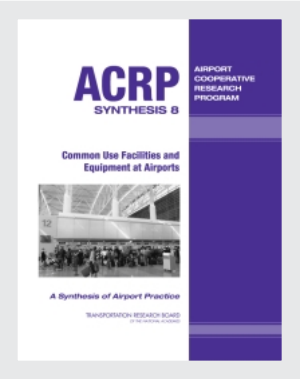

Common Use Facilities and Equipment at Airports

DETAILS

121 pages | | PAPERBACK
ISBN 978-0-309-09805-2 | DOI 10.17226/14164

AUTHORS

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AIRPORT COOPERATIVE RESEARCH PROGRAM

ACRP SYNTHESIS 8

Common Use Facilities and Equipment at Airports

A Synthesis of Airport Practice

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SUBJECT AREAS
Aviation

Research Sponsored by the Federal Aviation Administration

TRANSPORTATION RESEARCH BOARD

WASHINGTON, D.C.
2008
www.TRB.org

AIRPORT COOPERATIVE RESEARCH PROGRAM

Airports are vital national resources. They serve a key role in transportation of people and goods and in regional, national, and international commerce. They are where the nation's aviation system connects with other modes of transportation and where federal responsibility for managing and regulating air traffic operations intersects with the role of state and local governments that own and operate most airports. Research is necessary to solve common operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the airport industry. The Airport Cooperative Research Program (ACRP) serves as one of the principal means by which the airport industry can develop innovative near-term solutions to meet demands placed on it.

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The ACRP was authorized in December 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. The primary participants in the ACRP are (1) an independent governing board, the ACRP Oversight Committee (AOC), appointed by the Secretary of the U.S. Department of Transportation with representation from airport operating agencies, other stakeholders, and relevant industry organizations such as the Airports Council International-North America (ACI-NA), the American Association of Airport Executives (AAAE), the National Association of State Aviation Officials (NASAO), and the Air Transport Association (ATA) as vital links to the airport community; (2) the TRB as program manager and secretariat for the governing board; and (3) the FAA as program sponsor. In October 2005, the FAA executed a contract with the National Academies formally initiating the program.

The ACRP benefits from the cooperation and participation of airport professionals, air carriers, shippers, state and local government officials, equipment and service suppliers, other airport users, and research organizations. Each of these participants has different interests and responsibilities, and each is an integral part of this cooperative research effort.

Research problem statements for the ACRP are solicited periodically but may be submitted to the TRB by anyone at any time. It is the responsibility of the AOC to formulate the research program by identifying the highest priority projects and defining funding levels and expected products.

Once selected, each ACRP project is assigned to an expert panel, appointed by the TRB. Panels include experienced practitioners and research specialists; heavy emphasis is placed on including airport professionals, the intended users of the research products. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, ACRP project panels serve voluntarily without compensation.

Primary emphasis is placed on disseminating ACRP results to the intended end-users of the research: airport operating agencies, service providers, and suppliers. The ACRP produces a series of research reports for use by airport operators, local agencies, the FAA, and other interested parties, and industry associations may arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by airport-industry practitioners.

ACRP SYNTHESIS 8

Project 11-03, Topic S10-02
ISSN 1935-9187
ISBN 978-0-309-09805-2
Library of Congress Control Number 2008925354

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Printed in the United States of America

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ACKNOWLEDGMENTS

Special thanks are extended to Dr. Robin Sobotta for her major contributions to the common use continuum table and chart. Additional thanks are extended to members of the Topic Panel. Thanks are also extended to Frank Barich, Ted Melnik, Paul Reed, Justin Phy, Yvonne Esparza, and Theresa Belliotti for their editing and content updates. Thanks to Alexandra, Mykenzie, Courtney, Gabriella, and Lyndsee. Special thanks also to San Francisco Airport, Las Vegas Airport, and JFK Terminal 4 for providing images of their airports for inclusion in this paper.

FOREWORD

By Gail Staba
Senior Program Officer
Transportation
Research Board

Airport operators, service providers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to the airport industry. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire airport community, the Airport Cooperative Research Program authorized the Transportation Research Board to undertake a continuing project. This project, ACRP Project 11-03, "Synthesis of Information Related to Airport Practices," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an ACRP report series, *Synthesis of Airport Practice.*

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This synthesis study is intended to inform airport operators, stakeholders, and policy makers about common use technology that enables an airport operator to take space that has previously been exclusive to a single airline and make it available for use by multiple airlines and their passengers.

Common use is a fundamental shift in the philosophy of airport space utilization. It allows the airport operator to use existing space more efficiently, thus increasing the capacity of the airport without necessarily constructing new gates, concourses, terminals, or check-in counters. Common use, while not new to the airlines, is a little employed tactic in domestic terminals in the United States airport industry.

This synthesis was prepared to help airport operators, airlines, and other interested parties gain an understanding of the progressive path of implementing common use, noted as the common use continuum. This synthesis serves as a good place to begin learning about the state of common use throughout the world and the knowledge currently available and how it is currently employed in the United States. It identifies advantages and disadvantages to airports and airlines, and touches on the effects of common use on the passenger. This synthesis attempts to present the views of both airlines and airports so that a complete picture of the effects of common use can be gathered.

The information for the synthesis was gathered through a search of existing literature, results from surveys sent to airport operators and airlines, and through interviews conducted with airport operators and airlines.

Rick Belliotti, Barich, Inc., Chandler, Arizona, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

CONTENTS

COMMON USE FACILITIES AND EQUIPMENT AT AIRPORTS

SUMMARY

Airport operators and airlines are trying to balance growth and costs. This search for balance has caused airlines to consider carefully how changes at airports affect the airlines' overall expenses. It has also encouraged airport operators to find alternative ways to facilitate growth and competition, while keeping the overall charges to the airlines as low as possible. The entry of many new low-cost carriers has also highlighted the need to keep costs down at airports. One opportunity that airport operators around the world are seizing is the implementation of common use. Common use technology enables an airport operator to take space that was previously assigned exclusively to a single airline and make it available for use by multiple airlines and their passengers.

Common use is a fundamental shift in the philosophy of airport space utilization. It allows the airport operator to use existing space more efficiently, thus increasing airport capacity without necessarily constructing new gates, concourses, terminals, or check-in counters. In the construction of new gates, concourses, terminals, or check-in counters, it has been determined by de Neufville and Belin that the deployment of a common use strategy can help an airport save up to 30% of the costs of such new construction. Common use, although not new to the airline industry, is a seldom-employed tactic in domestic airline terminals in the United States.

This synthesis was prepared to help airport operators, airlines, and other interested parties gain an understanding of the progressive path of implementing common use, noted as the "common use continuum." It serves as an introduction to the state of common use throughout the world, reviews the knowledge currently available, and provides examples of how it is currently employed in the United States. The report identifies advantages and disadvantages of common use to airports and airlines, and touches on how common use affects the airline passenger. It also presents seven case studies of real-world experiences with common use. This synthesis presents the views of both airlines and airports so that a complete picture of the effects of common use can be determined.

Information for this synthesis was gathered through a search of existing literature, surveys sent to airport operators and airlines, and through interviews conducted with airport operators and airlines. Because the common use continuum is an ever-changing concept and practice, the literature search generally was restricted to information less than seven years old. Resources used in conducting the literature search included industry organizations [International Air Transport Association (IATA), ATA, ACI-NA], Internet and web searches, and vendor documents.

In conjunction with the literature search, surveys were sent to a broad sample of airports, including European, Asian, and North American airports. The airports selected had varying experiences with common use so as to gain an accurate picture of the state of common use throughout the industry. Surveys were also sent to airlines from the same regions and with the same varying experiences with common use. A total of 13 airlines and 24 airports were invited to complete the surveys; with survey responses received from 12 airlines and 20 airports, an overall response rate of 86%.

The survey responses confirmed that airports outside of the United States have progressed further along the common use continuum. This affects U.S. airlines that fly to destinations outside the United States, because they have to operate in airports that are already moving along the common use continuum.

Interviews were conducted with representatives from airlines and airports that have implemented common use in some fashion. The airlines interviewed included Alaska Airlines, American Airlines, British Airways, and Lufthansa Airlines. The airports interviewed included Amsterdam Airport Schiphol, Las Vegas McCarran, and Frankfurt International Airport. Interviews were also conducted at Salt Lake City Airport because it had previously considered, but chose not to implement, common use.

The information acquired was processed and is presented in this synthesis. From the information, the following conclusions were drawn:

- Industry-Wide Importance and Benefit of the Common Use Continuum

  Common use is of a growing interest to airports and airlines. Although the literature and available recorded knowledge are limited, common use is an important field and has a great impact on the airport and airline community. U.S. airport operators and airlines have an opportunity to benefit from the implementation of common use technology. Airport operators gain by using their space more efficiently, expanding the capacity of the airport, providing for greater competition, being more flexible in the use of the space, and creating an environment that is easier to maintain. Airlines gain greater flexibility in changing schedules (either increasing or decreasing service) and greater ease in accommodating failed gate equipment or other disruptive operational activities, such as construction; acquire the opportunity to lower costs; and potentially obtain a lower cost of entry into a new market. The converse is also true, in that if a common use implementation is poorly planned and implemented, airport operators and airlines stand to lose.

  Passengers also recognize the benefits of common use. When an airport operator moves along the common use continuum, the passenger experience can be greatly enhanced. Common use enables airport operators and airlines to move the check-in process farther from the airport, thus allowing passengers to perform at least part of the check-in process remotely, sometimes at off-site terminals. In some cases, the passenger can complete the check-in process, including baggage check, before ever entering the airport. This allows passengers to travel more easily, without the need to carry their baggage.

  It also allows the passenger to have a more leisurely trip to the airport and to enjoy their travels a little longer, without the stress of having to manage their luggage. Passengers arriving at an airport that has implemented common use have more time available to get to their gate and may not feel as rushed and frustrated by the traveling experience.

  Passengers also benefit because space utilization can be optimized as necessary to accommodate their needs. In today's environment, air carriers often increase their schedules very dynamically. With dynamic changes, passengers can suffer by being placed into waiting areas that are too small and/or occupied, and by having to cope with concessions, restroom facilities, and stores that are unable to accommodate the increased demand. Through common use, the airport operator is able to adjust airport space dynamically to help accommodate passenger needs. This creates a positive experience for the passenger, and results in a positive image of both the airport and the airline. This positive experience can lead to recognition and increased business for the airlines and the airport operators.

- Lack of Information Resources

  Throughout this process, it has become evident that the lack of resources available to educate interested parties leads to their gaining knowledge about the benefits of common use through site-specific experience—an inefficient way of learning about this industry "best practice." There is a significant amount of "tribal" knowledge throughout a portion of the industry; however, it has not been formally gathered and evaluated for industry-wide consumption. Most of the existing documented sources consist of vendor-provided marketing materials. Although the key concepts of common use may be gleaned from these documents, they do not present a balanced, unbiased picture of the common use continuum to assist stakeholders in learning about common use. Unlike some topics, there was no central place to go to learn about the topic of common use. Information available from industry organizations, such as IATA, is provided at a very high level or is not freely available.

- Need for Careful Planning and Open Communication

  It is important that any movement along the common use continuum be carefully considered so that the benefits and concerns of all parties are addressed. Airport operators must consider whether or not common use would be appropriate at their airport. If the airport has only one or two dominant carriers, it may not make sense to move too far along the common use continuum. If common use were to become widely adopted throughout the United States, however, more of the "dominant" carriers at many locations would be inclined to work in a common use environment. In essence, this is a "Catch-22" situation, where the wide acceptance of common use technology is somewhat dependent on it being widely accepted. Airports and airlines must work closely together during the design of the common use strategy at each airport operator's location to ensure that the passengers receive the benefit of the effort.

  It is the airline that brings the customer to the airport, but it is the airport that is necessary for the airline to operate in a given market. Both airlines and airport operators must move toward working together cooperatively for the benefit of their mutual customer.

  It is important for both airlines and airport operators to communicate openly and honestly when introducing common use. If airport operators include airlines, ground handlers, and other stakeholders in the design process, then all interested parties are able to affect the outcome of the strategy, usually for the better. In addition, the airport operators should make an extra effort to ensure that airline participation is facilitated. Having tools that facilitate remote meetings along with face-to-face meetings is one way to allow the inclusion of airline staff. Airlines, likewise, need to make a commitment to participate in the process. When an airport operator moves along the common use continuum, it is in the best interest of the airline to participate in the design. In many cases, the airport operator will move forward without the input of the airlines, if the airlines refuse to participate.

- Understanding of the Airlines' Resistance to the Common Use Continuum

  In general, U.S. airlines have a skeptical view of common use for many reasons. As will be shown in the body of this synthesis, when a non-U.S. airport operator views common use as a profit center, the airlines are not inclined to favor the initiative.

  Also, when airport operators move along the common use continuum without the input of the airlines currently serving that airport there is distrust in their motivation and also a concern that the strategy will not support the airlines' business processes put in

place to support their passengers. The converse is also true, in that the airlines must support the airport operators in their common use implementation strategy to ensure the airports achieve maximum benefit from the common use implementation.

The common use continuum continues to be of interest to airports and airlines as both ACI–NA and IATA are at the forefront, creating the standards and recommended practices governing the common use continuum.

Through further development, experience, and knowledge of the common use continuum, the airport and airline industry can jointly discover new ways to accommodate growth and competition.

CHAPTER ONE

INTRODUCTION

BACKGROUND

The U.S. air travel industry is undergoing a period of economization to remain competitive and solvent. As a result, airlines and airport operators are working together to reduce costs and make air travel more efficient. At the same time, the air travel industry continues to look for ways to improve customer service, the customer experience, and to speed up the passenger processing flow.

Concurrent with the airlines seeking to economize to reduce their operating costs is that airport operators across the United States are regaining control of their airport resources (i.e., terminals, gates, etc.) through the expiration of long-term leases, and sometimes by airlines ceasing or dramatically reducing operations at the airport operators' locations. This has caused U.S. airport operators to reevaluate the business model used to work with airlines to ensure the local needs of the cities being served are met, as well as the needs of the airlines.

One solution with the potential for addressing these needed areas of improvement is the implementation of common use. Common use enables an airport operator to take space that has previously been exclusive to a single airline and make it available for use by multiple airlines. These spaces include ticketing areas, gate hold rooms, gates, curbside areas, loading bridges, apron areas, and club spaces. Common use provides airports and airlines with the ability to better manage operations in the passenger processing environment, improving passenger flow and ultimately reducing overall costs. However, even with more than two decades of implementation history, the benefits of common use are still not adequately catalogued.

Common use may also include any space that is used or can be used to provide a service to the passenger. In this way, parking lots, baggage claim areas, and passageways can be considered common use. Common use also affects physical plant facilities such as preconditioned air and power. Other systems typically affected include ticketing, kiosks, baggage systems, check-in, next-generation check-in, and telephony. Airport common use systems also are increasingly being employed in cruise ship terminals, hotels, ground transportation, and other nonairport environments.

PURPOSE

The objective of this synthesis is to provide a document that consolidates information on common use for airports in a single source. This report therefore functions as a good starting point in the understanding of common use. It is intended that this synthesis be presented to all stakeholders, including airlines, airport operators, passengers, government entities, vendors, and ground handlers.

The synthesis assembles literature and survey information on the effect of common use on airport and airline finances, technology, operations, facilities, and business and policy decisions. Common use information is synthesized from the perspectives of passenger processing, ground handling, and technology infrastructure. The synthesis should leave the reader with a better understanding of common use and the expected risks, rewards, and issues that may exist.

SCOPE

This synthesis presents the research conducted with airports, relevant committees, airlines, and applicable vendors on their collective experience with current and planned common use strategies. Throughout the document, the synthesis draws from both actual experiences to date, as well as from known future developments.

Collection of information was through the following resources:

- Existing knowledge source research:
  - Objective literature from international and domestic locations on facilities and practices (whether or not common use is in place);
  - Aviation industry emerging standards;
  - Airline literature;
  - International Air Transport Association's (IATA's) Simplifying the Business surveys, initiatives, and articles; and
  - Applicable vendor literature.
- Airline and airport surveys (conducted in coordination with this synthesis).
- Interviews with airport operators and airlines representing different aspects of common use implementation.

