiasm and ‘never say die’ attitude. For a person with no aeronautical background, his proficiency in analyzing flight mechanics problems was a revelation. His pioneering work in the area of MSDF stands testimony to his ability to take on new challenges. His mantra was "You need to take a few calculated risks if you want to achieve something". As co-authors of the book "Modelling and Parameter Estimation of Dynamic Systems" which was published by IEE Control Engg. Series in 2004, we have been witnesses to his remarkable sense of determination, dedication, meticulous planning and technical insight.

Apart from his technical interests, he is a ‘poet’ who has penned some very beautiful poems which reveal his deep sensitivity, warmth and caring attitude. People closely associated with him also know that he is an avid reader, his latest penchant being the books written by Richard Dawkins. As we prepare to bid goodbye to Dr Raol, we salute the maestro who taught us how to blend pragmatism with passion and assure him that we will carry forward the legacy from him. We wish him many more successful years of health and happiness in the pursuit of his endeavors.

Girija Gopalratnam and Jatinder Singh

Mr Aithu Poojary

Mr Aithu Poojary, Scientist F, SED has superannuated from NAL after serving more than three decades. He is a familiar person in NAL. He joined in 1972 as JRF after obtaining his M.Sc in Physics from Mysore University, became JSA in 1973 and continued to grow with the organization.

Mr Aithu Poojary made great strides in the indigenous development of digital analog instruments under the guidance of Dr S R Rajagopalan. He developed co-quad analyzer for vibration studies and a host of electroanalytical instruments like charging current compensated D.C. polarograph, harmonic A.C. polarograph, charging current eliminated A.C. polarograph, pulse polaro-graphs, corrosion rate monitor and potentiostats for moderate and high current applications. The polarographs developed by him were useful for detecting ppm (parts per million) and ppb (parts per billion) levels of chemical impurities. It is gratifying to note that the know-how of all these instruments have been transferred to Elico Pvt. Ltd, Hyderabad. A patent has been obtained for pulse polarograph. More recently he has contributed to the development of a pH controller suitable for plating systems.

Apart from this he has served the division and NAL in various capacities as divisional representative for ISO, member in committees (SPC-II, SDC). The key role played by Mr Poojary as Chairman, Telephone Exchange for the creation of the state-of the art telephone exchange will always be cherished in NAL.

Mr Aithu Poojary is a simple, honest, dedicated, friendly, cheerful and contented person. We wish him all the best for his retired life with his family. We are surely going to miss him.

Bharathi Bai J Basu and S T Aruna

Dr Anand Kumar

The talk in the C-MMACS Lecture Hall on 27 July 2007 turned out to be quite unusual. Braving several acute physical handicaps, the speaker highlighted one of facet of his recent work. He showed with simple examples from diverse complex physical phenomena that the traditional numerical schemes for computing fluid flows do not conserve symmetry and invariants, as one would expect from the physical considerations. The central difficulty is that the usual finite difference schemes introduce a small directional bias in formulating the governing discretised conservation equations, leading to unacceptable errors. He also showed how his difference scheme overcomes the difficulty and conserves symmetry and invariants unlike the traditional schemes. The speaker was Dr Anand Kumar, Scientist G, C-MMACS, who retired on 31 July 2007.

He joined NAL as Scientist B in 1971. He had his undergraduate education in (BHU B.Sc. Hons), where his skill in solving geometrical problems was well recognized and appreciated. He joined IIT Kanpur in 1968 for Post-Graduate education. He completed M.Tech in 1970. Subsequently under the guidance of Dr. K S Yajnik in the area of separated flow, he obtained Ph.D in 1977. During his work in aerodynamics, fluid mechanics and later CTFD Divisions, he developed deep understanding of computational fluid dynamics (CFD). His creativity and depth of understanding are best seen in his computations of flow past a sharp delta wing that captured for the first time the fine structure of cross flow shock and shock-induced secondary separation in transonic flow and vortex breakdown in subsonic flow. They were published in the AIAA Journal in 1996 and the Proceedings of Royal Society in 1998.

