Improving and optimising the LoS of an airport

Developing new terminals and improving passenger experience is important – but at what cost? ACI and IATA have developed a new Level of Service (LoS) Concept that balances the need of providing good passenger experience while providing the right amount of space at an optimal cost. To explain further is Senior Manager for IATA Consulting **Jurgen Renner**, in collaboration with **Michal Wielgus**, Assistant Manager of Consulting Marketing and Business Development at IATA.

Many airports around the world are struggling with the increase in passenger traffic which is often causing significant congestion and low service levels. Passengers often experience long queues while airlines suffer from delays in the air or on the ground. As a result, airports are seeking new ways to optimise their resources and to get the most out of their investments.

In recent years, we have seen mega projects arise as part of the expansion or construction of airports around the world. Often, these projects set new investment or scale records – a trend that seems to be gaining momentum with every new project announcement. These major aviation infrastructure investments are often viewed as 'trophy projects' for incumbent governments. However, there is a strong case to question whether these projects are being properly designed in a cost efficient manner (in terms of construction and operation) while providing an optimum service level to its users.

One of the most common guides for designing or evaluating service quality within terminals is the LoS Concept initially developed in IATA's Airport Development Reference Manual (ADRM). For decades, the ADRM has

defined airport industry recommendations and guidance material pertaining to airport planning, capacity definition and design.

The ADRM 10th Edition

In 2014, IATA published a new version of the ADRM (10th Edition) – which includes a complete revision of the LoS Concept.

As part of this ADRM update, Airports Council International (ACI) and IATA collaborated in the preparation of the manual and its LoS Concept. Consequently, the content is now fully supported by both the airline and airport community.

"We hope that by joining forces with IATA and elaborating a new Level of Service philosophy we are able to help airports fully optimise their resources while minimising their investments costs, all the while improving the passenger experience as they travel through airports around the world," said Dr. Rafael Echevarne, former Director, Economics and Programme Development at ACI and now CEO of Montego Bay Airport, Jamaica.

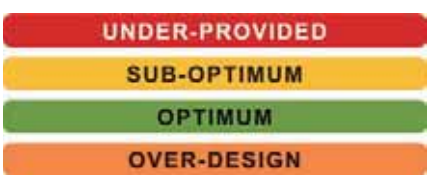

Figure 1: The six previous service levels have been narrowed down to these four elements

What is the Airport Level of Service Concept?

In essence, the LoS Concept is an aggregated guidance framework for the planning of new terminal facilities as well as for the monitoring of the operational service performance of existing facilities.

The previous LoS Concept provided six different service levels ranging from the letters A to F (see **Table 1**).

The previous LoS framework essentially specified the minimum space to be provided for each passenger within various terminal sub-systems, such as security control or baggage reclaim. The parameters typically vary from one sub-system to another. For instance, the space requirement for queuing areas at passport control is different from that for check-in.

The LoS Concept is also often used for performance comparisons to other industry-leading airports or as a benchmark that determines whether contractual obligations of airport operators and/or third-party service providers are being met (concession agreements).

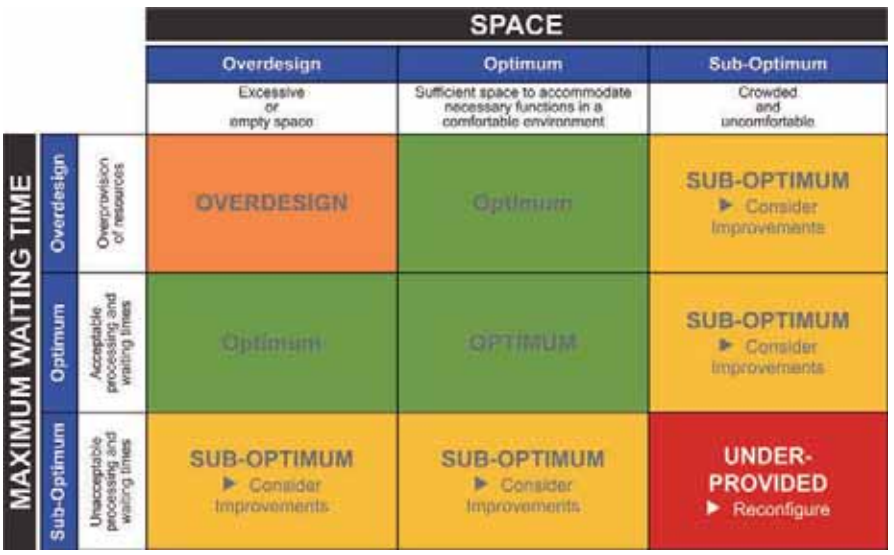

Figure 2: The new LoS philosophy

The previous Level of Service Concept and its weaknesses

IATA recommended LoS 'C' as an appropriate service level to be used for designing new facilities or for rating the operational performance of existing facilities. LoS 'C' denotes overall good service to passengers while balancing economic terminal sizing with passenger expectations. However, over the years, decision-makers have been instructing their contracted airport terminal design teams to provide passengers with an 'excellent' service level by choosing LoS 'A' as the applicable design standard, providing about 30% to 50% more space per occupant in comparison to the recommended LoS 'C'.