DATA COLLECTION

Data for this synthesis were collected in the following ways. First, a thorough literature search was conducted to determine the scope of available information. This search revealed that whereas journal articles and documentation exists, it is not abundant—highlighting the relative lack of information on this topic industry-wide. Of the documentation found through the literature search, it was noted that many of the same people were interviewed for inclusion in the articles.

An Internet search was also conducted, which revealed a limited amount of available information on common use. Most of the information available was provided by vendors in the form of marketing material. Although information can be gleaned from these documents, they do not present a balanced, unbiased picture of common use strategies to assist stakeholders in the learning process. Unlike some topics, there was no central place to go to study the topic of common use. Information available from industry organizations, such as IATA, is provided at a very high level or is not freely available.

Information was also obtained from IATA, vendors who provide common use solutions, and airlines and airports that have implemented these solutions. This information was primarily focused on CUTE (Common Use Terminal Equipment) and CUSS (Common Use Self-Service) installations (discussed further later in this synthesis). A spreadsheet containing the information acquired is contained in Appendix A. The researchers verified the data contained in this spreadsheet to confirm their accuracy; however, as time progresses, the data will become stale, and ultimately irrelevant.

Additional information was gathered through interviews, conversations, and experience. Although this synthesis does not formalize the collection of this interview information, primary use of the knowledge gathered is found in chapters two through five.

Surveys were also conducted to find out the state of the industry, both in implementation and understanding of common use strategies. Full survey results can be found in Appendix D. The survey results are analyzed later in this document. Separate surveys were sent to airlines and to airports. This was done primarily because the perspective of each is different, and therefore warranted different questions.

DOCUMENT ORGANIZATION

Chapter one contains the background information required to set the basis for the remaining chapters. Chapter two uses the information gathered through the existing knowledge sources noted in chapter one and presents the general progression for implementing common use. This is noted as the "common use continuum." This chapter discusses the various systems and technologies typically associated with common use. To support its case, the synthesis references specific industry documentation or "expert knowledge" sources where applicable. Chapter three presents information on the perceived advantages and disadvantages of common use from airline, airport, and passenger perspectives. As with chapter two, this chapter presents its findings from information gathered through the existing knowledge sources noted in chapter one. Chapters four and five build on the information presented in chapters two and three and reviews business and operational practices affected by common use. These chapters further discuss modifications needed to implement common use from both the airline and the airport perspectives. Chapter six presents seven case studies representing different aspects of "real-world" common use implementations. Further information on the case studies and the interview process is included in the appendices. Chapter seven presents airport considerations for common use implementations. Chapter eight provides the results and analysis of a survey conducted as part of the synthesis. Chapter nine summarizes the findings and presents suggestions for further study.

Appendices are included where needed for supporting documentation and are noted throughout this synthesis.

CHAPTER TWO

COMMON USE CONTINUUM

Airport operators and airlines are continually looking for opportunities to be more efficient and at the same time improve the customer experience. In this search for efficiency, every aspect of the business model is reviewed, analyzed, and inspected to determine if there are better ways to provide a more streamlined travel experience at a lower cost and a higher profit. It is at the airport where the goals of airports and airlines meet. Airlines may be looking to increase or decrease the number of flights to a given market, change seasonal flight schedules to meet demand, or adjust their fleet based on the requirements of a given market. Airport operators, on the other hand, are looking for ways to improve and ensure the continuity of the service provided to their region by adding flights, adding additional airlines, and maximizing the use of their facilities.

One key factor in any decision making is the cost of doing business in a given market. "Airport operators are constantly challenged by the dual objective of needing to maximize limited resources while providing a passenger-friendly experience" (Finn 2005). Because of these contradictory factors, airport operators are challenged with increasing their passenger throughput while minimizing their capital expenditures and construction. One effective way to reduce capital expenditures is to develop programs to utilize existing space more efficiently so that capital expenditures end up being deferred. It has also been shown that once capital expenditures are incurred for new construction of a gate, concourse, or terminal, these costs can be reduced by as much as 30% if a common use strategy is used in the design (de Neufville and Belin 2002).

The concept of the common use continuum, as shown in Figure 1, indicates that airport operators can gain centralized control over facilities and technology, increase passenger processing options, and acquire shared use efficiencies as they move from exclusive use toward common use. Conversely, airline tenants in an exclusive use arrangement retain a level of tenant autonomy over their physical space. Airport common usable space is defined as space in which any airline may operate and, as space that is not specifically dedicated to any single airline. As shown in Figure 1, it is highly unlikely that any airport with more than one airline servicing it does not provide some level of common use. Table 1 defines several airport management models on the common use continuum, shows key differences and benefits of each, differences in common use locations, and their impact on key stakeholders (e.g., airlines, passengers, and airport operators).

All airports begin with a basic level of common use. Based on interviews, once an airport facility moves beyond the basic level, the airport operator, airlines, and passengers begin to see additional benefits with common use. Beyond the basic level, however, there is an inherent lag-time between when an airport is capable of a common use model and when they choose to implement that common use model. As explained in chapter seven, there may be operational and business considerations that have to be identified before moving along the common use continuum.

EXCLUSIVE USE MODEL

At one end of the common use continuum is the exclusive use model. This model defines all airline-specific space as used exclusively by a given airline. In this model, each airline has dedicated ticketing counters, gates, office space, ramp space, etc. Airlines have traditionally favored this model because it gives them the most direct control over their flight schedule and operations. The airline provides gate management and other specialty applications to ensure efficient operations within the airline's allotted space. To add flights, the airline must have space available at its gates or be able to acquire additional gates at the airport.

In the exclusive use model, airlines pay for the space, even if the airline is not using that space. Airport operators therefore reap the benefit of having space leased whether it is actively used or not. Another benefit for the airport operator is that management of space is minimal. In the exclusive use model, airport operators only manage their airport usage based on airline and total number of gates used exclusively by those airlines.

Airports, however, do not achieve maximum utilization in the overall use of the facility, especially if the airlines that service that airport do not have fully loaded schedules.

There will be obvious times of day when concourses will be crowded, with many flights arriving and departing at the same time, as well as times when the concourses are completely empty. The airport operator has few options available to manage the peaks and valleys in the demand effectively over the course of a day.

As more flight services are added within peak time periods in the airport, the airport operator must add more gates and/or counter space. Once the airport operator is physically

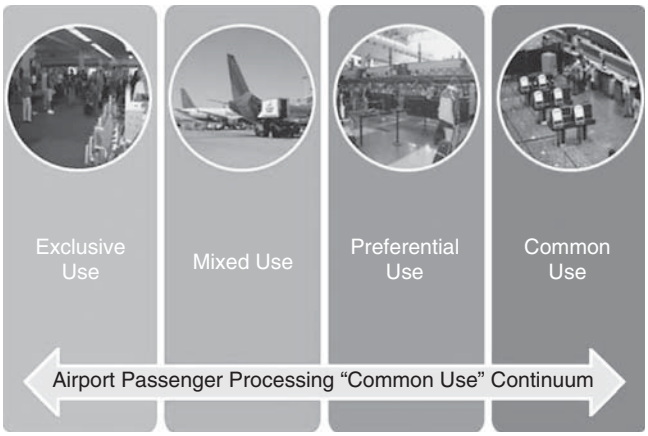


FIGURE 1 Common use continuum.

unable to add more gates, the growth of service to that airport stops. Likewise, as airlines add more flights into their schedule to a specific market, they must manage these flights based on the physical limitations of the exclusive space leased. At some point, the only way to add new flights or new airlines under the exclusive use model is to remove other services or wait until another airline relinquishes space.

In the exclusive use model, passengers are affected by the peaks and valleys caused by the flight schedules of the various airlines. In all areas of the airport, a peak demand of flights is the root cause of congestion. "Passengers are eager to reduce the time spent 'processing'" (Behan 2006). To the passenger, the airport is not the destination, but merely a point along a journey. The goal should be to move passengers through that point as expeditiously as possible. The exclusive use model may be a reasonable choice for airports that do not have a large number of airlines servicing the airport. If the airport has one or two dominant carriers, or if a particular terminal within an airport is dominated by a few carriers, the airport operator may choose not to implement common use. If the airport is not required to complete a competition plan, or is not planning to add additional airlines, then a traditional exclusive use model will probably remain and limited common use strategies and technologies may be implemented instead. For instance, for a hub airport, where 60% or more of the airport usage is dominated by one airline (e.g., Salt Lake City International Airport), a common use strategy may not make sense. The remaining 40% (or less) of airport capacity, however, may represent an excellent opportunity for common use implementation, because the remaining 40% of the gates may be in high demand. As will be discussed later, these "hub" airport operators need to consider all potential scenarios that could result if one of their dominant airlines ceased operations, or declared bankruptcy, necessitating drastic changes in its operations.

FULL COMMON USE MODEL

At the other end of the common use continuum is the full common use model. In this model, all airline usable airport space is available for use by any airline. The goal of the full common use model is to minimize the amount of time any given airline resource is not in use, as well as maximize the full use of the airport. Airports benefit from increased utilization of existing resources. In a full common use airport, airlines are assigned with no preferences given to any individual airline, similar to the air traffic control process. For example, each aircraft is put in the queue and assigned to a gate that best fits the needs of the airport gate management process. Technology plays a key role in the full common use model. To manage resources properly, computer software and systems are put in place to perform complex calculations, monitor usage, and provide status reporting. There are no dedicated spaces in a full common use airport. All resources are managed very closely by the airport operator, and the result is an efficient use of limited resources.

Airlines are less comfortable with this model because it removes direct control over their gate assignments within the market. The benefit of this model to the airlines, however, is more flexibility. Gates and ticket counters that were once exclusively held by a competing airline 24 hours a day, 7 days a week now become available for everyone's use.

Airlines can enter markets, expand in markets, and even exit markets much easier under this model because the lease changes from exclusive to common use. Although there are many models for leasing, airlines begin paying for only the portion of the airport used. In addition, there are more options available to airlines should a flight be delayed. The airline no longer has to wait for one of its exclusive gates to become available; the flight can be assigned to any available open gate. A common use airport allows "...carriers to focus on what they do best: moving passengers from one destination to another" (Guitjens 2006).

Airport operators must manage airport space at a more detailed level under the full common use model. The airport operator takes on full responsibility for the common use infrastructure; any service that is space-specific must now be viewed as common use. For example, jet bridges are now purchased and maintained by the airport operator. Again, technology plays a large role in allowing this to take place. As with space-specific resources, the common use terminal equipment (CUTE) systems and hardware also become the airport operator's responsibility, except in the cases of CUTE Local User Boards (CLUB) models. Airports benefit from increased utilization of existing resources. A CUTE CLUB is a system in which the airlines make the decisions on how the CUTE system will be paid for, operated, and maintained, for the benefit of all the CUTE CLUB members. Under this scenario, the airport operator does not usually own the CUTE system. In the United States this model is sometimes modified, where maintenance of the common use system is under a "CUTE CLUB" type model, while the airport retains ownership of the assets.

The passengers' experience in the full common use model is improved as they flow through the process of enplaning or

TABLE 1
COMMON USE CONTINUUM

Models	Exclusive Use (EU)	Mixed Use (MU)	Preferential Use (PU)	(Full) Common Use (CU)
Approach	Passenger Processing Facilities (PPFs), technology, and agreements are predominately owned/leased and operated by singular users.	Some investment and conversion to CU PPF technology and systems. CU equipment may be installed but not implemented, pending renegotiation.	Substantial investment and conversion to CU technology and systems. PU agreements are established, allowing select tenants priority over space under specific terms.	Complete commitment to CU equipment, systems, and agreements. (Few or no EU or PU agreements.) CU may extend beyond terminal curbs and walls (to ramps and other facilities).
Common Use Locations	Some baggage claim devices, paging systems, access control, building systems, etc.	CUTE in new/remodeled areas, international gates/jet bridges, CCTV, CUSS, remote check-in/out, information displays, etc.	CUTE at all PPFs, including ticket counters and in gate management. Extensive computer/phone system hard/software acquisition and integration.	CU may extend to ramp area: gate management, ground handling (GH), and other airport and non-airport areas.
Stakeholders	EU tends to:	MU tends to:	PU tends to:	CU tends to:
Airports	• Create underutilized spaces • Deter new air service entrants • Help to ensure air service continuation by some existing airlines in precarious markets	• Increase efficient use of selected underutilized spaces • Reduce space expansion needs • Prompt renegotiation of existing agreements • Familiarize tenants with CU	• Increase efficient use of underutilized spaces • Reduce future expansion needs/costs • Increase technology costs/expenditures • Offer more consistency for users than MU • Require staff/vendor for CU maintenance and IT functions. (Assume risks with outages.)	• Maximize efficient use of space and technology • Require high initial technology investment, but result in longer term per passenger savings • Reduce future expansion needs/costs • Allow increased access to new entrants • Require staff/vendor for GH functions
Passengers	• Be relatively uncomplicated and allow ease in way-finding • Limit PPF choices	• Increase PPF choices • Complicate way-finding, if not consistently used	• Increase PPF choices • Offer elevated tenant consistency, which supports way-finding	• Increase PPF choices • Support way-finding if coupled with effective dynamic signage
Tenant/Airline	• Offer high tenant autonomy and perception of control ” • Support traditional branding of physical spaces • Allow use of existing company equipment/programs, so no retraining/learning curve • Limit access to competitors	• Lessen tenant autonomy • Lessen opportunity for traditional branding of spaces • Require CU technology training (learning curve) • Allow some increased access and cost benefits • Create delays in transactions attempted on CU equipment	• Lessen tenant autonomy • Prompt branding concerns, unless addressed with dynamic signage • Require CU technical training (learning curve) • Create dependence on non-airline personnel (for CU system maintenance) • Provide space for emergencies and new service • Allow for cost savings when underutilized spaces are released	• Lessen tenant autonomy • Prompt branding concerns, unless addressed with dynamic signage • Require CU technical training (learning curve • Additionally create dependence on non-airline personnel for ground handling • Provide space for emergencies and new service • Allow for cost savings when underutilized spaces are released

CUTE = common use terminal equipment; CCTV = closed-circuit television; CUSS = common use self-service; IT = information technology.

deplaning. This improvement is the result of more efficient flow through the airport. Because the overall airport space is used more efficiently, congestion, queues, and general crowding can be better managed and peaks in flight schedules can be spread across the airport more efficiently. Common use implementation can lead to satisfied customers and result in awards to airports and airlines for improved customer service, such as the Las Vegas McCarran International Airport's 2006 J.D. Power & Associates award for customer service (Ingalls 2007).

As will be discussed later in this document, there are challenges, concerns, and risks involved with implementing common use. Airport operators surveyed and interviewed for this report indicated that often, airlines are not always willing to make the change from proprietary, exclusive space, to some other step along the common use continuum. As shown in Table 1, as airport operators move their airports along the common use continuum, airlines perceive a loss of autonomy and control over their operations.

COMMON USE TECHNOLOGY

The role of technology is critical in implementing common use because the processes needed to manage a common use environment are complex. Technology systems can include:

- Networking—both wired and wireless,
- Passenger paging systems—both audible and visual,
- Telephone systems,
- Multi-User Flight Information Display Systems (MUFIDS) (see Figure 2),
- Multi-User Baggage Information Display Systems (MUBIDS),
- Resource and gate management,
- Common use terminal equipment (CUTE),
- Common use self-service kiosks (CUSS),
- Local departure control systems (LDCS),
- Airport operational database (AODB),
- Common use baggage sorting systems, and
- Baggage reconciliation.

FIGURE 2 Multi-user flight information display systems (MUFIDS).

Although this list is not exhaustive, it does demonstrate the impact that technology has on making an airport common use.