Dr Anand Kumar’s interests in computational investigations have led him to diverse areas like viscoelastic fluid flow, liquid crystals, thin films, dendritic solidification and image processing. He also has given invited lectures in CFD Conferences in China, Germany, and Israel. He has held visiting positions in DLR, Germany (1985-86), University of Sydney (1991-92), and Raman Research Laboratory (2002-05). He has also been Regional Editor of CFD Journal, Japan.

All Anand Kumar’s colleagues feel deeply concerned about the progressive Parkinsonian disease that he has been suffering from in the last few years. We all wish him, his wife Dr Gita and his daughters, Aditi and Tara, all the best in his retirement years.

An old colleague

Mr M Subba Rao

Mr M Subba Rao, founding Head of Advanced Composites Division (ACD), retired on superannuation on 31 December 2007.As a long-standing deputy and a close colleague of his for over two decades, I consider it my privilege to be writing this note recalling his contributions.

The ushering in of co-curing / co-bonding fabrication technology for Carbon Fibre Reinforced Plastic (CFRP) airframe structural components development had a tremendous impact on the Tejas (Light Combat Aircraft - LCA) programme. Mr Subba Rao's contributions to this are immense and are nationally and internationally recognized.

His tryst with composites technology began in the Structures Division. As a scientist there, he played a key role in the development of CFRP rudder for the Dornier (DO-228) aircraft - a very successful collaborative venture with DLR, Germany.Spurred by this success he moved on to develop the country's first CFRP replacement rudder for MiG-21 aircraft, working in tandem with HAL-Nasik. Later, when the Tejas programme got going, Mr. Subba Rao took the challenge of making many airframe structural components in CFRP.The design and development of CFRP co-cured fin stand out here. He took the responsibility for the development of nearly fifty complex centre fuselage components with CFRP for the PV series of Tejas aircrafts. This brought crowning glory to the nascent ACD, which he has headed most effectively since its formation in 1997. Other accolades followed. These include the Centre of Excellence in Composites Structural Technology (ACECOST-AR&DB), Repair Technology Programme (IAF-11BRD Nasik) and Tejas Limited Series Production (LSP-HAL).

More recently, taking advantage of the National Programme on Smart Materials (NPSM), Mr Subba Rao initiated important activities at ACD concerning different aspects of smart materials usage in aircraft structures. He also established a programme on Structrual Health Monitoring (SHM). He has nurtured highly qualified bright youngsters to manage these efforts.

Coming to NAL's own SARAS aircraft programme, Mr Subba Rao's contributions are unique. Armed with the Tejas experience, he pushed for the extensive use of CFRP in SARAS airframe. He lead the group that developed CFRP control surface elements and has now proposed to make the wing also in CFRP – using a novel Vacuum Enhanced Resin Infiltration Technology (VERITy) process - for the production standard (PS) version of the aircraft.

Mr Subba Rao is a duty conscious disciplinarian. He loves challenges and has indefatigable energy. Execution of critical projects in advanced composites technology and related areas to fruition is his forte. His contributions to indigenous development of autoclaves and revamping of imported autoclaves have been other noteworthy facets of his long and distinguished career.

I wish him and his family great joy, satisfaction and fulfillment in the years to come.

M R Madhava

Gangan Prathap

Dr. Gangan Prathap, our most respected teacher and mentor, is an inspiration to all. One can rarely find a great personality like Dr. Prathap who is academically brilliant, an internationally renowned researcher and an equally wonderful human being. We were extremely fortunate to have worked very closely with him for many years.

His deep insight and creative mind have led to his achievements that brought him wide recognition. It should be remembered that Dr. Prathap, with his exceptional academic records from the IIT, was a true Indian, who has dedicated his research activities for our country. He pursued science with the insight of a philosopher and attitude of a sage. His outlook on science, technology, philosophy and epistemology are remarkable. Those fortunate enough to have worked with him in the area of Structural Mechanics and the Finite Element Method (FEM) will always remember him for his exceptionally strong theoretical foundations, meticulous work, punctuality, effortless ease and style of working, and as a remarkable colleague. He was a role model with impeccable integrity and a constant source of inspiration and strength. His commitment to his group was immense and we owe him a great debt of gratitude.

