The three papers in this session are based on work performed by three of the Project Line 2 RACE projects which continue through the final year of RACE - ICM, PREPARE, and PRISM. The papers report the valuable implementation experience the projects have gained applying the results of their own research, together with appropriate RACE and external results, to network and service management. This experience is further described below, and expanded upon in the three papers which follow. However, before summarising the papers it is worth reviewing the progression from RACE I to RACE II, and from the start of RACE II to the present day (the final RACE IS&N Conference) in order to see the papers in their proper context.

RACE I, whose main objective was “to review the options”, while constrained to a certain extent by established standards and norms, was quite free to review and use a wide range of methods and technologies. In those early days, RACE I TMN projects operated, quite rightly, as standalone projects with limited inter-dependency (though interworking was encouraged, for example though the GUIDELINE Project) and without necessarily being constrained by the need to interoperate with real network technology. This freedom was a great advantage which allowed the projects the flexibility to make good progress. The RACE I TMN projects produced very significant results, which were used as a starting point by the RACE II management projects, and with some results being incorporated in de jure and de facto standards by external bodies. The RACE I results therefore directly and indirectly influenced the RACE II projects, providing a good foundation for continued research.

RACE II, whose main objective was “to prepare for IBC deployment”, made early reference to RACE I work and to existing standards. Significantly, during the period of RACE II, external activity in the area of IBC management has accelerated, with the Network Management Forum and the ATM Forum being particularly influential towards industrial progress, while ETSI and Eurescom are influencing the Public Network Operators. Now IBC related products, particularly network level equipment, are becoming more readily available, and so the later work in RACE II and the developing and developed standards can be validated against real equipment, in a real operational context. This has obliged the projects to conform to these available technologies and reduced project’s experimental freedom. On the positive side, projects have been able to validate the relevance and performance of their
results against commercial and near-commercial technology. The three papers in this section report on different aspects of this experience.

The first paper, from the PRISM Project, describes the implementation of a telecommunications service prototype (VPN) and associated management services which have been specified according to the Services Management Reference Configuration. The implementation is achieved making use of an OSF Distributed Computing Environment (DCE) platform. The paper reports how the architecture is adapted to conform to constraints imposed by the platform.

The second paper, from the PREPARE Project, applies TMN principles to the management of ATM Virtual Paths over the European ATM Pilot network comprising a number of ATM cross-connects. The management system is constrained on the one hand by the TMN Architecture considerations (Network and Network Element levels) and on the other hand by the need to make use of commercial network management system. Further constraint is imposed by the physical network, in the form of commercial cross-connects which present standard information models to the management system.

The third paper, from the ICM Project, describes a TMN Operation System (OS) which monitors the performance achieved by a real ATM network. Again, the implemented system is constrained by TMN and network equipment standards. The OS, Performance Verification, is further constrained by the need to inter-operate with other TMN OSs, for example Routing.

As identified above, the TMN projects are becoming more and more constrained by emerging standards and by the latest equipment being deployed in the networks. This is likely to apply even more in ACTS. However, these constraints are not universal. There remain a large number of management issues which are still unresolved, where researcher's talents and imagination can be applied. Some of these, which will furnish the challenges of the future, are identified in the papers which follow. I look forward to their resolution in papers at the ACTS conferences!