Common use technology implementation requires coordination among several entities, which ultimately become partners in this endeavor. These partners include the platform provider, the entity that provides the technology and the hardware; the application provider, the entity that provides the computer applications that operate on the technology and the hardware; and the service provider, the entity that provides first- and second-level support for the technology. These partners, together with the airport operator and the airlines, must cooperate to make any common use technology implementation successful (Gesell and Sobotta 2007).

Wired and wireless networks, often referred to as premises distribution systems (PDS), are the backbones of all other technology systems. The PDS provides a way for technology systems to be interconnected throughout the airport campus and, if necessary, to the outside world.

Although a PDS is not necessary in a common use environment, it is does allow for the management of another finite resource—the space behind the walls, under the floors, in the ceilings, and in roadways.

Passenger paging systems are those systems used to communicate information to the passenger. Traditionally, this system was the "white paging phone" and the audio system required to broadcast messages throughout the airport. These systems are installed inside buildings in almost all passenger areas, and used by the airport staff, airlines, and public authorities. Today, these systems are expanding to include a visual paging component for those who are deaf or hard of hearing.

MUFIDS are dynamic displays of airport-wide flight information. These consolidated flight information displays enable passengers to quickly locate flight information and continue on their journey (see Figure 2). MUBIDS are dynamic displays capable of displaying arriving baggage carousel information for more than one airline. MUFIDS, MUBIDS, and a resource management system should interact with a central AODB to aid and complement the most efficient utilization of an airport common use system. Implementation of multi-user displays manages the space required to communicate flight information.

Resource and gate management systems allow the airport operator to effectively manage the assignment of gates and associated passenger processing resources to airlines. These

systems operate on complex algorithms to take into account information such as preferential gate assignments, altered flight schedules, size of aircraft, and other factors that affect the airline use of gates. Such systems may tie into accounting and invoicing systems to assist the airport operator with airline financial requirements.

CUTE systems allow an airport to make gates and ticket counters common use. These systems are known as "agent-facing" systems, because they are used by the airline agents to manage the passenger check-in and boarding process. Whenever an airline agent logs onto the CUTE system, the terminal is reconfigured and connected to the airline's host system. From an agent's point of view, the agent is now working within his or her airline's information technology (IT) network. CUTE was first implemented in 1984 for the Los Angeles Summer Olympic Games (Finn 2005). It was at this point that IATA first created the recommended practice (RP) 1797 defining CUTE. It should be noted that ATA does not have a similar standard for common use. From 1984 until the present, approximately 400 airports worldwide have installed some level of CUTE.

Since 1984, several system providers have developed systems that, owing to the vagueness of the original CUTE RP, operate differently and impose differing airline system modifications and requirements. This has been problematic for the airlines, which must make their software and operational model conform with each individual, unique system. Making these modifications for compatibility's sake has been a burden for the airlines.

As a result, IATA is currently developing a new standard of RPs for common use systems called "common use passenger processing systems" (CUPPS). The updated RP was expected to gain approval at the fall 2007 Joint Passenger Services Conference (JPSC), conducted jointly by ATA and IATA. Subsequent IATA plans are that the CUPPS RP will fully replace the current CUTE RP in 2008. This action will eliminate airline concerns about continuing system compatibility to manage multiple system/vendor compatibility.

In addition to IATA, the CUPPS RP is to be adopted by ATA (RP 30.201) and ACI (RP 500A07), giving the RP industry-wide endorsement. The Common Use Self-Service (CUSS) Management Group is monitoring the progress of the CUPPS committee to assess future migration with CUPPS.

"CUSS is the standard for multiple airlines to provide a check-in application for use by passengers on a single [kiosk] device" (*Simplifying the Business Common Use Self Service* 2006). CUSS devices run multiple airlines' check-in applications, relocating the check-in process away from traditional check-in counters. Passengers can check in and print boarding passes for flights in places that heretofore were unavailable. Examples include parking garages, rental car centers, and even off-site locations such as hotels and convention centers. The CUSS RP was first published by IATA in 2003 (Behan 2006) (see Figure 3 for a display of CUSS kiosks).

FIGURE 3 Common use self-service kiosks.

LDCSs are stand-alone check-in and boarding systems. These systems allow airlines that do not own or have access to a host-based departure control system (e.g., seasonal charter operators) to perform electronic check-in and boarding procedures at the gate. Without an LDCS, airlines that do not have access to a departure control system must board passengers through a manual process.

AODBs are the data storage backbone of a common use strategy. These databases enable all of the technology components of a common use environment to share data. The AODB facilitates integration between otherwise disparate systems and enables data analysis and reporting to be completed on various components of the common use system. These databases also help in the calculation of charges for airport operators. Baggage recognition systems provide the necessary components to track bags and ensure that they reach their intended aircraft.

Baggage reconciliation systems provide positive bag matching, baggage tracking, and reporting functionality. As airports move along the common use continuum, common baggage systems, and eventually common baggage drop locations, will necessitate the need for baggage reconciliation systems.

STATE OF AIRPORTS ALONG THE CONTINUUM

Common use acceptance and implementation differ dramatically between U.S-based airports and non-U.S-based airports. Much of this relates to the geography of the countries, as well as to the history of how airports were founded in the United States versus other countries. In Europe, for example, the close proximity of multiple countries makes the

majority of flights international. Because these airports support more international flights, they have been more disposed to implementing common use. Historically, airports in the United States were developed in conjunction with a flagship carrier. These relationships resulted in long leases and created the hub airport. European airports were developed mostly by governments and therefore do not have as many long-term leases with flagship carriers.

Although most airports started out as exclusive use, many have begun the journey along the common use continuum. Some U.S.-based airport operators, such as at Westchester County Airport (White Plains, N.Y.), manage counter and gate space by use of a lottery system (McCormick 2006), whereas other airport operators, such as at Orlando International Airport, assign gates and counter space by preferential use and historical precedence ("Common Use Facilities" 2004). Some airports employ a minimalist "use it or lose it" approach to gate assignments.

Another U.S.-based airport that has migrated along the common use continuum is Terminal 4 at JFK. JFK, Terminal 4, is unique in the United States in that it is operated by JFK IAT, LLC, a private consortium of Amsterdam Airport Schiphol; LCOR, Inc.; and Lehman Brothers. Unlike an airline-operated terminal, Terminal 4 serves multiple international and domestic airlines and manages its gate allocations (Guitjens 2006).

The Clark County Airport Authority at Las Vegas McCarran International Airport has taken a slightly different common use approach by moving check-in operations off site. The airport operator has installed CUSS kiosks in locations such as hotels, convention centers, and other destinations where travelers may be located. By doing this, the airport operator has effectively extended the stay of vacationing passengers, allowing passengers to perform most of their check-in processes (e.g., check bags and obtain boarding passes) before coming to the airport.

Outside the United States, airport operators are also moving along the common use continuum. Amsterdam Airport Schiphol has long been identified as a leader in the effort to improve passenger processing. Much of the airport is common use, even though the airport has a dominant carrier, KLM. Amsterdam Airport Schiphol is working on fully automating the passenger process from check-in, through border crossing, and finally through security.

To understand common use, it is helpful to understand, from a technology point of view, how many airports in the world (outside the United States) have enthusiastically adopted CUSS and CUTE. The reason that these two systems are a focus is because they serve as key ingredients in the common use continuum. Based on information from vendors, IATA, airports, and airlines, as of June 2007, approximately 400 airports worldwide had some level of CUTE installed. Approximately 80 airports worldwide have CUSS installed. As mentioned earlier in this document, CUTE has been in existence since 1984, whereas CUSS has been in existence since 2003. It is interesting to note that only 60 airports worldwide have implemented both CUSS and CUTE (see Appendix A for more detail).

Common use implementations are increasing annually. For example, in 2005, seven airports had signed memoranda of understanding with IATA to implement CUSS. By early 2006, 17 airports had implemented CUSS (Behan 2006). From early 2006 to early 2007, the number of implementations increased to 62. Similar interest is being shown with other common use technologies.

One airport that was interviewed, Salt Lake City, stated that it had determined that it was not in the best interest of the airport to pursue common use. The main reason given was that Delta Airlines accounted for 80% of its flight operations. The airport noted that, as it looks toward the future and construction of a new terminal, it may reconsider common use.

CHAPTER THREE

ADVANTAGES AND DISADVANTAGES OF COMMON USE

As airports and airlines move along the common use continuum, it is important that they understand the advantages and disadvantages associated with common use. Although the common use model is implemented at airports, airlines have a high stake in the changes as well. Changes may affect all facets of airport operations including lease structures, operating procedures, branding, traveler way-finding, maintenance, and software applications. Therefore, although the implementation of common use occurs at the airport, the airport should take into consideration the impact of common use systems on the airlines that service the market. More of this will be discussed in later sections of this document.

ADVANTAGES OF COMMON USE

The greatest benefit driving common use in airports is more efficient use of existing airport space. Other benefits include improved traveling options for passengers and reduced capital expenditures for airports and airlines. In New York's JFK International Airport, Terminal 4 is privately operated and currently has 16 gates. The terminal is expandable by up to 42 gates. With just the current 16-gate configuration, Terminal 4 is able to support 50 different airlines. A typical domestic U.S. terminal without common use would only be able to handle 4 or 5 airlines, instead of 50. In 2005, Terminal 4 processed more than 3.2 million international departing passengers within its 1.5 million square feet of space. Airlines are able to focus on flying their aircraft instead of dealing with terminal operations. As a true common use facility, the airport management is responsible for the terminal and any infrastructure required in supporting terminal operations (Guitjens 2006).

Another airport with common use experience is Las Vegas McCarran International Airport. In 2006, the airport processed more than 46 million passengers through its terminals. One way the airport operator has alleviated congestion in the ticketing area is through the use of CUSS kiosks. Before the installation of CUSS at McCarran, individual airlines installed a number of proprietary check-in kiosks to support their customers. This caused the passenger queuing in the ticketing lobbies to become unmanageable. McCarran International Airport needed not only to control the number of kiosks installed in its ticketing lobbies, but also to find ways to move the ticketing process out to other areas of the airport and, in some cases, other areas of the city. The result of McCarran's efforts is that ticketing lobbies, once crowded with departing passengers, have smooth passenger flow, and passenger queuing at the ticket counters is now limited. The airport also has the ability now to move airlines, add airlines, and expand service as needed, given its status as a destination airport (Broderick 2004).

Airlines also reap a benefit from common use. Many of the common use strategies implemented in airports actually reduce the airline costs. According to IATA, with the implementation of CUSS and e-ticketing, the average cost savings on a typical return ticket is $14.50 (Rozario 2006).

CUSS kiosks can also improve efficiency during the check-in process. Compared with traditional agent check-in, which can process between 20 and 25 passengers per hour, a CUSS kiosk can enable the check-in of 40 to 50 passengers per hour ("E-Ticketing Comes of Age" 2006). Even CUTE implementations can help reduce costs to airlines. Figure 4 presents a common use ticketing lobby with CUSS kiosks.

Results of an interview with Lufthansa Systems revealed that CUTE sites can be 35% to 50% less expensive to start up, support, and maintain than proprietary sites. Beyond the cost savings, an airline has an opportunity to enter into a new market, or expand an existing market, at a much lower cost when that airport is common use. Airlines have a lower barrier to exiting a market or reducing their presence in a market as well. If the systems, infrastructure, and required accouterments are owned by the airport, then the airline has one less factor to consider when managing seasonal schedules.

Table 2 lists the technologies that are commonly associated with the common use continuum, describes the benefits of each technology for both airports and airlines, and highlights the impact of each technology on airline operations. Although the common use continuum encompasses more than just technology, technology is a tremendous enabler to the common use continuum.

AIRPORT CONSIDERATIONS FOR COMMON USE

Although common use has many advantages, the major consideration when assessing common use is cost. Although the cost of implementing common use is significantly less than the capital cost of constructing new gates, concourses, or

FIGURE 4 Common use check-in desk layout.

terminals, the added cost is still something that must be considered. If not properly planned and executed, cost overruns can have a significantly negative impact on the benefit of the common use installation.

From a technology perspective, converting ticketing counters and gates to common use is expensive. The current CUTE technology required to facilitate the common use of a gate or ticketing counter is somewhat proprietary to the selected CUTE vendor, and therefore is generally more costly than simply purchasing a computer workstation and printer. Making the decision to implement common use also affects costs not generally first considered. For example, common use at the ticket and gate counters necessitates the replacement of static signage with costly dynamic signage. Cabling and network infrastructure for new equipment must also be added. There is also the cost in setting up the connections to the airline host systems, as well as the servers necessary to support the CUTE operations.

In addition to technology costs, an exclusive use airport must consider the cost of ownership of assets once controlled by the individual airlines. For example, the jet bridge is an asset typically owned by the exclusive use airline. To convert a gate to common use, the airport operator must consider and evaluate the cost to own and maintain the jet bridge, adding a capital cost as well as an ongoing operational cost. Other physical property items such as waiting lounge seating, ticket and gate counters, and other items originally provided by the airline, may now be the airport operator's responsibility. On the surface, this appears to have shifted the cost from the airlines to the airport. Depending on how the costs are recovered, however, the airline most likely winds up paying the bill anyway. What basically has changed is that responsibility for the asset has shifted from the airline to the airport.

Costs often overlooked include the "soft costs" required to support the common use installation such as additional maintenance and administrative staff, management costs, ongoing licensing, and other recurring costs. Airports and airlines also need to consider the labor implications of switching to a common use model. For example, if ground handling is moved from the airlines to the airport, the existing labor contracts would need to be revisited. In the case of Montreal Trudeau airport, when the airport instituted self-tagging, the labor issues forced airport management to continue using existing counter agents to handle the process of receiving the bags and injecting them into the system. Again, these costs ultimately are paid for by the airline; however, the responsibility has shifted from the airline to the airport.

According to interviews, these costs become quite evident to the airport operator when support for the airport-controlled common use system is reported as "inadequate" by the airlines.

Depending on the airline's operation and the plan set forth by the airport, the airport operator may also have to consider additional storage accommodations located near the gates to allow the airlines to store items that agents use during the processing of passengers at a gate. These could include special boarding card stock, headsets, or other items that are given to the passenger at the time of boarding. The airport operator will also have to make accommodations at the ticketing counters as well. Depending on the number of airlines serving the airport, it may also become difficult to find back office space dedicated to an individual airline. In this case, the back office space would also become common use.

Airlines may also see disadvantages to common use. First, when moving from an exclusive use environment to a common use environment, airlines lose some control over the use of their dedicated gates and ticket counters. For small stations, this may not be an issue, but for larger operations, airlines see this as a loss of flexibility. No longer can they assign flights to their gates based on gate utilization, but instead they must submit gate requests for airport approval. In the case of a delayed flight, the airport operator manages how this flight is routed on the ground and what gates are available. At large hub airports, the hub airline generally remains in control of its gates, and in most cases those gates are not converted to common use. Airports also need to consider how this could affect their ability to make gates available to handle irregular operations.

