Preface

The year 2006-07 marks the end of the tenth five year plan and the successful completion of the CSIR Network project on Mathematical Modelling for which C-MMACS has played multiple roles: while the Scientist-in-Charge, C-MMACS was the Chairman of the CSIR Task Force on Mathematical Modelling, it played the role of the nodal laboratory in one of the sub tasks (Multi-scale Environmental Modelling) and a major participant in the other sub-task.

Several products and new results have emerged from the Network project. FINEART, a finite-element based engineering analysis software, was brought to a marketable status under the Network project. A major milestone has been the development and launching of the Industrial Fog Forecast Platform under a CSIR-Industry synergy. The Network project also saw the genesis and the development of E-Drishti the multi-scale environmental modelling platform.

The research activities under the four major research programmes: Climate and Environmental Modelling Programme (CEMP), Solid Earth Modelling Programme (SEMP), Computational Industrial Mechanics Programme (CIMP) and High Performance Computing and Networking (HPCN) have seen systematic growth both in terms of depth and coverage. In addition, C-MMACS has now a number of major projects of scientific and societal importance. These scientific programmes are supplemented by three meta-scientific activities: C-MMACS Academic Programmes (CAP), G-MMACS Knowledge Management (CKM) and Computer, Communication and Convergence (CCC). Each of the research programmes is further augmented by collaboration with national and international agencies.

In 2006-07, CEMP has seen a number of major developments. C-MMACS continues to extend the scope and outreach of its long-range, high-resolution monsoon forecasts. The post-forecast analysis of forecast of 2006 monsoon is presented here with C-MMACS' emphasis on forecast of monsoon rainfall at sufficiently high spatial resolution. Considerable expansion in scope of CEMP can be seen with research results now covering a wide spectrum of scales: from extreme rainfall events to intra-seasonal oscillations to climatic scales. In ocean bio-dynamical modeling, several improvements have been made in the coupled model based on MOM4, developed at GFDL, Princeton, USA. The simulations carried out under this activity provide fresh insights into spatio-temporal variability of pCO2, dissolved organic carbon and inorganic carbon in the upper layers of the Indian Ocean.

C-MMACS to-day is a leading organization in the country in the areas of GPS Geodesy and Seismology. The year 2006-07 for SEMP has seen a spectrum of activities in the areas of seismic data analysis, study of tectonics in the Himalayan region and applications and analysis of GPS data. Detail analysis of the Sumatra-Andaman earthquake and its effects at GPS sites over the Indian sub-continent and quantification of deformation of Gharwal and Ladakh Himalayas through GPS re-measurements are some of the highlights. The year 2006-07 has been a year of growth and expansion for HPCN both in terms of computing resource and areas of research. A substantial enhancement of C-MMACS computing platform took place through installation of the Storage Area Network (SAN). The two prominent research areas under HPCN: Network Security and Cryptography, provided new results in these important areas.

Multi-institutional, national and international collaborative research programmes have been at the core of C-MMACS' overall activities. C-MMACS to-day has active collaboration with a number of national and international institutions. The year 2006-07 has also seen a number of developments. A milestone has been

the signing of an MoU between CSIR(C-MMACS) and the Indian Air Force for collaboration in the area of weather forecasting and meso-scale observations. Similarly, the signing of an MoU with the Pondichery University and establishment of an automated weather station and CO_2 measurement facility in the campus of the university has considerably enhanced the scope of its CO_2 modelling programme. A new research programme under collaboration between CSIR and the National Science Foundation of India (NSFC) has been initiated with the ambitious plan of developing a Monsoon Asia Modelling Platform. At the national level, C-MMACS is now a major participant in a national initiative for management of hydro-meteorological disasters.

The publication record of C-MMACS continues to be good and compares favorably with the international average. In the year 2006-07, C-MMACS has published 19 articles in SCI journals. G-MMACS scientists had participated in a number of national and international scientific events. And, as usual, C-MMACS had a vibrant year with visitors (39), invited talks (23) and other knowledge activities.

In keeping with its objective of developing skill and expertise in Mathematical Modelling and Computer Simulation in the country, G-MMACS maintains an active academic programme. The year 2006-07 has been a busy year in terms of various academic activities. A number of training and exposure courses were organized for participants cutting across universities, research organizations and industries across the country. The year had also seen, as usual, a large number of students and trainees from various universities and institutions.

An important feature of C-MMACS' research programme is its strengthening outreach programme, be it in the area of monsoon forecasting, post-tsunami analysis, quick-response GPS measurements at Andaman or training; a trend we hope to strengthen and continue in the coming year. The G-MMACS' monsoon forecasts are regularly supplied to agencies like the India Meteorological Department (IMD) and the Govt. of Karnataka on request.

The year 2006-07, of course, also heralds the beginning of the 11th Five-year plan, and C-MMACS plans to play a significant role in the efforts of CSIR to contribute to the nation's progress and prosperity. In particular, C-MMACS is preparing to take up some of the critical issues like vulnerability and sustainability in the backdrop of a changing climate.

This is an excellent opportunity to thank many institutions and individuals that have helped C-MMACS to play its role effectively. In particular, we thank the Chairman and the members of the C-MMACS Advisory Council for their guidance and the R&D Planning and Development Division of CSIR for excellent support. Finally, I would like to thank Team C-MMACS and the C-MMACS Knowledge Management Group for the efforts to bring out the Annual Report.

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