As aforementioned, the previous LoS Concept was primarily based on space provision. Therefore, a LoS 'A' airport actually over-provides the space necessary for passengers and results in an immense terminal facility that is effectively empty for most of its initial working life. LoS 'A' facilities are tremendously oversized during regular operational periods (off-peak), resulting in an inefficient and costly infrastructure to build, operate and maintain. Over-designed terminal sub-systems result in huge operational expenses for cleaning, air conditioning, heating, etc. which has a significant negative impact on life-cycle cost analysis. This is certainly a crucial financial factor that needs to be taken into account as aviation industry competition becomes fiercer with each passing year.

> *"IATA recommended LoS 'C' as an appropriate service level to be used for designing new facilities or for rating the operational performance of existing facilities"*

Another issue with the previous LoS concept was that not enough emphasis and clear guidance was attributed to passenger waiting time. As there was no direct link between the previous waiting time guidelines and the specific LoS categories A/B/C/D/E/F, often confusion was caused amongst users with regards to the correct applicability of the maximum waiting times as show in **Table 2** on page 50.

Table 1: Level of Service Framework

A	An Excellent Level of Service. Conditions of free flow, no delays and excellent levels of comfort.
B	High Level of Service. Conditions of stable flow, very few delays and high levels of comfort.
C	Good Level of Service. Conditions of stable flow, acceptable delays and good levels of comfort.
D	Adequate Level of Service. Conditions of unstable flow, acceptable delays for short periods of time and adequate levels of comfort.
E	Inadequate Level of Service. Conditions of unstable flow, unacceptable delays and inadequate levels of comfort.
F	Unacceptable Level of Service. Conditions of cross-flows, system breakdowns and unacceptable delays; an unacceptable level of comfort.

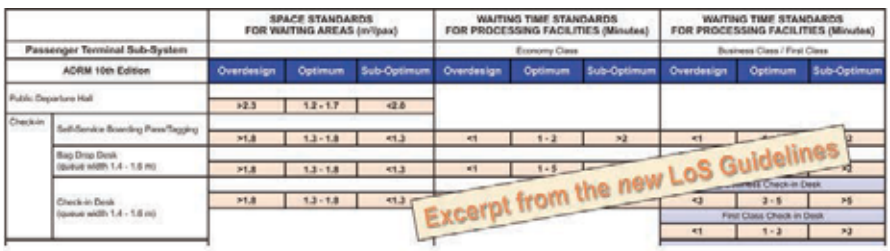

Figure 3: The recommended values for the LoS parameters

In addition, recent survey results prove that passengers actually value short waiting times much more than space – short, hassle-free journeys through a terminal with minimal delays are key factors for a great passenger experience. However, the previous LoS Concept and its focus on space provision could lead to an unbalanced configuration with a lot of free space, but also very long queues of waiting passengers.

The new Level of Service Concept

Based on these issues and latest trends, the new LoS Concept aims to optimise expenditures while increasing speed, quality and efficiency. Therefore, whereas the previous concept was primarily based only on space provision, now two important parameters jointly comprise the new LoS Concept: space *and* maximum waiting time. The new LoS is now defined by the combination of both factors, with optimum waiting times being clearly defined and considered as important as space. The concept has also been simplified: the six previous service levels have been narrowed down to only four as show in Figure 1 on page 48.

The new LoS philosophy can be reflected in a space-time matrix, integrating both elements space and maximum waiting time. As shown in Figure 2, 'Overdesign' is depicted in orange, green indicates an 'Optimum' LoS, the yellow squares represent 'Sub-Optimum' conditions and the red square indicates 'Under-Provided' requiring reconfiguration.

The recommended values for the LoS parameters are provided within the LoS Guidelines shown in Figure 3.

Figure 4: The LoS of a complete terminal is assess by its different sub-systems as shown

How to evaluate a terminal and its sub-systems?

The LoS of a complete terminal is assessed by analysing its different sub-systems, as shown in the sample airport terminal assessment in **Figure 4** on page 49. The columns show the new LoS categories and the rows show the LoS assessment results for each sub-system.

Depending on how each sub-system rates as per ADRM guidelines, it is identified as:

- **Over-Design** (over-design rating at both space and maximum waiting time)
- **Optimum** (optimum rating at both space and maximum waiting time)
- **Sub-Optimum** (sub-optimum rating at either space time or maximum waiting time)
- **Under-Provided** (sub-optimum rating at both space and maximum waiting time).

As per the general LoS philosophy, the lowest LoS of any sub-system defines the overall LoS of the whole terminal.