From a technology perspective, airlines lose some control over the quality of the systems installed, as well as the ability to have direct control over the costs of those systems. In the current common use environments where system configurations differ from airport to airport, airlines tend to have more configuration management requirements on the back end. In the future, CUPPS will address this issue from a technology standards perspective, allowing airlines to manage only one configuration for all common use airports in which they participate. From the airline perspective, having to deal only with the systems they implement greatly simplifies their operations. In a poorly implemented common use system, the ability to process passengers quickly through the check-in

TABLE 2
COMMON USE ENABLING SYSTEMS

Common Use Continuum—Related Technologies		
Technology (general category)	Benefit	Airline Impact
Access Control	Shared use of security access	Airport operator may require use of airport access control on airline controlled gates.
Building Management	Manages shared use of building utilities—Potential cost savings, cross billing to users	Immediate gate changes may impact areas where building utilities are currently off.
Baggage Reconciliation/ Tracking	Manages the sortation of airline bags—Saves time, reduces bag loss	Reduction of lost bags results in substantial cost savings.
CCTV	Shared use of video monitoring	Shared use of video monitoring
Communications Infrastructure	Shared use of physical and electronic communications	Airlines may be forced to use shared infrastructure, which results in concerns related to maintenance, performance, and accessibility.
CUSS	Allows sharing of check-in self-service units	Significant change in airline operations (discussed throughout this paper)
CUTE	Allows sharing of gates/counters	Significant change in airline operations (discussed throughout this paper)
Dynamic Signage	Shared use of way finding/general information system	May impact airlines dedicated use of static signage or the use of airline gate information displays.
Gate Management	Manages gate/ticket counter assignments	May impact airline's automated gate management systems in place.
GIS	Manages shared used of airport space	Little to no impact. Positive impact can be experienced with better use of airport-related information.
LDCS/LBA	Automates local departure and boarding Provides a means for the airport to assist with improved boarding process	Positive impact for airlines not currently using an automated system
MUBIDS	Multi-users of baggage information displays—Provides more information to the passengers in a single area	May require advanced scheduling of baggage carrousels.
MUFIDS	Multi-users of flight information displays—Efficient use of airport space; provides more information to the passenger in a single area	Affects airline use of dedicated FID systems; may complicate requirements for data feeds.
OPDB	Storehouse of integrated data elements—Improves use of shared data	May complicate data feed requirements
Paging	Shared use of zoned visual and audio paging—Improved messaging to all airport users	Improved messaging to all airport users May affect means and methods airlines use to share information with passengers, particularly in the gate areas.
Payroll System	Used to charge shared use of resources—Improved means of tenant cross-charging	Little or no impact; airlines may experience improved means of billing and charging.

(continued on next page)

TABLE 2
(*continued*)

Common Use Continuum—Related Technologies		
Technology (general category)	Benefit	Airline Impact
Property Management System	Manages shared airport space—Improved means of tenant cross-charging	Little or no impact; airlines may experience improved means of billing and charging.
Resource Management	Manages airline/airport resources. Used with gate management. Improves airport operator's ability to manage airport facility and resources used by airlines.	May impact airline's operations in managing dedicated space/resources. Typically, not all airline resources are managed by the airport resource management system, so that careful coordination is required between systems.
VoIP Phone	Allows shared use of phone system	May impact airline's current use of phones.
Web Application Services	Allows for shared access to airline-specific web applications through airport controlled/owned computing systems	Can result in positive impact for airline's use of specific web-based services.
Wireless Network	Shared use of wireless communications	May impact airlines current use of wireless services.

and bag-drop procedures only moves problems to the gate area, causing delays in boarding. As an example, if the airport purchases lower-quality printers to keep down the cost of the common use system, the boarding passes produced by those printers may not be readable by the equipment at the gate, or downstream in the airline system.

There is also concern, from a technology perspective, that security can be compromised. Airlines expressed concern that there could be a breach of security within their network when operating in a common use environment.

Airlines are also concerned that if one airline's application fails, is compromised, or in some way causes the system to have a failure, then all airlines operating in that environment will also fail. Most technologies available today are developed with security in mind; however, airport operators should consider this concern when preparing to implement common use.

From a passenger's perspective, common use installations have the potential to become confusing. As with all airports, way-finding is an extremely critical element of making an airport easy to use. When an airport moves along the common use continuum, consideration must be given to the types of signage that are used to convey information to the passengers. Although today most airlines have preferential gate assignments, in a fully common use airport any given airline can use any given gate. Way-finding complexity increases when an airline is located in one area one day, and then in another area another day. In a common use environment, static signage will not suffice. In practice, departing airline flights are generally clustered by airline, so as not to create such confusion for the passengers. However, within a terminal or concourse, signage is very important and must be considered when moving across the common use continuum.

Usability of common use technology by disabled individuals is increasingly becoming an issue. In the United States, airports and airlines are mandated to meet Americans with Disabilities Act (ADA) requirements in their construction, technology, and customer service. The predominant concept is to provide equal access to information and services. Many of the current common use technologies do not meet the equal access requirements, which will become more important as U.S.-based airports consider common use.

CHAPTER FOUR

AIRPORTS—IMPLEMENTING COMMON USE

For an airport that is fully exclusive use, common use is a major shift in philosophy. Many areas of an airport's operations will be affected when the airport operator chooses to move along the common use continuum. In doing so, the airport operator must consider the impact of common use on all areas of airport operations. It has been shown that the primary areas where airports are most affected when changing to common use include:

- Technology,
- Physical plant,
- Competition planning,
- Fiscal management, and
- Maintenance and support.

TECHNOLOGY

Many of the solutions that help to move an airport along the common use continuum involve technology. Technology can be used to facilitate the multi-use of gates and ticket counters, as well as to manage gate assignments and baggage carousel assignments. In an exclusive use airport, the airport operator typically provides the basic services such as conditioned air and electricity. In an airport that is moving along the common use continuum, the airport operator becomes responsible for providing a greater number of services. As such, the airport operator is forced to become much more aware and involved in the management and status of its facility and its use.

Technology offers many tools to help an airport manage the limited resources it provides to the airlines. Development of an airport's common use strategy should include the involvement of the airport's technology organization. Common use implementations are a cooperative effort among operations, business management, technology, facilities management, and senior management. These functions need to have input into the full common use strategy for it to succeed. When an airport is considering a common use strategy there is typically a need to upgrade and/or procure new technologies. The airport operator must have access to people who understand technology and specifically the common use technology being considered. Although not all-inclusive, Table 2, which can be found in chapter three, presents technologies found to have various levels of use/benefit in the common use continuum and varying impacts on airport operations. It is important to note that each airport is affected differently.

For example, an airport servicing 10 million or more passengers a year may find great benefit in using geographic information systems to help manage common use lease space, where smaller airports can be managed cost-effectively without the use of this technology. Also, note that each of the technologies listed are general categories that potentially include many technology systems.

PHYSICAL PLANT

Common use impacts the airport facility in many ways, some of which create benefits not previously available to the airport operator. For example, common use enables the airport operator to move airlines from one gate to another to facilitate construction and maintenance of existing gate areas.

In an exclusive use airport, if construction around an existing gate must be performed, the airline has to move its operations to another exclusive use gate that may already be fully utilized. Under a common use strategy, the airport operator can move the scheduled airline operations to another gate that is not being used, according to the resource management schedule. This allows for construction to occur without interrupting flight operations and without affecting the local station manager's already scheduled flights. Along with its benefits, common use affects an airport in ways that require additional management of the physical plant. The following general areas affecting airports that implement the common use continuum were noted:

- Standardized counters;
- Signage;
- Off-gate parking;
- Technology infrastructure closets and core rooms and Intermediate Distribution Frames (IDFs) and Main Distribution Frames (MDFs); and
- Passenger, concessionaire, and vendor communications.

Standardized Counters

Airport operators often attempt to standardize ticket and gate counters. Typically, airports migrating from an exclusive use environment have existing counters that are conventional hard-

faced surfaces. The lengths of the counters for each airline will vary, reflecting the individual designs that were installed over time. Several of the counter positions may have been retrofitted or changed out by the airlines to include self-service units imbedded in the counters. In the common use environment, any counter (gate or ticket) specifically configured for an airline must be reconfigured in a manner that allows that counter to be used by any airline. This standardization may also reveal that although the gates and ticket counters look the same, the overall dimensions of the gates and ticket counters can be drastically different. This podium size standardization can enable the airport operator to gain useable space at the gates and additional ticket counters at the check-in desks.

Signage

Airport operators often replace static signage with dynamic signage designed for common use. The primary areas include ticket and gate counters, but also may include new areas where free-standing CUSS kiosks have been installed. Although it is not necessary to change to dynamic signage, it is more efficient than using static signage. The change in signage may require reinforcement or reconstruction of the back walls to ensure that the walls or overhead are sturdy enough to support the weight of dynamic signage.

Off-Gate Parking

Airport operators changing to common use often need to reconsider space needed to park aircraft. In an exclusive use airport, airlines may choose to park an aircraft at their exclusive use gate. In a common use airport, parking an aircraft at a gate may not be considered a valid use of the gate. When calculating physical space needs, airport operators must factor in the off-gate space required to park aircraft that previously were parked at a gate. This change results in new parking formulas that allow the airport operator to calculate accurately the required off-gate parking per use of gate by a given airline. Figure 5 shows an example of off-gate parking.

FIGURE 5 Off-gate parking.

Technology Infrastructure Closets/Intermediate Distribution Frames/Main Distribution Frames/Core Rooms

Airport operators often require additional rooms and closets and utility resources for use with communications infrastructure, network electronics, and computer servers/workstations to implement the common use systems. Depending on the decisions the airport operator makes regarding management of these rooms, access control and other security measures can also be affected. Other shared uses of space noted include training rooms and testing facilities. It should be noted that these spaces can also generate rental revenue while maintaining an overall common use approach.

Passenger, Concessionaire, and Vendor Communications

Airport operators need to consider the impact of common use on passengers, concessionaires, and other vendors at the airport. When an airport is full common use, passengers can become disoriented and confused as to where to find their flight. It is important that an airport that chooses to move to a full common use model enhance way-finding and other modes of communication to passengers. Concessionaires are also affected by common use, because the products they sell are marketed based on the airlines that are operating.

Airport operators need to maintain good communications with vendors and concessionaires so they will know which airlines are operating out of which terminals or concourses. In this way, they can appropriately target their product selection to the airline clientele served in various airport locations.

COMPETITION PLANNING

As presented in previous chapters, it has been determined that there are many reasons why airport operators choose to move toward common use. For U.S. airports that receive FAA grants and passenger facility charges (PFCs), the airport operator is obligated to ensure access for new entrant airlines. In some cases, the FAA requires the airport operator to submit a competition plan that defines how competitive access is achieved. Usually it is only a limited number of large- and medium-sized hub airports that the FAA will determine need to prepare and submit such a plan. These airports are characterized by having one or two airlines controlling more than 50% of the annual passenger enplanements. For those airports that are required to prepare a competition plan, movement along the common use continuum can be a part of the strategy that is outlined in their plans.

FISCAL MANAGEMENT

Changes in technology, space management, and services resulting from the common use implementation affect the fiscal requirements and financial management of the airport

operator. Some effects are obvious, whereas others are frequently overlooked. The following fiscal requirements were noted:

- Accounting efficiency,
- Usage fee calculations,
- Physical infrastructure costs, and
- Capital planning.

Accounting Efficiency

Common use has an immediate impact on the accounting efficiency of an airport. As a result of the more efficient use of existing space, the airport operator can more closely monitor the use of airport facilities. This can equal better accounting of enplanement fees, as well as other fees charged to airlines. With the use of tools such as an operational database, the airport operator can get an earlier look at the data needed to calculate fees charged to an airline. Flight information data, combined with gate utilization, provide the airport operator with real-time data and allows for closer monitoring of the fees reported by airlines.

Airport operators can also "load-balance" their airport, thus creating a friendlier environment for passengers. In an exclusive use airport, there are certain times of day when all carriers in a geographically close area have peak activity. In a common use airport, the airport can spread that peak activity around to different areas of the terminals, thus allowing for better passenger flow through the airport.

Usage Fee Calculations

Airport operators track the actual usage of gate and ticket counter assignments and charge airlines accordingly. When an agent logs into the common use system, or when the airport operator uses gate management, data are collected that give a clear picture of when a gate or counter is occupied, and when it is not. The result is accurate charges to an airline for its specific use.

The rates and charges for a common use airport become much more focused to the exact utilization of the airport, rather than simply charging an airline for a gate lease. This level of charging compels the airport operator to be more diligent in tracking an airline's actual use of the airport's facilities than under a non-common use strategy. The airport operator adjusts the existing financial models to account for the more detailed billing, as well as for data collected for backup of the billing process. Depending on the specific reasons at each airport, the airport operator determines how to charge, or if to charge, for the common use systems implemented at the airport. If the airport operator chooses to embed the common use operational costs into the rates and charges, the need for detailed billing is diminished, and is necessary only for the operations of signatory and itinerant airlines.

Physical Infrastructure Costs

In addition to any system costs incurred in common use, airport operators must account for costs of physical infrastructure that an airline traditionally installs to facilitate the use of gates. One major cost that tends to be overlooked is jet or loading bridges. At many airports, it is the airlines that own the loading bridges, not the airports. Once a gate is converted to common use, the airport operator typically assumes ownership of the jet bridge. This could entail purchasing new jet bridges or purchasing the existing jet bridges from the current carriers. One hidden risk of such a purchase is that a jet bridge that was acceptable for use before common use implementation may become "unusable" after the common use implementation.

Airport operators are establishing new charging models resulting from common use implementation, such as the cost of parking aircraft. Typically, once a gate is converted to common use, on-gate parking may become a nonlegitimate use of the gate, except where the gate is not needed for normal operations. If a flight needs to use the gate for enplaning or deplaning, then the aircraft parked at the gate must be moved. Although the movement of the aircraft is the airline's responsibility, the actual space used to park the aircraft may need to be accounted for in the charges to the airline.

Capital Planning

Finally, airport operators noted that the implementation of common use requires careful planning for the future. The airport operator is able to defer and possibly reduce capital expenditures to build additional gates, concourses, or terminals. Airport traffic continues to increase, in most cases, therefore it is improbable to assert that common use will prevent construction expenditures. The flexibility and efficiency of common use enable the airport operator to plan better for growth, allowing for the management of landing fees, rates and charges, and other fees that increase owing to increased capital expenditures. This flexibility allows the airport operator to plan future changes, utilize capital funds differently, or simply defer expenditures until absolutely necessary.

In the event that land is not available for expansion, the airport operator is able to derive maximum utilization of existing physical resources through implementation of common use systems. Airport operators must also consider the planning for, and funding of, replacement of assets that were not considered before. This includes CUTE systems, CUSS kiosks, passenger loading bridges, baggage systems, etc.

MAINTENANCE AND SUPPORT

Airport operators noted the increase in requirements for maintaining and supporting existing and new items resulting

from the common use implementation. The following areas found for this report included:

- New equipment maintenance,
- Technology support, and
- Risk considerations.

New Equipment Maintenance

Airport operators must be ready to maintain equipment that they may not have had to maintain previously. Jet bridges, for example, become the airport's responsibility. The airport operator must either have the staff qualified to maintain jet bridges or contract with a vendor that can provide those services. Maintenance of equipment such as jet bridges and common use systems that are needed to operate an airline requires high availability of personnel to do the work. Airport operators must consider service-level agreements for maintenance and response times that may not currently be included in existing operations.

Ticket and gate counters may also require additional maintenance. If an airport does not already own the ticket and gate counters, they will have to add these areas to their maintenance rotation and be prepared to repair any damage. If an airport operator chooses to remodel the counters, it needs to keep in mind the access of equipment and the maintainability of the counters themselves.

Technology Support

Technology support is also required in a common use airport. Whether an airport operator hires a third party to perform technology support, or hires its own support staff, the need for a trained tech-support staff increases tremendously in a common use environment. The diversity in types of systems also requires diversity in support staff. The airport operator must consider database administrators, system administrators, equipment maintenance staff, and other technologists to maintain the many different aspects of the system.

The airport operator also must consider the size of the staff required to provide the necessary service-level agreements to support flight operations. This may include 24-7 support, quick response times, and high availability. Network redundancy and availability also need to be factored into the technology support functions. Vendor selection is critical to technology support. When an airport operator chooses a common use vendor to supply and install its common use technology, the airport operator must also evaluate the vendor's ability to provide staff support and training. It has been indicated through interviews with airlines and airports that some vendors have difficulty providing training for the local support staff, and that knowledge gained at one site is not transferred effectively to other support sites.

Risk Considerations

As with any project, it is important for airports to consider the risks involved in moving along the common use continuum. Because common use affects so many areas of an airport's operations, there are many types of risks associated with implementing common use that need to be considered. For example, such risks can include labor contracts, impacts on other tenants, security, passenger push-back, and airline acceptance, to name a few. Airports should also consider the impact on other airline operations that could result if one airline's service is delayed and affects the airport operator's ability to assign gates to other airlines. The airport operator must analyze these potential risks, determine the likelihood that any of them could become an issue, and then decide whether or not it is willing to accept these risks.

