

Guest Editorial

In the first year of this millennium, India has demonstrated its commitment and capability with the successful launch of geosynchronous satellite launch vehicle (GSLV), polar satellite launch vehicle (PSLV), successful flight of light combat aircraft (LCA), *Agni* and other missiles.

In comparison to advancements in the first seven decades of world aviation, there has been a major leap-frogging in aerospace technologies in the past three decades. The new generation military aircraft and missile systems incorporate design concepts and system features that are far more advanced than what has been feasible in their counterparts of just the previous generation. Unorthodox aerodynamic configuration, fly-by-wire flight control system, composite structure, glass cockpit, advanced engine, stealth features, smart weapons, etc., have added tremendously to the operational and performance capabilities of the present-day aerospace systems.

Quality engineering, that has evolved almost concurrently with the new aerospace technologies, has rendered it possible to build highly reliable aerospace systems with hitherto unknown complexity and sophistication. The techniques and tools of quality engineering in today's aerospace world include: Failure mode effect and criticality analysis, fault-tree analysis, hazard analysis, computational fluid dynamics studies, evaluation of real-time simulators and test rigs, advanced non-destructive testing methods, static and dynamics tests sweeping the entire performance and environment envelopes of the systems, etc. Design and manufacturing tools like computer-aided design and computer-aided manufacturing also contribute to the inherent quality and reliability of the systems developed. It is common knowledge that the advances made in computer capabilities have been centrally responsible for the revolutionary gains in the system technologies. Integration, verification and validation of the enormous amount of software going into the subsystems has therefore become a mandatory exercise to ensure the operational reliability of the systems under all the possible combinations of critical situations.

The first National Conference on Quality Engineering in Aerospace Technologies (QUEST'95), held in Hyderabad, on 27–28 October 1995, helped in bringing together eminent scientists, technologists, and engineers in the aerospace field to discuss interactively and appraise the challenges ahead in the furtherance of the national programmes and interests. The second National Conference (QUEST'99), held in Bangalore, on 20 and 21 August 1999, carried forward the efforts. The third National Conference (QUEST'2001), in this series organised by the Vikram Sarabhai Space Centre, Thiruvananthapuram, was held on 23 and 24 November 2001. Themes of all the three conferences like 'towards total quality and excellence', 'thrust to indigenisation and self-reliance', and 'quality through design and competitiveness' were timely and relevant to the present Indian aerospace scenario.

There has been an overwhelming response from the scientists, engineers, and the technologists working in the leading aerospace organisations like Defence Research and Development Organisation, Indian Space Research Organisation, Hindustan Aeronautics Ltd, etc. All the three conferences on Quality Engineering in Aerospace Technologies unanimously resolved and recommended the formation of the Society for Aerospace Quality and Reliability (SAQR).

The SAQR is intended as a forum for the presentation and exchange of views on quality and reliability related to aerospace design, materials and processes. The main objective of the SAQR is to advance the study in the areas of quality and reliability engineering and promote their applications with particular relevance to the needs of the aerospace industry and to disseminate knowledge pertaining to theory and application of quality and reliability engineering through QUEST conferences, newsletters and journals. Now, SAQR has been registered with the Govt of Andhra Pradesh with its Headquarters at Hyderabad.

It has been decided to bring out a Special Issue of *Defence Science Journal* (DSJ) on Aerospace Quality and Reliability - 2002 at the time of inauguration of the SAQR by Dr A Sivathanu Pillai, Distinguished Scientist and Chief Controller, Research & Development at the Defence Research and Development Laboratory, Hyderabad, on 18th October 2002.

Seven papers have been selected for inclusion in this Special Issue of DSJ. I would like to thank the organising committee of QUEST'2001 for granting permission to publish these papers. I would like to thank the authors for the special efforts made by them for making necessary changes in their original papers to make these acceptable for publication in DSJ. I wish to express my gratitude to Dr Mohinder Singh, Director, DESIDOC, Delhi, and the editorial team of DSJ in bringing out this Special Issue.

I hope that the seven papers included in this Special Issue would give the readers a glimpse of the high technology content of quality engineering and motivate the scientists, engineers, and the technologists working in the quality and reliability engineering and related technologies to enable our country to maintain a lead in the high technology areas.

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