His significant contributions to the field of science and engineering is mainly on non-linear structural mechanics, founding the basic principles of the science of finite element formulation of constrained multi-strain field problems - statement of conceptual scheme, definition of the appropriate vocabulary for this new area, design of operational procedures to remove inconsistencies in constrained strain-field definitions and for error analyses etc. and the design and development of a library of field-consistent elements, the finite element analysis of composite structures - development of FEPACS - a general purpose package for analysis of composite structures, error analysis in finite element elastodynamic problems, stress correspondence paradigm and work on projection theorems for elastostatics and elastodynamics in finite element computation, development of finite elements based on higher order theories, studies on finite element modelling of structural dynamics, production run stress analysis of aircraft structures, studies on scientometrics etc. He has over 90 publications in International Journals, over 300 short papers and reports and authored the book ‘The Finite Element Method in Structural Mechanics’, published by Kluwer Academic Press (1993).

His contributions brought him the prestigious award for scientific research in the country, the S.S. Bhatnagar Award, in 1990. He is a Fellow of the Indian Academy of Sciences and the Indian National Science Academy. He is a member of many professional societies, expert committees and editorial boards of many reputed international journals.

It is beyond doubt that Dr. Gangan Prathap will perform the role of Vice-Chancellor of CUSAT with great distinction and continue his work untiringly. He will continue his spirit of promoting education and research. We wish him all success, good luck, greater achievements and many more laurels in the years to come.

Dr. Prathap’s old FEM group – at NAL Structures Division and C-MMACS .

Dr Sekhar Majumdar

Dr Sekhar Majumdar, Head of Computational Theoretical Fluid Dynamics Division (CTFD) retired on 31 January 2008 after 19 years of fruitful service. I have known Dr Majumdar since 1992 when I joined NAL. He still looks the same as he did in 1992 and if anything he is even more productive today.

Dr Majumdar assumed the leadership of CTFD division on March 2005. He is essentially a mechanical engineer holding B. E., M. E. and Ph. D in that discipline. He is really an old timer in CSIR since he started his career in Central Mechanical Engineering Research Institute, Durgapur in 1972. Looking back, a turn in his career seems to have come with his tenure at Karlsruhe University, Germany from 1983 to 1989. During this time he worked with Prof. Rodi and developed RANS code for arbitrary configurations. I also get the feeling that he fell in love with turbulence during this time. He joined NAL in 1989 and continued to develop this code (RANS3D). Thanks to his efforts, this code is probably the only code which boasts of a number of turbulence models like k-epsilon, k-omega, SST, Spalart Allmaras and v2f.

Perhaps thanks to his mechanical engineering genes, while most of us looked into aerospace applications, Dr Majumdar took his RANS3D to such diverse areas as analysis of underwater bodies, ship hulls, weather radar radomes, aerostat balloons and so on. Thanks also to his efforts, we now have LES capability. I am sure that we will miss his expertise since we still need to substantially improve upon these capabilities.

Dr Majumdar has undoubtedly received fame at both national and international level today. He was the National Committee Co-Chairman of Asian Computational Fluid Dynamics Conference (ACFD7) hosted by NAL, which was completed successfully recently. He served as the chairman of the CFD Division of AeSI for the last 4 years. He was recently elected as a Fellow of AeSI. He is also a Member of Hydrodynamics Panel of Naval Research Board (NRB).

Dr Majumdar is one of those very few people who have an academic bent of mind. He has been an excellent teacher and guide to many of us. His passion for teaching has helped many students to benefit from his deep knowledge of turbulent flows. He has served as visiting faculty and examiner for Masters and Ph.D. theses. I understand that henceforth he will dedicate most of his time to teaching.

Though he is known for his work on turbulent flows, he is very laminar by nature. On behalf of CTFD family, I wish Dr Sekhar Majumdar and his family, good health, happiness and active retired life.