CHAPTER FIVE

AIRLINES OPERATING IN COMMON USE

With a successful common use implementation, an airline has the potential of receiving benefits not available otherwise. With common use gates and ticket counters, the airline is able to grow more effectively because it is not constrained by the exclusive use model. An airline can work with the airport operator to find gates that are open at the times the airline would like to start new service. Instead of the local station manager having to contend with assigned flights in a limited number of gates, the airport operator is able to open the search for available gate space to the entire airport. In reality, this is typically limited to available gates adjacent to the airline's normal operational areas, resulting from ground service limitations and proximity to operations offices. At an airport that is fully common use (i.e., common ground handlers in addition to common use technology) however, an airline has the flexibility to use gates farther away from its normal operational areas.

For any common use implementation to be successful, it must simplify the airlines' operations. Airlines expect consistency in operations as well as invoicing and overall experience. Airport operators should consider their common use implementations to ensure that these goals can be achieved. If the airline is able to simplify its operations and can expect consistent performance from the common use implementation, then it will be more apt to support moving along the common use continuum.

If an airport is implementing CUSS kiosks, airlines also stand to benefit. "IATA estimates that [CUSS] will save airlines up to $2.50 per checked-in passenger through higher productivity of traditional check-in facilities" (*Simplifying the Business Common Use Self Service* 2006). Additional cost savings are found in the elimination of the maintenance of proprietary kiosks, redeployment of staff, and other operating efficiencies. These gains, along with e-ticketing, are "...estimated to save an average of $14.50 on a typical return ticket" (Rozario 2006).

Airlines also gain an advantage in entering a new market. If an airport has already moved along the common use continuum, airlines have a lower cost of entry into that market. It no longer becomes necessary for an airline to install technology infrastructure, proprietary systems at gates and ticket counters, or proprietary kiosks in the airport. The airport is already configured to accept the new carrier. The carrier will be responsible for adding a direct connection from its host system to the common use system, also known as a circuit, and have the common use service configured to accept its application and log-ins.

As airport operators move along the common use continuum, however, airlines that service these airports can be adversely affected in several areas. Research noted that airlines can typically face an adverse impact from common use in the areas of:

- Additional resources for planning, design, and implementation;
- Airline operations;
- Common use hardware and software;
- Additional costs;
- Branding; and
- Local support.

ADDITIONAL RESOURCES FOR PLANNING, DESIGN, AND IMPLEMENTATION

Experience has shown that, as common use is implemented, airport operators should engage the airlines that service their airport early in the process. It is obviously important to include the airline local staff, such as the station manager, but it is also critical to include the corporate airline staff. It is especially important for the airlines' corporate technology staff to be involved in discussions for common use systems because they are most knowledgeable about the impacts to the airline and have experience from implementing common use at other airports. It has been noted through interviews with airlines that there is a general lack of trust between airports and airlines. It is important that both parties present their reasons, issues, and approaches in an open and honest dialogue so that the parties can move beyond this distrust.

Airlines should also expect to work more closely with airports in developing a common use strategy. As an airport continues to analyze the growth in passenger traffic, it will need to make decisions for expending capital funds either to increase the number of gates or to move toward a common use strategy. It is important for airlines to participate with the airport in the design of the common use strategy. As they work cooperatively, the strategy that is put in place can be beneficial to both.

Airlines should also participate early on in the design phase for the common use strategy to ensure that business processes within the affected areas are taken into account.

Because each airline may have different business processes, and may use different equipment and peripherals to support those business processes, open and honest communication is necessary. Airlines and airport operators need to ensure that the airline technology people communicate with the airport technology people, and not, as is often the case, have airline properties people attempting to communicate technical issues to their technology staff.

Some airlines interviewed noted that the start-up of a common use system at an airport is always a labor-intensive effort. It was also noted that many of the same functions that are currently available in their proprietary systems have not yet been made available in their common use systems, thereby reducing the functionality that the agents need to perform their tasks.

Airport operators should also consider that an airline may have multiple airports that need the commitment and service of the corporate staff, and should have other methods of open communication available for airline staff to participate in the dialogue. It would be of value for airport operators to seek other technical methods to facilitate communication and meetings, such as conference calls, collaborative Internet-based tools, and other solutions. There is no substitute for face-to-face meetings; however, these can be augmented by other methods to ease the burden on those who may have to travel from one site to another.

Likewise, it is good practice to schedule the design meetings around the flight schedules of the carriers that are going to participate, so that the airlines can control their costs and travel arrangements during the process.

Airport operators should also consider the evolutionary approach that airlines have taken toward common use. As airlines refresh their technologies, they will consider common use approaches. This will be particularly important to the CUPPS initiative, as the airlines that are updating their technology will be more likely to adopt the CUPPS application approach.

AIRLINE OPERATIONS

Any common use strategy implemented by an airport affects an airline's operations at that airport. Fiscally, an airline is affected by the change in rates and charges that can arise from the common use strategy. Airports may choose to charge back to the airlines the costs associated with the common use strategy, effectively increasing the rates and charges to that airline. Conversely, the argument can be made that implementation of a common use environment (in the long term) can actually reduce the rates and charges to existing airlines by increasing the number of signatories that share the costs of doing business at the airport.

A common use strategy may also change the "remain over night" practices at an airport. Airlines that park aircraft at gates at a common use airport may need to move the airplanes off-gate at any given time. Some common use airports do not allow aircraft parking at gates, but require all aircraft to be parked off-gate. This change could result in more movements of aircraft to and from the gates, and off-gate parking can sometimes be some distance from the gates.

COMMON USE HARDWARE AND SOFTWARE

With the common use implementation at a specific airport, airlines are faced with hardware and software systems that typically may not be supported by the airline. As a result, the airline must be aware of and prepared to use the supported hardware in a common use system to facilitate its business process. It was noted through interviews with airlines that each airport operator creates its own "unique" common use platform, thus causing the airlines to modify their applications to support the unique requirements of the local installation. It was noted that this occurs even if the same vendor solution is used at multiple airports. Unique requirements include network connectivity, hardware preferences, and software application functionality, to name a few.

The airline must also make accommodations for software certifications required by each common use vendor at each airport. Airlines need to decide how much common use they will use at the airport. In most instances, airlines do not engage common use in their back offices. This means that their local staff will need to use two sets of systems. Also, airports in a common use environment usually do not support the airlines' proprietary back office systems; therefore, the airline will need local support for these systems.

ADDITIONAL COSTS

Although the potential for cost savings exists with the common use implementation, airlines noted that hidden or additional costs often outweigh the cost savings. These costs can include additional training for the agents, additional software maintenance and upgrades for separate applications, certification and deployment costs under common use, and delay costs in releasing software updates through the existing common use processes. Airlines also indicated that there are additional "soft" costs that have not yet been quantified. These include the cost of time delays to distribute common use applications versus proprietary applications, support of more than one set of applications for multiple environments, and costs associated with the certification process to gain the ability to operate in a common use environment. Understanding the true cost of doing business in a common use implementation is a primary concern of many of the airlines. It is therefore important for airports to consider the impacts to airlines with respect to these costs. The airport operator must consider the message that is conveyed when implementing a common use strategy and the charges that are added to the airlines. If an airport presents an honest picture

of why it is going toward common use, it can better account for the costs of the common use strategy.

If an airport operator's goal is to increase airport service by increasing the number of airlines at the airport, it should evaluate how it divides the total charges of the common use strategy among the current carriers. It is also important to consider the federal definitions and expectations of an airport and the types of improvements that can be made, how those improvements can be charged back, and how that could affect other sources of federal funding. According to Section 601, "Terminal Development," in *FAA Order 5100.38C—Airport Improvement Program Handbook* (2005, p. 107), except as noted, terminal development is defined as "development for non-revenue-producing public-use areas that are directly related to the movement of passengers and baggage in terminal facilities within the boundaries of the airport."

With few exceptions, FAA funding eligibility requirements for terminal development through the Airport Improvement Program (AIP) limit the provision of federal financial support to areas of the terminal that are for public use and do not produce revenue for the airport or its exclusive users and commercial tenants.

For example, Section 601, "Terminal Development," designates parts of the airport terminal ineligible for AIP funding, including "areas that are primarily revenue producing such as restaurants, concession stands, and airline ticketing areas" (p. 108).

Section 606, "Expanded Eligibility under the Military Airport Program (MAP)" specifies that, "Some expanded eligibility at MAP locations will facilitate the transition of military facilities to civil airports." Accordingly, with respect to AIP funding eligibility for passenger terminal buildings, "Section 47118(e) of the Act makes eligible the construction, improvement, or repair of a terminal building facility, including terminal gates used for revenue passengers getting on or off aircraft. The gates must not be leased for more than 10 years. The gates must not be subject to majority in interest clauses" (p. 111).

Section 611, "Eligibility Limitations" of the FAA handbook further substantiates "eligibility is limited to non-revenue producing public-use areas that are directly related to the movement of passengers and baggage in air carrier and commuter service terminal facilities within the boundaries of the airport" (p. 113). Airport operators noted that a more reasonable charging model was based around the percentage of use by each airline.

Airport operators must have a clear communication path to the airlines, and present an honest and open dialogue. Through this open dialogue, items such as cost can be discussed and worked through so that both the airport and the airlines benefit. Many airlines understand that the cost of implementing a common use strategy can be a cost savings, but they are leery of the implementation of common use because many non-U.S. airport operators, where common use is more prevalent, tend to view the common use continuum as a revenue stream, rather than a service. Because of this concern, airlines are less likely to support a common use strategy, especially if the airport operator does not include them in the discussions during the design phase of the common use strategy.

BRANDING

During interviews, airlines noted concern with loss of airline-specific branding. Although not as prevalent an argument as in times past, an important facet of airline marketing remains in its ability to use its facility locations as a means of "selling" its name. Airlines view common use as taking away their branding ability. Many airports that implement common use are also seeking ways to address these branding concerns. Airports are more commonly implementing digital signage along with their common use strategies to facilitate branding opportunities in a common use environment. The digital signage can be added, as required, to ticketing counters, gates, and other areas in the airport that are temporarily used as airline space in a common use environment. In addition to the gates and ticket counters, airports are using digital signage to address branding issues on CUSS kiosks.

Many airports that have implemented common use and provided digital signage also allow the airlines to provide their own branding during the time that they are occupying the common-use space. Some airports, such as JFK's Terminal 4, allow the airlines to customize the common use space with as much branding as they would like, providing a sort of marketplace feel to the environment.

Other airports provide distinct locations for additional branding, such as additional signage locations. In any event, common use airports continue to look for ways to allow airlines the ability to market their brand within the common use space.

LOCAL SUPPORT

As an airport operator assumes responsibility for maintenance support, it is noted that maintenance costs for the specific airline should decline. It is far less expensive for an airport to provide dedicated maintenance personnel, able to respond rapidly to failed devices, printer jams, and other maintenance issues, whereas airlines typically must fly in maintenance support from their central headquarters, thus spending significantly more time and money to achieve a repair.

Because airport common use implementations are still relatively few and quite different from airport to airport, the elimination of an airlines maintenance support requirements at a specific airport becomes a "one-off" scenario.

This scenario often results in the airline wasting money because it must treat a particular airport as unique. Some airlines have large maintenance and support contracts that are based on the number of stations that need to be supported. As airports implement common use, the short-term effect could be a rise in support costs as the number of stations decrease. Overall, however, airlines should be able to experience lower maintenance and support costs as more airports convert to common use, moving the costs of support from the airline to the individual airport.

CHAPTER SIX

REAL-WORLD EXPERIENCE

A search of the available documentation revealed that although there are some journal articles and other resources that address issues surrounding the common use continuum, the amount available in relation to this topic is relatively small. In addition, a small group of subject experts currently appears to be providing most of the information to those that are writing about the topic. Sources such as IATA, ATA, and ACI do not have information readily or freely available for researchers. Also, the number of airports that have embraced common use is relatively small, compared with the total number of commercial airports in operation worldwide. Although the list of airports is growing, the industry is still in the early adopter stage.

To support the findings of the knowledge-based resources noted in the previous chapters, the development of this synthesis also included the preparation of case studies of specific airlines and airports selected as relevant samplings of common use implementation. Seven case studies were completed as a part of this synthesis. The participants in the case studies were Alaska Airlines, American Airlines, Amsterdam Airport Schiphol, British Airways, Frankfurt International Airport, Las Vegas McCarran International Airport, and Lufthansa Airlines. These case studies can be found in Appendix B of this document. This chapter summarizes the findings of these case studies.

During the preparation of the case studies, it was noted that any discussion about common use appears to lead to a discussion of common use technology systems, such as CUTE and CUSS. Although the common use continuum embraces much more than just IT systems, IT is a vital part of the equation and needs to be explored. Even though CUTE has been around since 1984, its implementation is relatively limited. CUSS has been around since 2003 and its implementation is even more limited. These two systems, however, form the technological basis for common use.

AIRLINES

Airline case study participants have witnessed an increase in common use implementations during the last six to seven years. Respondents interviewed noted that it has been their experience that each airport operator creates its own unique common use platform, thus making it less and less 'common use.' This uniqueness is the result of requirements that an airport operator places in its procurement process. Examples of these unique requirements are network connectivity, hardware preferences, software application functionality, etc.

Many of the case study respondents have been using common use for many years. As international airports began migrating across the common use continuum, it became necessary for airlines to determine their overall approach to common use. Some respondents determined that it was best for their applications to migrate to a common use platform, whereas others work to maintain a proprietary environment.

Even though they may be using common use systems, many of the airlines participating in the case studies indicated that they do not prefer operating in a common use environment. Figure 6 shows an airline operating at a dedicated gate at its hub airport. Their preference is to install dedicated systems, but some airlines will consider each airport independently. If common use makes sense at a given airport, some airlines try to work with the airport operator to ensure that the airline's needs are met. The experience of the case study participants has shown that implementations at airports differ, even if the same vendor is selected. The start-up of a common use system at an airport can be a labor-intensive effort for the airlines. The airlines want to ensure that the installed system functions in a manner that allows them to conduct business. Even though airports may have the same common use provider, since each airport is slightly different, airlines are forced to create site-specific application versions. This approach defeats the purpose of common use and creates an environment that is very difficult for an airline to support and manage. In the same way, vendors choose to make these unique site-specific decisions to win the procurement opportunity.

Case study respondents recognize that there are benefits to an airport implementing common use. They also recognize that common use can provide advantages to airlines; however, respondents have indicated that their experience shows that the cost of a common use implementation still tends to be more expensive overall than a dedicated environment. Much of the additional cost comes from the inability of a common use system to support an airline's ability to control the distribution process in a timely fashion. On proprietary systems, airlines can remotely update and distribute their applications on demand. In a common use environment, the update and distribution processes are dramatically longer,

FIGURE 6 Airport on-gate parking.

and require at least one certification process by the vendor before being released. This can delay the update process by as much as four months, according to survey results and case study participants.

Many of the perceived benefits of common use have not yet proved true for many of the respondents. For example, common use is expected to make entry into a market quicker and easier. It has been the respondents' experience that the need still exists to provide a dedicated connection back to the host, as well as to install back office proprietary systems. Based on their experience, the installation of the dedicated connection back to their host system is the long lead item in any installation. Thus, common use does not accelerate the overall schedule of starting up a new service to a new market.

Case study participants see a benefit with common use in international terminals, which must support many airlines in a limited amount of space. Implementation of common use at an international arrivals terminal could help airlines more quickly turn a flight into a domestic continuation. In today's environment at many airports, flights must arrive at an international terminal, deplane, and then the airplane must be towed to their domestic gates for departure. If common use were implemented in an airport such as the one described, the airlines could leave a plane at the gate where it arrived and then reboard the plane for the continuation of the domestic flight, assuming that the gate is not needed for another international flight.

Case study participants also indicated that local support personnel may not always be adequately trained to support the system. In many instances, the local support is supplied directly or indirectly by the vendor. The implication is that the knowledge transfer from site to site is not adequately managed. This can affect the airlines' business, because what may otherwise be a minor event is not quickly resolved, and the resolution is not clearly communicated to the airlines.

