In the early days of flight, there were many problems to solve just to keep aircraft flying, and
airports were simply sandy beaches or very much improvised landing strips, basically a flat and
possibly not too hard surface. Flying was an adventure and a bet for the few who had enough
money and courage to give it a try. As time passed, the flying objects became more and more
safe until some thirty years ago, when aviation became a “mass transportation system,” and more
and more people started enjoying it, either for business or for leisure. Aircraft started to fly in
almost “all weather” and airports became more and more complex interfaces between the
airborne part of the trip and the surface part.

The need to look at the sky as well as to the surrounding region obliged the one-time “landing
strip” to grow into a complex airside system, which then included the runway connected through
a more or less complicated network of taxiways to the terminal, both for passengers and for
freight. Consequently the airside of an airport needed rules to accommodate more and more
aircraft from the moment the aircraft touched down until it reached the gate, and from there to the
take off area.

Contemporarily, with a series of gates, the landside, or terminal, grew to welcome passengers,
arriving as well as departing. Terminal segregated areas were dedicated to domestic or to
International flights, checking desks, security controls, baggage recovery bays and waiting
rooms. These grew together with other services, such as shopping areas, business areas and
lounges.

So the airport, from a mere landing strip became, in many instances, a huge city with thousands
of employees and many thousands of passengers arriving and departing. Its impact on the
airborne side of the aviation system is such that congestion at a major airport may cause a
significant ripple effect both on the surrounding airports and on the normal flow of traffic in the
overall system. Also, on the terminal side, if there are congested areas, such as in the security
check, in the baggage delivery system or in the access to the airport, late departures may be
introduced, with a consequent loss of take off slots.
The idea for an “Airport Issue” of the *Air Traffic Control Quarterly* arose last year while reviewing the achievements of the last decade. These included important developments in the fields of processing, micro-electronics, data link communication and other technologies that opened the way to set up new operational concepts and new ways of operating. All airport operations, from take-off, to landing, to docking at gates, as well as all the terminal operations needed to service the aircraft, have to be seen as part of the same interactive system. Although with different importance, all contribute to the safe and smooth roll out of operations.

Actually, controllers now have the possibility of surveying and controlling the aircraft movements, receiving in real time precise information on the identification and position of the aircraft/vehicles from the electronic system. Their early and accurate appreciation of an impending dangerous situation enables a much enhanced intervention for providing timely guidance to pilots. Controllers have also the possibility of using coordinated planning tools for arrival, departure and ground movements, making it feasible to optimise the sequencing in technical and operative terms. The approaching sequence can be modified taking into account the type of aircraft, the turn around time and the occupancy of the stands, besides, of course, that of the runway.

Additionally, still in the research area, but ready for pre-implementation testing, aircraft can be equipped with tools that provide the pilots with timely, simple and precise information about any type of operations they have to perform. This new situation will also lead to a different evaluation of responsibilities between controllers and pilots.

The airport itself is being explored and scanned, both on the airside and the landside, in order to assess and quantify the benefits that can be achieved. Airport modelling is maturing and becoming more and more user-friendly. For instance, considering the changes in the aviation world due to the growing security issue, which in aviation mostly concerns airport operations, a lot has been put into place to develop more and more sophisticated tools for the analysis of airport flows, aircraft on the airside and passengers or freight on the landside. Many different lines of action have been taken to explore these areas and to bring research closer to implementation.

This issue of the *Air Traffic Control Quarterly* addresses recent progress dealing with this complex element of the Air Traffic Control system. The ideal situation might be to collect the state of the art of development and research activities encompassing the interface from en route flight to descent and runway occupation, taxiing, gate services and terminal services; that scope is too large and in too variable degrees of maturity to handle in the current context. Instead, this issue presents three papers addressing the range of variation in nature and in type of approach, to provide a broad idea of what it does mean to embark into the analysis and assessment of the airport’s operations. Future papers will continue to present ongoing work as it progresses in maturity and scope.

The first paper in this issue, on *Interaction between Runway Loading and Effective Speed of Arriving Aircraft* is a very good example of how terminal and en-route domains are closely correlated. It provides an encouraging analysis on the possibility for improving the traffic flow management. A strictly scientific analysis of data, taken at six American airports, provides an interesting theory on the flow management behaviour and its relation to runway occupancy.
Although at first sight this work may seem abstract, in a context of Collaborative Decision Making (CDM), it provides useful indications to determine the effect of alternative flow management practices.

The second paper, on Benefits of Advanced Surface Movement Guidance and Control Systems (A-SMGCS), provides a broad view on tests performed both in Europe and in the United States. The results, obtained through field trials as well as through simulation activities, provide the evidence of benefits that can be achieved using the A-SMGCS concept in terms of safe operations in all weather conditions, reduction of environmental impact and of delays. The interpretation of different A-SMGCS aspects of the concept and its implementation looking at the benefits that it can produce are a good example of flexibility and at the same time of harmonisation of operations in different scenarios and contexts.

The third paper, on Integrated Airport Performance Analysis through the use of the OPAL Platform deals with the airport system as a whole including the airside and the landside. OPAL, the Optimisation Platform for Airports including Landside, is an integrated computational platform that enables the coupled use of existing modelling tools for the airside and the landside of airports. It introduces the concept of total airport performance analysis and, ultimately, intends to provide a user friendly tool for the analysis of airport performance.

I wish all the readers to enjoy this issue that provides such a varied and intense look into the airport domain. The proposed papers are only the tip of the iceberg of the research activities related to an airport’s operations; however I am sure that the authors have proven the validity of their investigations and the need for an open minded approach to such a complex reality.

Cesare Bernabei