Vidyadhar Mudkavi

Dr T G Ramesh

I have known Dr T G Ramesh since 1971, right from his research student days in the Materials Division of NAL, when I spent a sabbatical year in the Division to set up facilities for High Pressure research. At that time Dr Ramaseshan brought him to me and introduced him as one of his best students. We ended up discussing about the anomalous high-pressure behaviour of cesium. A few years later Dr Ramesh wrote a beautiful paper with Dr Ramaseshan on this subject, with clear insight. To me this reflected his excellent grasp of condensed matter physics and electronic behavior of solids under high pressure. I believe this constituted a part of his PhD thesis. His subsequent entry into the world of high-pressure research, this time as an experimentalist led to many outstanding contributions in the field of mixed-valent materials and 4-f electron systems. Dr Ramesh and Dr Shubha pioneered thermo electric effect as a probe to investigate high-pressure phenomena of many metallic systems, including the spin density wave ordering in Cr based alloys.

I have watched with interest his growth as a condensed matter physicist and his excellent contributions to high-pressure research. His humility combined with a wide knowledge, and ability to inspire younger scientists impressed me very much.

During my recent visit to NAL after a long gap, I was extremely happy to see him as the Head of the Materials Division and to hear about some of the projects he has initiated in the field of applications and technology.

Dr Ramesh has immensely contributed to the intellectual atmosphere in the Division and will be missed by his colleagues and friends. I admire his work, his scholarship, his ability and his dedication to science and technology at NAL.

I wish him a long life, continuing interest in Science and happy years of retirement.

Dr A Jayaraman, AT & T Bell Telephone Laboratories, USA

Dr K S Nanjunda Swamy

I was wrong. I thought that writing a paragraph about somebody I now know for more than 17 years should be quite simple.

It isn't. Far too many thoughts and images rush to my mind as I think of my senior colleague Dr K S Nanjunda Swamy, and my hand just can't keep pace with this cascade of memories.

It must be because every individual has multiple-facets to his personality! It must be because Dr Swamy achieved far too much during his long innings as NAL's Chief Medical Officer (CMO). But let me try … let me try to replay my memories in slow motion.

I first met Dr.Swamy when I came cycling to NAL in 1991 to submit my application for the post of medical officer. I was coming in fresh from a private hospital, where some consultants carried that unmistakable air of superiority, I was therefore surprised to see Dr Swamy casually dressed as we talked in the NAL Staff Club shed. In fact, Dr Swamy was so unassuming that I even nervously asked him "Are you NAL's CMO?"

My earliest memories after I joined NAL are of a young doctor eager to please his stern CMO. Initially Dr Swamy's strict sense of discipline, and his 'siren-dictated' punctuality, unnerved me. Since I was coming in from a private hospital, my body clock was tuned to working long hours without a break for food or rest – and my body wasn't wired to eat a masala dosa simply because a siren went off somewhere! My odd timings didn't please Dr Swamy – and he told me as much – but then he turned more sympathetic when he found that I was putting in long hours at work in spite of my different routine.

Actually, I found that I had a lot to learn from Dr Swamy when it came to correct eating habits: his controlled food intake, his ability to relish even a meager meal, his admirable propensity to opt for a 'by two' meal plan if he felt full, the use of his 'surgeon's hand' to neatly pick food from an impossibly tiny tiffin box … these were remarkable, and they also explain why he retains such a trim physique. In fact, even that occasional smoking habit was tightly controlled!

As a fellow doctor, I appreciated him for putting in hard work even on days when he was personally unwell. Dr Swamy often braved painful mouth ulcers and crippling backache and headaches to be present at the Health Centre to treat his ailing NAL colleagues. I have only rarely spotted a grimace of pain or a show of personal discomfort behind a jovial exterior. But then, that's what every good doctor's life is all about.

.Of course, there were some moments when Dr Swamy lost his temper, and other moments when he seemed unapproachable. I've also heard him fly into a rage while talking on the telephone. But we must remember that a doctor is human too: a doctor too can be all of moody, pleasant, serious, jovial, tense, irritable and cheerful.

So while I have some memories of an angry Dr Swamy, I have many more memories of the good doctor, chortling uninhibitedly at a good joke, and enjoying his occasional glass of beer.