The overall objective of the new LoS philosophy is the provision of 'Optimum' terminal facilities, avoiding over-provision or under-provision. Terminal facilities that operate at an 'Optimum' service level provide sufficient space to accommodate all the necessary functions in a comfortable environment. They allow stable passenger flows with acceptable processing and waiting times, denote overall good service to passengers while keeping capital expenditures (CAPEX) and operational expenditures (OPEX) at reasonable levels. In essence, 'Optimum' facilities typically balance economic terminal dimensions with passenger expectations.

Table 2: Level of Service Maximum Waiting Time Guidelines (in Minutes)

	Short to acceptable	Acceptable to long
Check-in Economy	0 – 12	12 – 30
Check-in Business Class	0 – 3	3 – 5
Passport Control Inbound	0 – 7	7 – 15
Passport Control Outbound	0 – 5	5 – 10
Baggage Claim	0 – 12	12 – 18
Security	0 – 3	3 – 7

It is very important to assess the LoS during typical busy periods. IATA defines a typical busy day as the second busiest day in an average week during the peak month. This is visualised in **Figure 5**. The LoS philosophy and related busy day definition allow an airport to have a few days per year when it is acceptable that the LoS is below optimum levels. From an economic perspective, designing facilities for the busiest day of the year would be extremely inefficient and costly.

> *Undoubtedly, with the growing numbers of passengers traveling by air year after year, improving and optimising the LoS of an airport will be a growing trend as airports consistently seek to attract new airlines and passengers*

Airports are already meeting these new international standards

Airports around the world are already evaluating their facilities according to these new LoS guidelines. For instance, the operators of Amman Queen Alia International Airport (QAIA) assessed their new terminal according to the new LoS Concept.

Based on the study: *'it was determined that the airport meets international best-practices for Passenger Level of Service and for Passenger and Baggage Airport Processes. Prior to the inauguration of the new QAIA terminal in 2013, the airport was ranked internationally at 186th place in ACI's global Airport Service Quality (ASQ) Survey, the world's leading airport passenger satisfaction benchmark programme. Since then, QAIA has made considerable headway in its service and passenger satisfaction levels, ranking 38th from nearly 250 airports worldwide during 2013.'*[1]

Undoubtedly, with the growing numbers of passengers traveling by air year after year, improving and optimising the LoS of an airport will be a growing trend as airports consistently seek to attract new airlines and passengers.

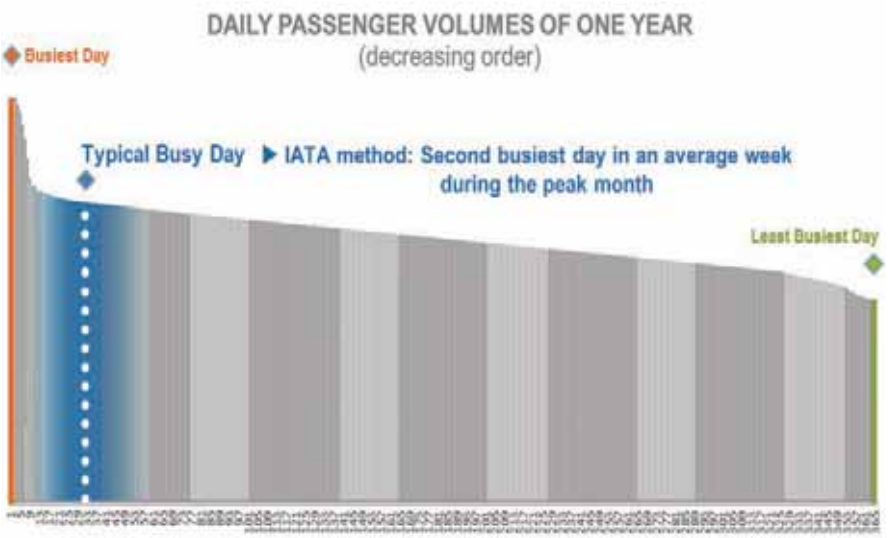

Figure 5: It is very important to assess LoS during typical busy periods

Jurgen Renner has gained comprehensive experience in the aviation business, particularly in airport development, design and management. He joined IATA Consulting in 2009. Being located at IATA's Head Office in Montreal, Canada, he currently holds the position as Senior Manager, IATA Consulting. In 2013, Jurgen was appointed as IATA's permanent member on the ICAO Aerodromes Design & Operations Panel where he provides independent technical expertise in the development and adoption of Standards and Recommended Practices (SARPs) to the ICAO Annexes and Procedures for Air Navigation Services (PANS Aerodromes). Before IATA, Jurgen worked in Germany for HOCHTIEF AirPort (HTA) as Manager for the Technical Services Department where he handled consulting projects for various international airports primarily focusing on topics such as master planning or technical design of airport infrastructure. As airport development expert, Jurgen was also actively involved in optimising HTA's existing airport assets from a technical and operational perspective (terminal expansion concepts and phasing strategies, cost-efficient infrastructure development, project implementation etc.).

Reference

1. http://www.aig.aero/en/content/aci-and-iata-report-confirms-qaia-terminal-meets-international-operational-standards