A seemingly minor event results in a ripple effect throughout the downstream system, affecting not only the current flight, but flights from/to other airports within the airline's entire system.

Case study respondents reported that they have less functionality with a common use implementation than they do with their proprietary system. For example, the functionality of one respondent's gate information display system (GIDS) is not available through common use installations. This system enables the gate agents to display the status of their stand-by list for the current flight, among other features. For GIDS to be present in a common use environment, the airport operator must provide a second computer or space for a second computer to drive the data to the gate display. Most airports object to adding the airline-specific computer, because this changes the gates to a more dedicated format, thus somewhat diminishing the airport's ability to use the gate as a common use gate.

In some of the common use sites that respondents operate, they also use their proprietary check-in application in their back offices and lounges. Whenever possible, airlines continue to install their own dedicated equipment. These airlines assert it is still more cost-effective to have dedicated equipment at a station rather than CUTE equipment. Caveats to this are whether the station is located at a significant distance from the airline's headquarters and whether the station has local IT staff support. The difficulty with CUTE installations at non-U.S. airports is that the airport operators are continually moving toward profit making. This causes the airport operators to start charging too much for the CUTE usage, which affects the airlines' business. When possible, some airlines interviewed prefer to use the CLUB model, as they then have an influence with the provider. Several case study participants work with very experienced CUTE developers, and have developed a close relationship with the CUTE vendors to help speed the deployment of application upgrades to their stations.

In an effort to streamline the deployment of their CUTE applications, at least one case study participant has created a "terminal emulator," which allows them to deploy one package to all sites and all vendors. This terminal emulator is the only portion of the system that is certified CUTE; however, it allows the airline to make business functionality upgrades on a regular, shortened deployment cycle. The application is able to determine the vendor and configuration of the station and to launch the appropriate set of applications for that vendor platform. In this way, the airline has simplified the management of its code and the deployment of its applications.

Several respondents' concerns with CUTE is the timeliness of upgrades. In their proprietary sites, many of the respondents are able to upgrade almost instantaneously. For CUTE sites, there is no control over the release at local sites, and therefore the release time is variable. This adds an

amount of uncertainty to the release cycle that is difficult to manage.

The respondents' noted that because of this uncertainty, there are some sites that are several months out of date from their current CUTE application release cycle. These occur even though some of the respondents send out their following year's release schedule months in advance.

Airlines are also concerned about the visibility of charges for common use. From their perspective, as they are planning and budgeting for the following years, they need to account for costs appropriately. It has been some respondents' experience that CUTE charges are line-itemed into a single bill, eliminating visibility of those charges. Bundling of the CUTE charges into the overall rates and charges also hides this visibility. Respondents recommend transparency in costs and, as much as possible, that the price remains somewhat level, not subject to frequent changes.

Some of the airline respondents viewed CUTE as a strategic advantage for their airline. As such, these airlines will encourage an airport to install CUTE. One of the criteria these airlines seek in an airport when they are investigating new routes is whether or not that airport has CUTE implemented. If the airport does not have CUTE installed, then these airlines educate the airport operator about the benefits of CUTE. Hopefully the airport operator will choose to install CUTE as a result.

Other respondents have a unique process for creating, updating, certifying, and releasing CUTE applications. In some cases, the airline is responsible for the creation and updating of the software for its CUTE applications. Once the application is created or updated, however, the code is handed over to another division or company for precertification, certification with the CUTE vendors, and deployment to the local sites. The other division or company may also provide certification services to more than one airline. These third-party entities provide precertification for multiple CUTE providers and operating systems, thus offering an economy of scale for the precertification process. The benefit of this configuration is that airlines are able to test their CUTE applications on multiple vendor platforms in one location. These third-party precertification entities have highly trained experts who have worked with the CUTE vendors for many years.

Case study participants indicated that they have created their self-service kiosk application utilizing the CUSS standard, and as such the application is CUSS certified. However, none of the case study participants promotes common use kiosks in airports as they do CUTE. These airlines have many concerns about the implementation of CUSS kiosks that to date have prevented them from taking the same approach as they have with CUTE. For example, it is difficult to meet the branding needs of an airline using CUSS. Also, airports are standardizing boarding pass stock to help reduce costs. Bag tag printing is another issue. For example, as each airport standardizes, there are different lengths of standard bag tags. One airport uses one length and another airport uses a different length. These airlines have to develop their bag tags to meet all possible scenarios.

Some respondent airlines are very concerned about the stock used to print their boarding passes. One reason is the quality of what is printed by the boarding pass printers. For example, low-quality paper stock affects the ability of the gate reader to read a two-dimensional (2D) barcode, thus causing more gate delays during boarding. This can be especially troublesome to these airlines as they continue to automate the boarding process. Also, to meet customer branding images, some of the respondent airlines require use of their current boarding pass stock. The stock is high quality, but is not usable in thermal printers, which are becoming a popular type of printer for CUTE and CUSS terminals. All of the case study airlines are members of IATA and they are fully ready and compliant with the Simplifying the Business initiatives that IATA is implementing. They are already compliant with the 2D barcode initiative as well as with the e-ticketing initiative. With both of these initiatives, however, these airlines are facing challenges. Although these airlines are 2D barcode compliant, the current installed base of printers is not. They require firmware, which is the software resident in the printer itself, and, in some cases, hardware upgrades. In a common use airport, this cost could be the responsibility of the airport. As such, many airports are currently not supporting the migration to 2D barcode printing and therefore are preventing the roll-out of this IATA initiative. In some countries having only an e-ticket and not a paper ticket presents a problem. Customs agents for the United States, for example, may require a passenger to show a return ticket before allowing that passenger entry into the country. With e-tickets, there is no return ticket, causing entry to the country to be denied. Another example is India, where one must have a ticket to enter the airport terminal. E-tickets do not suffice as a ticket in this case and can result in denial of entry to the airport, thus causing the passenger to miss the flight.

Case study participants had some recommendations for airports that are considering a common use implementation. It is important for the airport operator to have a good relationship with the technical people at the airlines as well as with the vendor providing the solution. The airport operator should have a sharp technical staff that understands the common use system and its inherent issues. Common use has both a business side and a technical side, and the airport operator must be able to address the needs of both. The airport operator needs to treat service partners as partners, not turn them into adversaries. Another recommendation is that the airport operator needs to remember that the operation of the check-in and boarding process is part of the airlines' core business, and to ensure that it is not removing core business requirements from airline control.

Respondents also recommended that airport operators work with the airlines during the design, bidding, and installation

process. It is important to bring in the airlines early in the process so they can help the airport operator understand the requirements the airline has for check-in and boarding processes.

By working with the airlines and allowing them to provide the requirements for the common use implementation, the airport operator will develop a good rapport with the airlines and will eventually install a common use solution that meets the needs of the customer. In addition, they should include both the local airline representatives as well as corporate airline representatives. It may become necessary to use alternate methods of communication, such as conference calls, Web conferences, or some other method of communication, that enable airline corporate employees to participate. Case study respondents recommended that airport operators proceed with common use based on open and honest communication. Airports should specify the real reason they are moving to common use. Airlines interviewed expressed concern that the stated reasons an airport would move toward common use may differ from the actual reasons, thereby indicating a lack of trust between the airport and the airline.

Many of the airline respondents recommended that airports not implement common use except where it is absolutely required by constraints. Instead, the respondents recommended that the industry should correct standards to better meet the requirements of the airlines. Many respondents indicated that they would reconsider their position on common use once it is able to support the full functionality of the dedicated systems, costs the same or less overall as installing and maintaining dedicated systems, and provides a transparent delivery mechanism for updates.

Based on their experiences, these airlines also advised airport operators to carefully consider the charging model. Fair and equitable charging is understood, but the airport operator should have an open book policy, helping airlines understand what the charges are and why they are assessed. Airports should bear in mind that although they are buying the system, in most cases they are not a user, so they should seek the input of those who will use the system. The airport operator needs to work out the service-level agreements so that there are neither too many variables nor too many parties involved in troubleshooting problems. Finally, they recommended that the airport seek a service-level agreement that has enforceable penalties for inadequate performance.

AIRPORTS

In 1984, Westinghouse worked with SITA at Los Angeles World Airports to create what is now known as CUTE. It was at this point that IATA first created RP 1797 defining CUTE. It should be noted that ATA does not have a similar standard for common use. As noted in an earlier chapter, approximately 400 airports have installed some level of CUTE since 1984. Today, airports are exploring ways to make more efficient use of their space and to defer large capital expenditures. Through case study interviews, airports have expressed a need to hold costs down and to increase customer service and they are counting on common use as a way to improve the customer experience at their airports and to keep overall costs to airlines down.

Through case study interviews, it is clear that common use is more prevalent outside of the United States. Many larger Canadian and European airports indicated that they are utilizing common use to facilitate their operations. Many of these airports support a larger number of international flights than do U.S. airports. Because of the business environment and the management differences in non-U.S airports, they are also providing other "common use" services to the airlines. These include ground handling services, fueling services, and other services that are more commonly provided by airlines at U.S.-based airports.

Several airports interviewed for this report also indicated that they work at developing good relationships with their common use providers to ensure the success of their common use implementations. Case study participants indicated that, from a technology perspective, CUTE implementations are more readily accepted and used by the airlines than CUSS implementations. There are many different reasons for this acceptance, including the airline's concerns over branding, lack of true standardization in the CUSS platforms, and cost concerns. Both U.S. and non-U.S.-based airports are reviewing their implementations to help address these concerns.

Even with the differing degrees of acceptance for common use technologies, respondents indicated that they are seeking more technologies that will help them along the common use continuum. Several respondents are interested in developing a common bag drop; however, IATA does not yet have a standard for common bag drop; hence there is no common solution for the airport operator.

European airport respondents also indicated that they are considering future improvements in the way border crossings are managed. The European Union (EU) for example has long embraced the concept of the free movement of people in Europe, and in the late 1990s adopted the Schengen Agreement, which allows for the abolition of systematic internal border controls between the participating countries. Schengen countries are those that have signed the Schengen Agreement. To date, 27 EU countries have signed the agreement, as well as three non-EU countries (Iceland, Norway, and Switzerland). This means that the border crossing and security requirements differ between Schengen and non-Schengen countries (Wikipedia 2007). In addition to Schengen Agreement requirements, the United States security requirements also affect the implementation of common use technologies. According to European respondents, the implementation of the Federal Bureau of Investigation's terrorist watch list currently prevents the use of CUSS kiosks for non-U.S. airlines.

Some survey respondents indicated that they negotiated with the airlines when their airport made the decision to move to common use. In several cases, the airport was renewing the airlines' leases, and they used the lease renewals as a catalyst for open communication. Through this communication, the airport operators were able to honestly address these concerns to ensure success of the common use program.

During negotiations, several respondents indicated that the airlines clearly wanted to retain their exclusive use of gates, and that the airport operators wanted no gate assignments. As a compromise, several of these respondents now employ preferential use of gates.

U.S.-based airport respondents indicated that they first install CUTE at the gates of their international terminals. As these respondents continue their movement along the common use continuum, they try to expand CUTE to the remainder of their airports. Respondents indicated that the installation of common use cost their airports about the equivalent of one gate, but in return they gain the equivalency of several gates. Respondents also noted the importance of quantifying the benefits of common use to airport management and demonstrating how common use facilitates deferral of capital expenditures for constructing new gates, concourses, and eventually a new terminal.

In some cases, part of the common use installation process involved replacing or updating ticketing counters. Many respondents discovered that the ticket counters were not the same size, and they were able to gain additional check-in locations by standardizing the size of the ticket counters.

According to respondents, one area of the airport not normally converted to common use is the operations space for the airlines. When a new airline is added to the airport, it is given operational space that is dedicated only to that airline. Even with this requirement, many of these airport operators are continuing to add new service and new airlines, which allows continued growth and improved service to their community.

Many of the respondent airports have also joined IATA and helped to define the CUSS RP. The driver for this was the airline implementation of dedicated check-in kiosks. Airlines installed dedicated kiosks in the airport lobby areas that undermined the airport operators' common use strategy for efficient use of airport space. The placement of dedicated kiosks essentially forces ticket counter space to become exclusive use. Locations not near the ticket counters cannot be fairly shared by all airlines, in most cases. The airport operators worked with the IATA Common Use Self-Service Management Group to help define CUSS.

In addition to the ticket counters, some respondents are installing CUSS in areas outside the airport, including their parking garages, rental car centers, remote hotels, and other off-site locations. These installations essentially have allowed airport operators to extend their check-in counters to areas outside the airport. Although this improves passenger processing, according to respondents it also improves the passenger experience, because many passengers are now able to fully check in before arriving at the airport.

Case study respondents recommended that other airports consider moving along the common use continuum. Technology is a key enabler and allows the airport operator to efficiently use and manage the limited space available. Technologies such as LDCS are very beneficial in helping new airlines start up, to charter operations, and as a backup to the airline-owned departure control systems. Respondents also suggest that airport operators not worry about managing tasks currently handled by the airlines, such as gate assignments. Through the use of new technologies the airport operator now has the means to manage these tasks effectively and efficiently. Other areas to keep in mind during the migration along the common use continuum are the ownership of jet bridges and the management of off-gate parking. Both of these issues are commonly overlooked during the start of any common use strategy involving the gate areas. Case study respondents recommended developing a formula for the amount of off-gate parking that will be needed as operations grow.

Airport case study participants had several pieces of advice for airports considering the common use continuum. First, it is important that airlines see an advantage in moving toward common use. To make the transition from exclusive use toward common use, airport operators must work closely with the airlines and ensure that there is interest and buy-in. Also, it is important for the airport operator to ensure that there is a service-level agreement in place for any services that are the airport operator's responsibility. Several respondents indicated that they have to guarantee service for the network and infrastructure for the common use installation to succeed. The focus of support should be toward the airline agent, especially if the airline has a small station at the airport.

Many respondents also suggested considering how common use can assist an airport operator during construction and growth. In some cases, as they have needed to maintain and upgrade the apron areas, these airports have been able to move airlines to other gates efficiently without affecting the airlines' operations. This has saved time and money, during the maintenance and construction projects that continue at the airport.

CHAPTER SEVEN

AIRPORT CONSIDERATIONS FOR COMMON USE IMPLEMENTATIONS

For various reasons, airport operators are establishing a need for moving along the common use continuum. Based on interviews and limited documentation on the subject, an airport operator may establish need through any one or combination of the following:

- Promote competition. Several airport operators have implemented common use as a method of meeting their FAA competition planning requirements. These planning requirements apply to a limited number of airports. The FAA makes a determination and publishes a list of large- and medium-hub airports that it requires to prepare and submit a competition plan. These airports are characterized as having one or two airlines controlling more than 50% of the annual passenger enplanements. Several of these airport operators have identified common use as a method to enable the required competition at their airport, thus allowing the airport operator to have its PFCs approved to receive a grant issued under the Airport Improvement Program. Many of these competition plans use common use as a tool to provide reasonable and necessary access to ensure that an airport has a level playing field for all entrants to the market.
- Increase efficiencies with limited resources. According to interviews, several airport operators needed to increase service at their airports while keeping airline operating costs down. These operators employed common use to increase gate utilization efficiency and to help defer capital expenditures that would otherwise be necessary for gate, concourse, or terminal construction. Common use can enable airport operators to operate more efficiently and cost-effectively. Increased efficiency is also important if airports are to keep pace with growing workloads brought on largely by low-cost carriers, which typically bring a higher number of flights into a facility. Airports today are squeezing more people through fewer resources. This is a growing concern today, because many existing terminal facilities were not designed to accommodate such intense traffic.
- Increase flexibility of airport resources. For airport operators, a basic mandate today is increased flexibility in both costs and business models, which allows them to adapt to shifts in the business environment. Both airlines and airports are in the process of reinventing themselves and developing business plans that are flexible enough to make dramatic shifts in operations. To a large extent, this means changing the often-rigid agreements that airports have with airlines. Other reasons for increased flexibility include temporary relocation of airline operations owing to construction and demolition and handling of seasonal overflows.
- Provide equal access and facilities. Many of the interviewees identified the need to ensure that airlines have equal facilities available to them, which also enables competition. Some airports have installed LDCSs to enable smaller airlines, charters, and others to provide an alternative to the manual boarding process. This solution allows airlines that do not have LDCS to still support automated, or electronic, boarding procedures. In addition, GIDS are increasingly being added to common use implementations. If GIDS are provided to the airlines by the airport, then airlines that do not have their own GIDS can provide their passengers with information about flight status, standby passengers, and other features that are provided by a GIDS system.
- Allow for new entrant carriers or expansion of existing carriers. Several airport operators indicated that they are concerned about the potential for large, dominant air carrier operations either eliminating or greatly reducing operations at their airport. Without common use, these airports would be unable to reassign these gates to other carriers in a quick and efficient manner. Airport operators are implementing various levels of common use to accommodate access requests of several new entrants and expanding carriers.
- Combination of all. Noted in a recent FAA summary document, an airport stated the following as the basis for common use:

> Installing common use ticketing equipment at ticket counters and gates so that all airlines operating there will use identical gate check-in and gate CUTE equipment, thereby providing maximum flexibility in assigning gates, even on a per flight basis, thereby increasing the opportunities for competition; provides Airline Entry Package and airport facilitates negotiations between requesting carriers and incumbents.