Without being too orthodox or devout, Dr Swamy has always been God-fearing, and was a keen participant in the events at the Ganesha and Shiva temples at the NAL campuses. I have also seen him being the Good Samaritan as he dipped into his own pocket to help some of his needy and underprivileged patients. But, at the end of the day, Dr Swamy proved to be a good doctor. His interactions and close bonding with so many of his patients allowed him to be a healer, a beacon of hope, a personal confidant, a source of strength, a harbinger of solace and a friend, philosopher and guide. Being a doctor myself, I know that these qualities often mean much more than cold medical knowledge. Dr Swamy knows this too. He's been there for 33 years; he's seen it all. And he's brought greater respect to this noblest of professions.

Amarnarayan

Dr S V Narasimhan

Dr. S.V. Narasimhan retired as the Deputy Head of the Aerospace Electronics and Systems Division after rendering about seventeen years of dedicated and committed service to the Laboratory. He has been a role model, a mentor and a teacher to many and I am sure his talent and scholarship are undeniable and will be difficult to replace. For all those who know him well, he had built a personal relationship with his place of work and transformed it unobtrusively from a professional activity to an impossibly addictive hobby.

Some notable contributions have come from the leadership of Dr. S.V. Narasimhan at NAL in a diversity of applications that include Active Noise Control for LCA, speech processing, CVR analysis, radar signal processing, wireless communications and so on. The group has done pioneering work in the analysis of non -stationary signals in the group delay domain. This method exploits the additive property of the Fourier transform (FT) phase to extract spectral information of the signal in the presence of noise. The phase is generally featureless due to random polarity and wrapping; but the group delay function can be processed to derive significant information such as peaks in the spectral envelope. This concept has been thoroughly exploited by Dr. SVN in many of his publications for the analysis of non-stationary signals using cyclostationary methods, time frequency analysis, the bispectrum etc For all his contributions in this area, Dr SVN is fondly nicknamed as MGD Narasimhan by Dr. B.S. Adiga.

Many say that scientists lose their enthusiasm with age. This is certainly not always true for all the scientists one come across, and most certainly not true for Dr. S.V. Narasimhan. Personally for me, Dr. Narasimhan *at sixty* is still the best *postdoc* NAL can still find. He is still capable of making various contributions and can play a role in providing a deeper perspective on scientific strategy — many young scientists have not grasped the importance of seeking out unsolved and unregarded problems.

NAL recognizes the need to maintain and enhance the pool of productive scientists by promoting recruitment and innovative schemes to tap the potential of retired scientists. Here’s welcoming DR NARASIMHAN as Scientist Emeritus to CSIR once again.

S M Vaitheeswaran

Dr.M.R.Madhava

Dr.M.R.Madhava, Head, Advanced Composites Division of National Aerospace Laboratories, retired on superannuation on 30 April 2009. Dr.Madhava obtained his B.E. (Electrical) Degree from Bangalore University in 1970, M.Tech. from IISc. in 1972 and Ph.D. from Bath University, UK in 1977.

On return to India in 1977, he worked as a Scientific Officer at Cryogenic Facility, IISc., Bangalore and was responsible for the setting up of state-of-the-art experimental facilities for materials property evaluation at liquid helium temperatures. From 1979 to 1981 he was a scientist at RRL, Trivandrum. There, he established experimental facilities for characterization and Non-destructive Evaluation (NDE) of novel composite materials.

In 1982 he joined Composite Structures Laboratory of Structures Division, NAL which later became Advanced Composites Division (ACD). His major emphasis at that time was towards understanding of NDE of composite materials and structures. During the initial phase, studies were conducted on the use of Acoustic Emission (AE) techniques for studying the failure modes in composites. Ultrasonic NDE techniques were also established for the inspection of composite structures. However, these studies were restricted to coupon level. Further to this, the group took a major initiative in hardware development programmes related to primary aircraft composite components. To support this programme, he focused on setting up of the state-of-the-art Non-Destructive Evaluation facilities for composites to qualify LCA and SARAS parts. He also put forth an imaginative QA set-up taking advantage of the NDE successes and got this accredited to regulatory bodies. These efforts conferred on ACD the ability to develop certified airworthy composite structures. This brought ACD into the forefront of technology development with regard to NDE and the NDE group was considered as a “solution finder” for any of the NDE issues related to composites.

He assumed the responsibility as the Head of the Division in January 2008. Dr. Madhava was an extremely pleasing and affable person with a good sense of humour. He had a natural flair for rendering complex technical details in simple language with consummate ease. His command over the english language was exceptional and this had a positive bearing on the day to day proceedings of the Division. He was the Management Representative for ISO accreditation for the Laboratory. He performed this task exceptionally well. Also, he served as DSC Member Secretary of Structures Division. He has about 95 publications for his credit. In his long tenure as the Chairman of the stores and purchase committee, he efficiently solved many issues with his cool and calm nature. His colleagues and close associates will remember him for his wit and sharp intellect. Director and staff of NAL wish him and his family a healthy, peaceful and prosperous future..

H.N.Sudheendra, G.N.Dayananda & H.V.Ramachandra, ACD

Dr. I R N Goudar

Dr. Goudar after completing his B.Sc in Physics and M.Sc in Human Physiology did his Bachelors Degree in Library and Information Science from Karnataka University. He also obtained Associateship in Documentation and Information Science from DRTC/ISI .in 1979 and his PhD in 'Library and Information Science' from Karnataka University in 2006 on ‘E-Journals Access and Management: Consortia Models for India’ a topic for which he took a big initiative at CSIR level.

He started his career as a Scientific Assistant at CFTRI, Mysore during 1977. Then he moved to L&T, Bombay for a short period of one year as Supervisor-Documentation. He served Indian Institute of Chemical Technology, Hyderabad, one of the CSIR organization for nearly 12 years as Scientist-Information. He was on deputation as Deputy Librarian at IIT, Chennai for a period of one year. Since 1992 he has been serving as Head of Information Centre (ICAST) of NAL, Bangalore.

Dr. Goudar has been bestowed with many honours and awards, notably among them are British Council Scholar during 1993 wherein he visited more than 60 institutions / libraries in England and Scotland and the prestigious Fulbright Fellowship during 1995-96 at universities of Columbia, NY (2 months) and Michigan at Ann Arbor (6 months).

Dr. Goudar conceived, planned, initiated many initiatives not only at NAL but also in a big way at both CSIR and Aerospace L&IS levels. A man with a positive vision, Dr. Goudar made very significant and notable contributions to the ICAST library more in terms of modernization and infrastructure. Under his dynamic leadership, ICAST has many ‘Firsts’ to its credit. During late 90’s he initiated the Library Automation for nearly one lakh records in a ‘mission mode’ within 10 months. It was during his tenure that web based services and quick document delivery services were initiated. He took full advantage of the advances in Information technology and Internet to develop and create Library Website and an Aerospace portal ‘AeroInfo’ with more than 50, 000 links to national and international aerospace websites The union catalog of journal holdings of all the CSIR labs. with an automated email request and the database of AIAA papers (>45,000) with browse and search features were made accessible through the library website under his leadership. The ‘Newsclip’ service covering day to day news items of interest to aerospace community and its by product ‘AeroNews; a weekly bulletin of summary of articles appeared during the week was his brainchild. It was he who extended the corporate membership scheme to companies like GEITech, GM, Honeywell, Infosys to make use of ICAST facilities, thus enhancing NAL’s ECF by 6-8 lakhs per annum. The credit of setting up of the Digital Repositories like NAL’s Institutional Repository with >3000 scholarly publications of NAL scientists and the recently initiated conferences@NAL covering the contents of conferences/seminars held at NAL goes to Dr. Goudar and his team. He is a strong advocate of the ‘Open Access Movement’ and organized a good number of events on this topic.

Dr. Goudar’s contributions at CSIR level is noteworthy. Under his dynamic leadership along with a few other CSIR Heads of L&ICs played a major role in bringing out a ‘Manual of Procedures and Practices for CSIR LICs’ (GB approved) with him as the convener. His initiative and leading the consortia movement along with NISCAR, a sister lab. in providing more than 6,000 e-journals held by leading publishers access to all the scientists of NAL is an added feathers in his cap.