Airport operators that were interviewed all agreed that it is critical for airport operators to identify the needs they are attempting to meet through common use and to clearly convey that need to all of the stakeholders. Once a need is clearly established, there is a growing list of issues an airport operator must consider. Key considerations that were raised in interviews and research included obtaining political backing, identifying the proper business model, assessing impact on all operations, understanding airline operations, and making necessary modifications to airline agreements. Each of these key considerations is discussed in this chapter.

POLITICAL BACKING

Information gleaned through interviews indicated that it is critical for airport operators to have the proper political backing to support any common use initiative. As discussed in this paper, airlines traditionally do not support common use. As with many decisions at airports, there is a large amount of political influence that comes to bear on any major decisions involving airport operations. Airport operators should have a clear understanding of the needs that are required to be filled, as well as any federal or local policies that could influence the decision to implement common use. In many instances, there are no applicable federal or local policies and it may be necessary to create a local policy to facilitate the common use initiative. There are, however, national level strategies that are addressing future demand and capacity. These are causing a ripple effect, from a terminal planning perspective, on airport operators, who are increasingly looking toward common use to solve terminal, capacity, and roadway capacity issues. For a summary of some of the FAA initiatives that affect common use, see Appendix E.

A key element of the political backing is to ensure that the money is available to pay for any common use solutions. It is important not only to ensure that the money is in the budget, but that the authorities required for expenditure approval are properly informed and prepared for the airport's request. Although common use implementations are not as expensive as constructing a concourse or a terminal, the costs are significant, and must be appropriately planned for in the budget.

BUSINESS MODEL AND BUSINESS CASE

All interviewed airport operators emphasized how critical it is to establish a clear business case for common use. As part of this business case, they also indicated that the business model for operating in a common use environment needed to be defined and presented to the airlines. These two elements were identified as the most critical factors in the success or failure of any common use implementation.

Although there are many different business models, the airport operators and airlines interviewed indicated that consistency and cost transparency were critically important. It was clear that airlines were more accepting of the charges necessary to operate a common use implementation if those costs for the system were readily available, explained, and easily understood. Airlines indicated that they were not in favor of including the common use costs as part of a larger, roll-up number in the invoices submitted to the airlines. Airlines and airport operators both appeared to agree that charging based on an enplaned rate may simplify billings and make charges as transparent as possible.

When defining the business case, it is necessary to consider the possibilities of airline bankruptcy, flight schedule reductions, as well as additional airlines and increased flight schedules. Any common use implementation should facilitate expansion of, as well as contraction of, operations. In this way, the business model allows the airport to quickly respond to changes in airline operations without negatively affecting overall airport efficiency.

When presenting the business case to the airlines operating at the airport, the airport operator should clearly communicate its intentions, the needs to be met, and benefits to the airlines. Some airports have successfully supported airlines by enabling them to create their own identity in a common use space and then clear out once they have completed their use of that space. One example is JFK Terminal 4, as seen in Figure 7.

Airport operators should be clear on how common use will benefit the airlines. Areas of consideration include supporting split operations, quarterly growth, and constrictions in routes, as well as facilitating operations to handle changes in passenger volumes. Airport operators should indicate which areas of the airport will be made common use, such as ticketing counters, gate hold rooms, gates, or a combination of areas. The more an airport operator communicates, and the earlier in the process that they communicate, the better informed the airlines will be during the design and implementation process.

ASSESSING IMPACT ON ALL AIRPORT OPERATIONS

During interviews, airport operators stressed the need to analyze carefully all areas of airport operations and the potential impacts of common use installation on each. For example, an airport may choose to install common use at the gates, but may overlook that ticket counters are fully allocated, thereby barring entrant carriers at the ticket counters. Also, increased utilization of the ticket counter areas may adversely affect outbound baggage facilities. The demands placed on utility facilities of "clean power," air conditioning, and backup power must also be considered.

FIGURE 7 JFK Terminal 4.

Once airport operators begin using the common use continuum, they find themselves in new areas of liability, support, and staffing needs that many times are at first overlooked. Here are some examples.

- Maintenance support and costs. Getting beyond the initial capital costs and warranties, one issue to be decided is who will provide the long-term maintenance and support. Some airports have chosen to increase staffing and provide the first-line maintenance support; others have chosen to outsource this function, whereas others have chosen to let the airlines establish a "club maintenance" contract. Each approach has its advantages and disadvantages.
- Accessibility and security. Being the equipment owner of common use components, the airport operator now assumes co-responsibility for issues dealing with accessibility and data security. Compounding the situation is that both of these areas are currently in a state of flux vis-à-vis common use technology components. Airport operators need to be attuned to the latest updates from governing bodies that regulate business operations covered by, for example, ADA and the Payment Card Industry Data Security Standard (PCIDSS).
- Shared access to facility rooms. This is a primary concern when it comes to accessing the various telecommunications network rooms, where the common use network components may share closet space with airport-dedicated network equipment.
- Customer service staff. With the use of CUSS ticketing and other similar common use components, passengers and airlines alike view these services as airport-provided, and airport operators find themselves having to supplement customer service staff, especially in the common areas of the airport.

UNDERSTANDING AIRLINE OPERATIONS

Although most airport operators fully understand that airlines may be hesitant to endorse common use, they still frequently make the mistake of taking the "if you build it, they will come" approach. For example, one airport recently installed a series of free-standing CUSS units throughout the airport facility and is now finding most of the airlines fighting the use of the CUSS units.

One airline explained that with its new business model, it no longer has any need for the self-service check-in kiosks as located and installed by this airport. The airline further stated that the airport operator never really asked its opinion about the function and location of this equipment.

Understanding and working with airline internal maintenance and operations schedules will continue to grow in importance as more airports move down the common use continuum. Airlines have limited resources that must work with each of these airports. To manage their costs, the airlines are establishing internal dates for software changes, hardware deployments, and procedural changes; all of which will impact an airport's success in deploying common use. Airport operators must realistically analyze implementation schedules and help set appropriate expectations for management regarding completion dates and major milestones.

AIRLINE AGREEMENT MODIFICATIONS

Another area for airport operators to consider is the existing airline agreements. Before a common use initiative begins, airport operators should review their existing airline agreements and prepare any needed language updates. Although it is outside the scope of this document to directly address any language within these agreements, the airport operators who were interviewed all recommended that the airline operators consult with their attorneys about the terminology to change, modify, or update in their agreements. It is important, however, to ensure that the airline agreements are not overlooked during the initial planning process to determine whether or not to implement common use. As discussed earlier, each step along the common use continuum requires a different agreement to move from exclusive use, to mixed use, to preferential use, and finally to full common use.

CHAPTER EIGHT

ANALYSIS OF DATA COLLECTION

SURVEY

Surveys were conducted to find out the state of common use facilities and equipment at airports, both in implementation and in the understanding of common use strategies. Full survey results can be found in Appendix D. The surveys proved to be very interesting and the results are analyzed in this chapter. Since airline and airport operator perspectives differ, separate surveys were sent to both. The TRB Panel identified 24 airports to be surveyed. A total of 20 surveys were received, for an 83% response rate. The TRB Panel also identified 13 airlines to be surveyed. A total of 12 airlines surveys were received, for a 92% response rate. The overall response rate to the surveys was 86%.

The following airports responded to the survey:

- JFK International Terminal (Terminal 4)
- Clark County Department of Aviation, McCarran International Airport
- San Francisco International Airport
- Tampa International Airport
- Greater Toronto Airports Authority
- Greater Orlando Airport Authority
- Metropolitan Airports Commission, Minneapolis–St. Paul International Airport
- San Diego County Regional Airport Authority
- Salt Lake City International Airport, Salt Lake City Department of Airports
- Williams Gateway Airport
- Halifax International Airport Authority
- Vancouver International Airport Authority
- Dallas–Fort Worth International Airport
- Amsterdam Airport, Schiphol
- Aéroports de Montréal
- Miami–Dade Aviation Department
- Four anonymous responses.

The following airlines responded to the survey:

- Lufthansa AG
- EasyJet Airline
- American Airlines
- United Airlines
- Qantas Airlines
- Southwest Airlines
- Skybus Airlines
- Delta Airlines
- Air Canada
- Alaska Airlines
- Two anonymous responses.

The survey instruments created revealed many interesting pieces of information with respect to the use, understanding, and implementation of common use strategies. One of the key pieces of information the surveys revealed is that airport operators and airlines have different opinions about the inhibitors of both CUTE and CUSS implementations at airports. When the question of CUTE implementation was asked, airport operators identified the top three reasons airlines do not accept CUTE as:

1. Airline preference for dedicated systems
2. Loss of branding ability
3. Lack of control.

When airlines were asked the same question, they identified the top three reasons as:

1. Lack of control
2. Costs too much
3. Maintenance and support.

These results are shown in Figure 8.

When asked the same question regarding CUSS, airport operators rated the top three causes of inhibiting implementation of CUSS as:

1. Airline preference for dedicated systems
2. Lack of control
3. Loss of branding ability.

Airlines rated the top three reasons as:

1. Lack of control
2. Difficulty with deployment
3. Costs too much.

These results are shown in Figure 9.

Both of these charts indicate there is a difference of opinion as to what inhibits the implementation of common use systems at airports. Unfortunately, airlines were not asked if

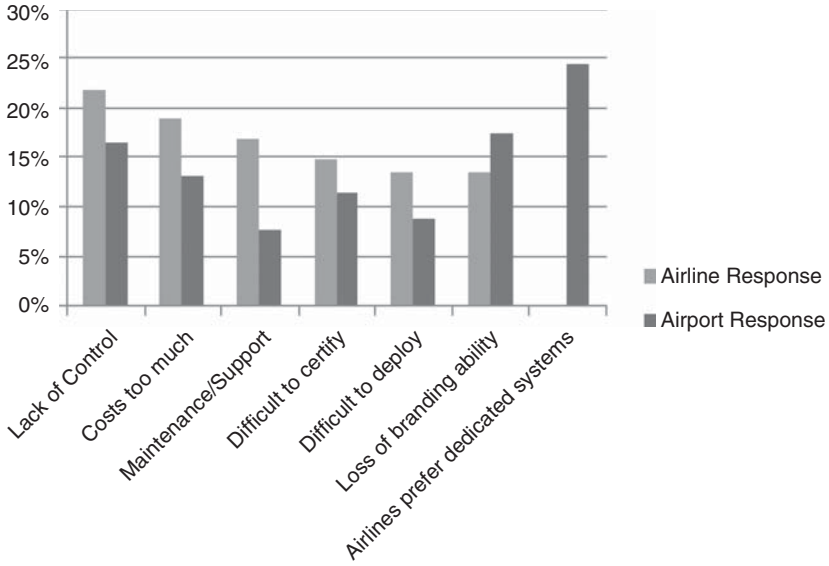


FIGURE 8 CUTE inhibitors ranked by airports and airlines.

they preferred dedicated systems, so this somewhat skews the data results. However, it is interesting how different the remaining inhibitors are between the two entities. These charts alone indicate that there is a need for an open and honest dialog between airport operators and airlines. Until there is an agreement as to what the inhibitors are, it will be difficult to determine how to overcome them for the benefit of the industry.

Airlines were also asked to rank the reasons why their airline might choose to use a CUTE system at a given airport. The number one answer was that the airport operator required its use. This was followed by a need to share gates. This question indicates that in general there is not a willingness to use CUTE voluntarily at an airport. When combined with the answers shown in Figure 9, it is clear that the airport operator needs to consider airlines' involvement in the process of procuring, implementing, and maintaining a CUTE system. Figure 10 shows the response to this question.

As a related question, airlines were asked whether they believed airport operators were doing well in implementing common use at their airports. There were some common themes in the answers. Overall, CUTE was viewed as a success, but CUSS was not. It was noted on several responses that airport operators that included airlines early in the process were viewed as successful. CUTE's success in Europe was identified, as was the ability of an airport to keep an open book policy toward the fees charged for common use.

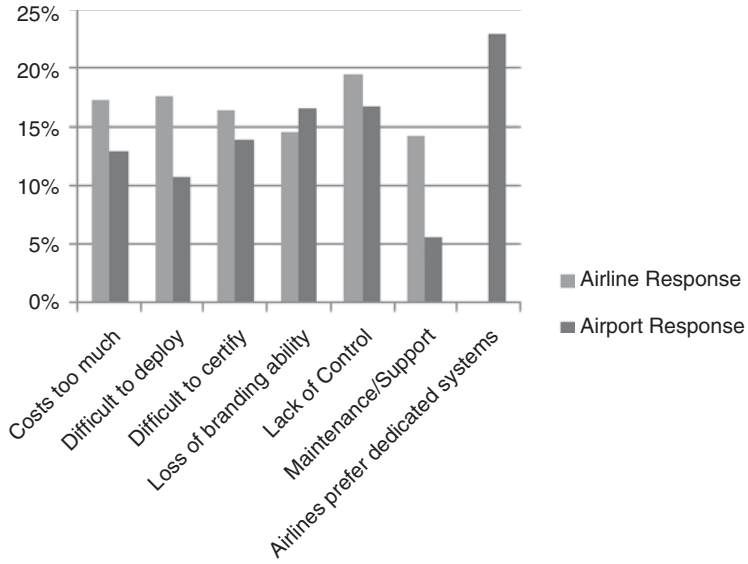


FIGURE 9 CUSS inhibitors ranked by airports and airlines.

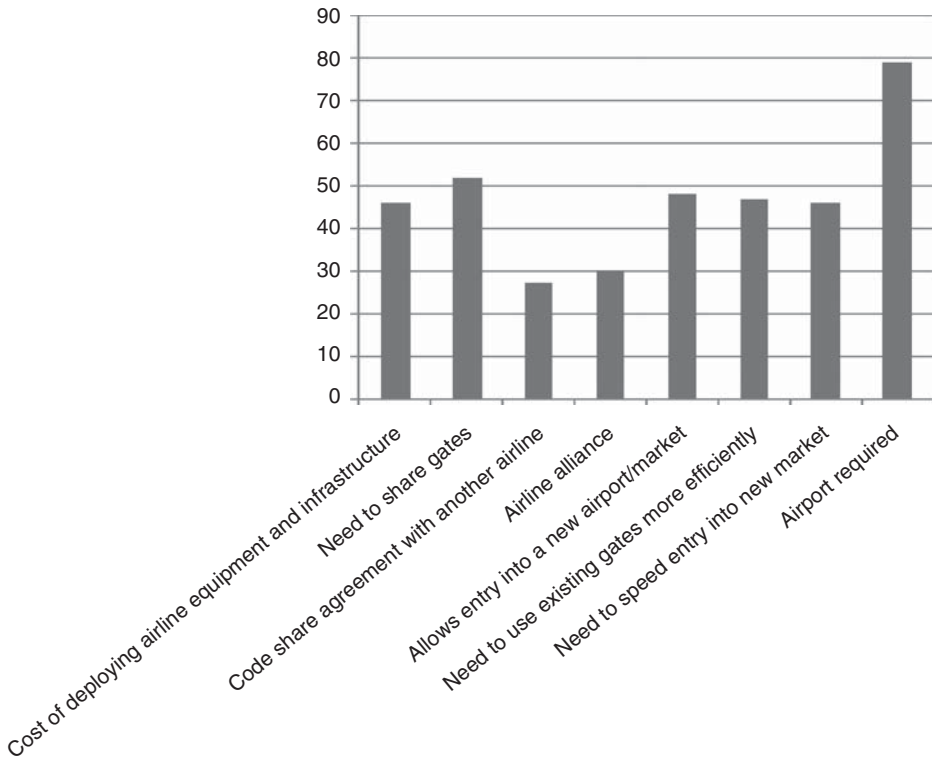


FIGURE 10 Airlines' reasons to choose to operate on CUTE.