He has guided and helped other CSIR labs in setting up of their Institutional Repositories.

The CSIR metadata harvesting facility holding the research output of 5 CSIR labs NAL, NCL, NIO, CDRI and IMMT) have been set up at NAL with a unified search facility under his initiative. An active member of the Aerospace Information panel of AR&DB, Dr. Goudar has come out with many innovative ideas towards the networking of all Aerospace Libraries in the country. He has served as members on the advisory board s of many national projects and academic curricula. He has delivered innumerable keynote and invited lectures at national and international level. He has been the the President of Karnataka Library Association (KALA) and an active member of Special Library Association (SLA), ILA, IASLIC etc.

Dr. Goudar was the FIRST person to have persuaded ‘Annavaru Dr. Rajkumar’ to be the chief guest at the Silver jubilee of Kannada Sangha . Thanks to you Sir!!!

Apart from the professional achievements, Dr. Goudar is a very friendly and helpful person in his personal life. Cheerful and with a smiling personality, Dr. Goudar is, no doubt, a person always sought after. His persuasive ways in encouraging youngsters to improve their educational qualification and update their knowledge has helped many youngsters in building up their career profile.

Director and we, his colleagues both at ICAST and NAL wish him a happy and an active retired life.

Poornima Narayana

Dr Uday Narayan Sinha

Dr. U. N. Sinha, retired on 31st July 2009 after working for 37 years at NAL. Dr. Sinha, the scientist, is very well known in the NAL, CSIR and the Indian scientific circles for his breadth and depth of knowledge, be it in mathematics, fluid dynamics, thermodynamics, parallel computing, atmospheric science or Sanskrit. Among his strengths are: the number of new ideas he has, constant optimism and boundless energy. He has been a source of inspiration for many of his colleagues and students. I have been fortunate to have been associated with him since 1993 and have learnt a lot. What follows is an account of Dr. Sinha's career and his contributions to NAL from my perspective. I am sure that a number of his friends who have known him for a longer time will be able to write about many other achievements and aspects of his multi-faceted personality.

Dr. Sinha obtained his engineering degree in automobile engineering in 1967 from Bhagalpur University and his PhD from IIT Kanpur in 1976. He joined NAL in 1972 when Dr Valluri invited him. It is reported that in the interview rather than being questioned, Dr. Sinha conducted a lesson to the panel members on hypersonic flows. Initially he worked in the Belur campus on many aerodynamics problems such as transonic small perturbation theory, conformal mapping, supersonic flows etc. He popularized study of advanced mathematical techniques among the scientists and also worked on gas dynamic lasers. Many colleagues would seek him out for consultation on particularly tricky equations or physical concepts. A trend which continues to this day. Some of the programs he developed during that time, on supersonic wave drag calculation became part of the NAL SOFFTS library and were also used extensively in the country's aircraft design programs.

The year 1986 was a turning point in his career. Faced with the shortage of computing resources for fluid dynamic calculations, the scientists approached Prof. Narasimha who in turn suggested that the building of a parallel computing system in-house could be a solution. This challenge was taken up by Dr. Sinha, who at that time did not know much of electronics, and the Flosolver project was born. It is creditable that Dr. Sinha and his team developed Flosolver Mk1, India's first parallel computer, within a year. It is not known to many that other parallel computer development programs in the country, such as those of CDAC, were started following the success of the NAL efforts. Since then was no looking back and Dr. Sinha led the Flosolver lab to develop many generations of parallel computing systems. The current version under development is Mk 8. Right from the time of Mk1, the focus was to develop integrated hardware-software platforms for solving fluid dynamical problems (hence the name Flosolver), and not general purpose machines.

Another significant event was in 1993, with the taking up of DST's project to parallelize a global weather prediction model which was being used by NCMRWF for operational forecasts. The NAL team was the first to complete the parallelization. It is an indicator of Dr. Sinha's vision that he did not see the work as just an exercise in computing, but the potential it offered.

He saw numerical weather prediction as a special case of computational fluid dynamics and started steering the Flosolver group towards this. After many years of working with the basic equations, various approximations, algorithms of the spectral code, the NAL team had a re-engineered GCM with which further studies could be undertaken. The integrated approach to computing also led to a new idea of how to build a communication device which would be optimal for weather prediction codes.

This concept led to the development of the NAL FloSwitch (patented). In recognition of these efforts, in 2001, a national team led by Dr. Sinha was awarded the New Millenium Indian Technology Leadership Initiative (NMITLI) project to build an integrated system for modeling the Indian monsoon.

The NMITLI project saw a quantum leap in the R&D achievements of the Flosolver Unit. Many versions of the communication hardware, (FloSwitch, FloOptiLink, Flosolver Mk6) were developed. The modeling activity included the development of the Varsha GCM: with new features such as the boundary layer scaling appropriate for the low-wind regimes which characterize the Indian sub-continent. In a break from tradition, a C version of the Varsha GCM was developed. Another new direction advocated by Dr. Sinha was multi-precision computing. To the best of our knowledge, the VarshaMP is the only global weather prediction code to have the capability to perform computations with any desired number of digits: this is important given the sensitivity of weather computing to perturbations. In 2005, Dr. Sinha took another important decision: to start making experimental forecasts with the NMITLI hardware and Varsha GCM. This ensured that the project provided value to the country as a whole. After the initial five day forecasts, he took the bold step of making one month forecasts which is against the conventional meteorological practice. It is heartening to note that the Ministry of Earth Sciences now supports the Flosolver program and the India Meteorological Department uses the NAL forecasts in its assessment of the monsoon. The story of the Flosolver programme has been described very well in the book bought out by Dr. Srinivas Bhogle.

Apart from his scientific acheivements, Dr. Sinha has many other accomplishments to his credit: building a very good book collection in the library, teaching a very large number of students, taking good care of his colleagues. His nature is such that people cannot say no to him. The series of birthday lectures by Prof. Narasimha at NAL is one such example. Other aspects of Dr. Sinha which his friends and colleagues associate with him are: Violin, Hawaii chappals, lemon tea and lots of books. Dr. Sinha is also very passionate about things he believes in. It is sheer will power which saw him lead the group through a difficult phase of the NMITLI project, following his eye surgery.

Many colleagues at NAL and elsewhere find it difficult to believe that Dr. Sinha has actually retired. It is difficult to imagine that a person who has been working so hard for all these years is no longer on the NAL rolls. He has still many dreams to fulfill and his colleagues know that he will be visiting NAL often to continue to guide the projects he started. At this juncture, we wish him all the best for another phase of his life.

T. N. Venkatesh

Dr J P Pichamuthu retires
A tribute which appeared in the Information Pasteboard

Joseph P Pichamuthu is a unique person, a gentle and dynamic personality and a warm and affectionate friend. Son of Prof C S Pichamuthu, one of India's foremost geologists, Joe had his early education in Singapore, his engineering degree from IIT Kharagpur and his Ph.D. in laser optics from the University of illinois. If NAL is known for its contributions to airport instrumentation, the credit goes squarely to him. Joe's philanthropic qualities, his compassion, his crusade to teach physics to under-privileged campus children, his contributions to the Kendriya Vidyalaya are other endearing facets of this remarkable person.

P S Gopalakrishnan

Joe was picked at NAL by Prof Ramaseshan in 1972 who wanted to build a strong laser science and technology group in the Materials Science Division. Being an optical and laser physicist-engineer, Pichamuthu quickly realised the needs of the Met Department and designed systems to measure runway visibility, issue wind shear alerts and for optical slope guidance. Joe is pleasantly-mannered, ever helpful and peerless when it comes to ready wit and the gift of repartee. I wish him the very best in the future and look forward to many more active and enjoyable years in the company of Joe Pichamuthu.

T S Kannan

If NAL is known for its contributions to airport instrumentation, the credit goes squarely to J P Pichamuthu