Airlines expressed the concern that non-U.S. airport operators are starting to view common use as a profit center, which has a great impact on the airline. In interviews with airlines, there seems to be a willingness to accept common use expenses as a cost plus model, but it is when this service is looked at as a way to increase profits, as it is in some non-U.S. airports, that airlines begin to struggle with the concept. From an airline point of view, the airport operator receives the greatest benefit from common use strategies. As such, airport operators should be willing to take that into account when developing pricing models for common use (Behan 2006). However, the type of charging system also needs to be considered, as to whether it is residual or compensatory rates and charges system. It could be that if the airport benefits, then all of the airlines do too.

When asked what airport operators were not doing well, the responses paralleled what the airport operators were doing well. Survey results showed it is very important to the airlines that they be included early on in the procurement process. It is also noted that several airlines believe CUSS has not been implemented well. It is important to note that some of the responses indicated an animosity between airlines and airport operators. Some airlines responded that airport operators are doing nothing well. Again, this indicates a lack of communication.

Of the airlines surveyed, 68% stated they do not have a service-level agreement with a common use provider. This information is interesting in that it is the airline, or its vendor, that has to create the application, but the platform provider that has to deploy it to the end location. The airlines are dependent on the platform provider to certify and release their code, but they have no service-level agreement to enforce a timely release cycle (see Figure 11). A successful common use installation at an airport must take this into account. If the contractual relationship with the vendor is owned by the airport, then the airport operator must work with the airlines to ensure that reasonable terms are put in place to facilitate the efficient release of application updates. Although this is traditionally viewed as the airline's issue and not the airport operator's, in the common use continuum, airport operators are taking more of the airline's traditional responsibilities.

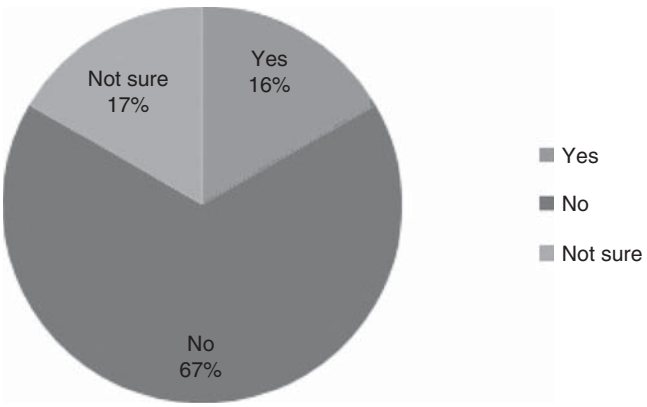


FIGURE 11 Airline service-level agreements with common use providers.

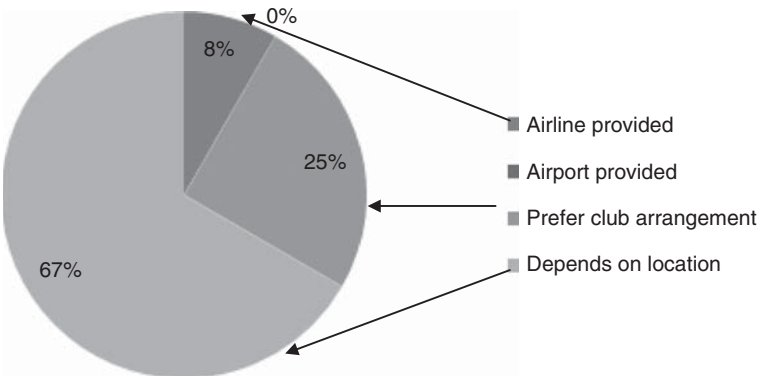


FIGURE 12 CUTE equipment provisions.

When airlines were asked what type of common use arrangement was preferred, 67% answered that it was dependent on location, whereas 25% stated they preferred the CLUB arrangement. This bears further investigation, but it could indicate that airlines are open to different models based on the size and location of the station in question. None of the respondents preferred to have the airport operator provide the CUTE equipment. This again indicates a distrust of the process that airport operators are using and that airlines are concerned with their participation in the procurement of CUTE equipment (see Figure 12).

Even with airlines concerns over the use and procurement of common use, almost all of the respondents are operating on a CUTE environment and a large percentage are operating on a CUSS environment.

Of the 12 responses received, 11 airlines, or 93%, indicated they are already operating in a CUTE environment. Nine airlines, or 75%, indicated they are currently operating CUSS environment (see Figures 13 and 14).

When looking at supporting technologies for common use, 67% of airline respondents stated that MUFIDS helped to improve the implementation of common use strategies. This was followed by 33% supporting Voice over IP (VoIP).

This is also evident in practice, as more and more airport operators have installed MUFIDS systems to aide passengers in finding their flight, and to provide 'meeters and greeters' the ability to find their party efficiently. Respondents of the survey did not regard other technologies as beneficial. This could partly be because they are in limited use, the technologies are not understood, or they are not seen as adding value to the process. In any case, it is important to discover the true reason, as well as to assist the industry in understanding the value, if any, of these supporting technologies. Figure 15 gives the airlines' perspective on additional common use technologies, and their value or importance in a common use airport.

Internet or online check-in is also having an impact on the common use continuum. As more travelers begin their check-in process at home, there will be a direct correlation to the use and need of check-in facilities at airports. Most of the airlines surveyed stated that 10% to 20% of their passengers

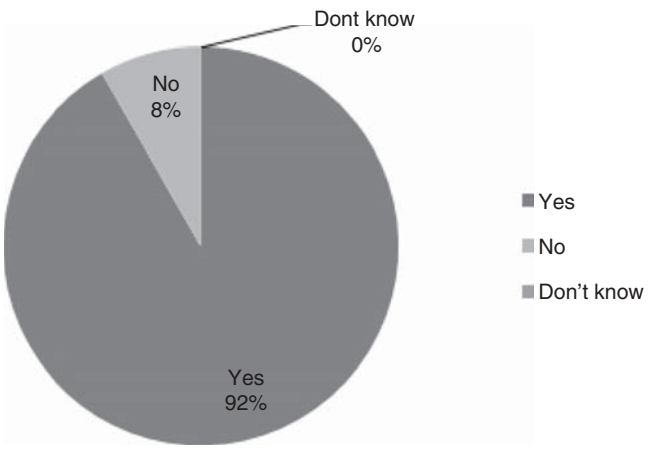


FIGURE 13 Airlines currently operating in a CUTE environment.

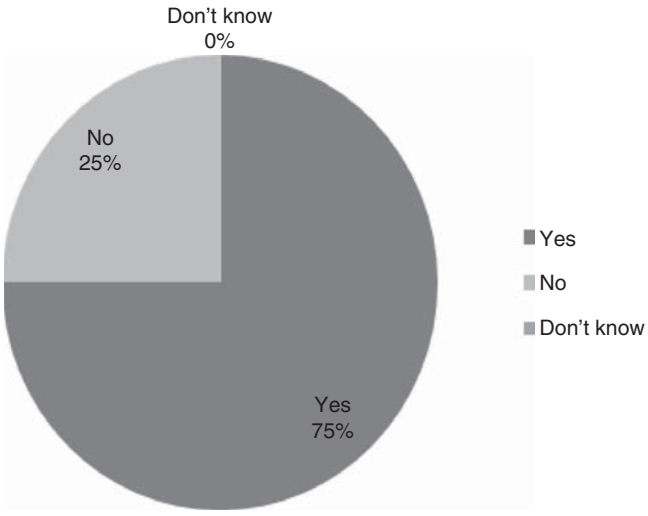


FIGURE 14 Airlines currently operating in a CUSS environment.

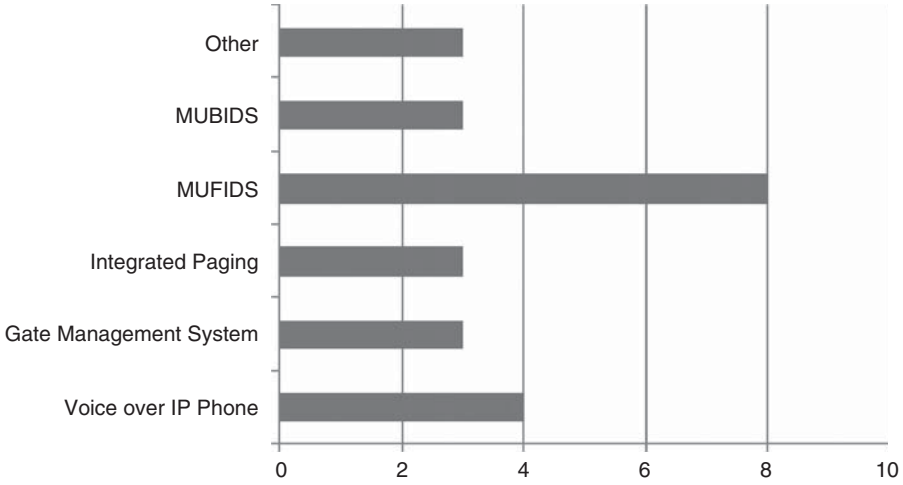


FIGURE 15 Common use supporting technologies.

check-in online. Three airlines indicated that 40% or more of their passengers check in online. Although one of these numbers is not substantiated, it does indicate the types of travelers that an airline is reaching as well as the increasing saturation of online check-in. Nine of the ten results are substantiated through actual accounts or professional estimates. Figure 16 shows, by airline, the percent of passengers that are checking in by means of the Internet. For example, 60% of the respondents indicated that 10% to 19% of their passengers are using the internet to check-in for flights.

The survey also sought from the airlines which vendors' platforms the airlines had a CUTE application certified under. While there is currently no industry source to determine the number of airlines supported at a given CUTE installation, the results of this survey question indicate that there are two very dominant vendors, and two additional vendors that have a higher percentage of the respondent's applications. Further research is required to get a better picture of the industry, but the results of this survey question support the idea that airlines would prefer the installation of vendors with which they already have an application working and certified. IATA is currently working on a survey to determine the exact airlines that are supported at a specific airport by a specific vendor. The survey is expected to be released in August of 2007. This also becomes a barrier to entry into the marketplace for new vendors wanting to provide solutions (see Figure 17).

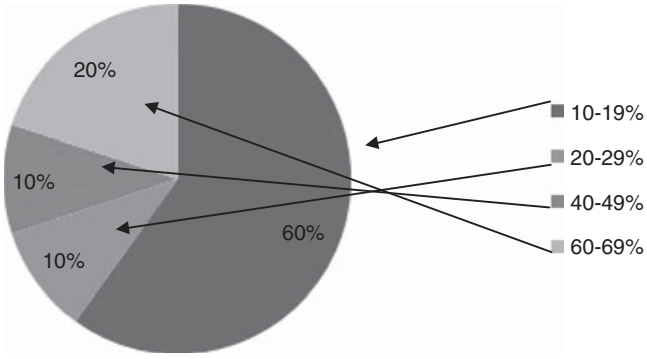


FIGURE 16 Percent of passengers using Internet check-in.

Additionally, the survey asked airlines about their CUSS applications and which vendors they currently had applications certified with and deployed. Although the field of CUSS vendors is relatively small, smaller than CUTE vendors, there were two dominant vendors. Combining this with the data gathered from IATA and industry research, it is possible to get a clear picture on the number of airline applications and vendor supports. It is interesting to note that IBM has worked with ARINC and IER on past installations, so the picture of purely IBM, ARINC, and IER is somewhat blurred in the chart. Refer to Appendix A for the full data supporting the industry information in the figures.

The survey also revealed a number of business models used to charge for common use facilities and services. Although there are several ways to charge for common use services, 60% of airport operators surveyed include the common use fees in the rates and charges. Figure 18 shows a comparison between the survey results and the industry results shown in Appendix A.

In interviews with various airlines, and through industry experience, this method appears less desirable because it does not lend itself to visibility of the charges. Airport operators argue, on the other hand, that airlines want the visibility so they can negotiate different terms. This is another area that requires research, but ultimately clear and open communication can resolve these differences (see Figure 19 for more information).

For the airport operators surveyed, the main driver for moving along the common use continuum was the ability to maximize the use of existing gates. This indicates that airport operators believe their gates are underutilized and that this underutilization is the main inhibitor to growth at their airports. While this implies the deferral of capital expenditures, the actual deferral of those expenditures was not a driving factor in

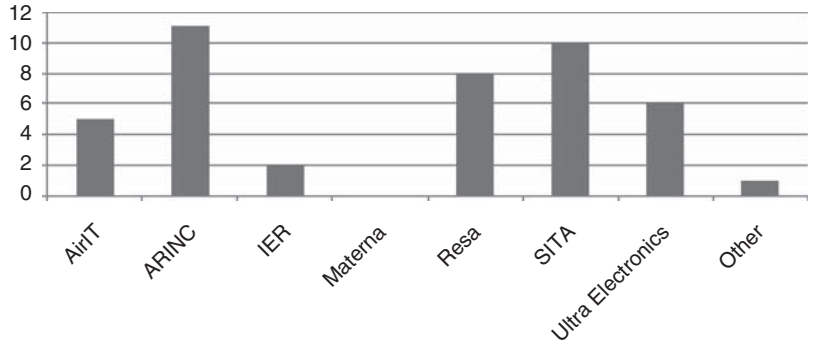


FIGURE 17 CUTE airline applications, by vendor.

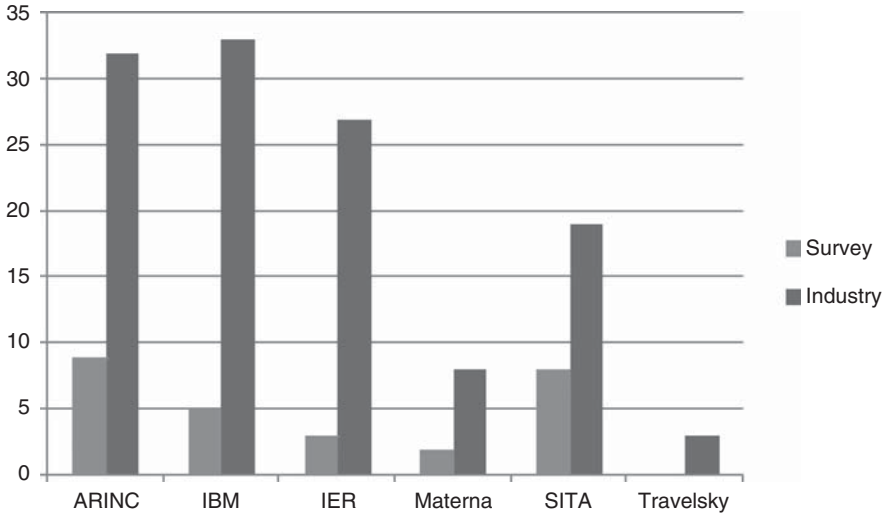


FIGURE 18 CUSS airline applications, by vendor.

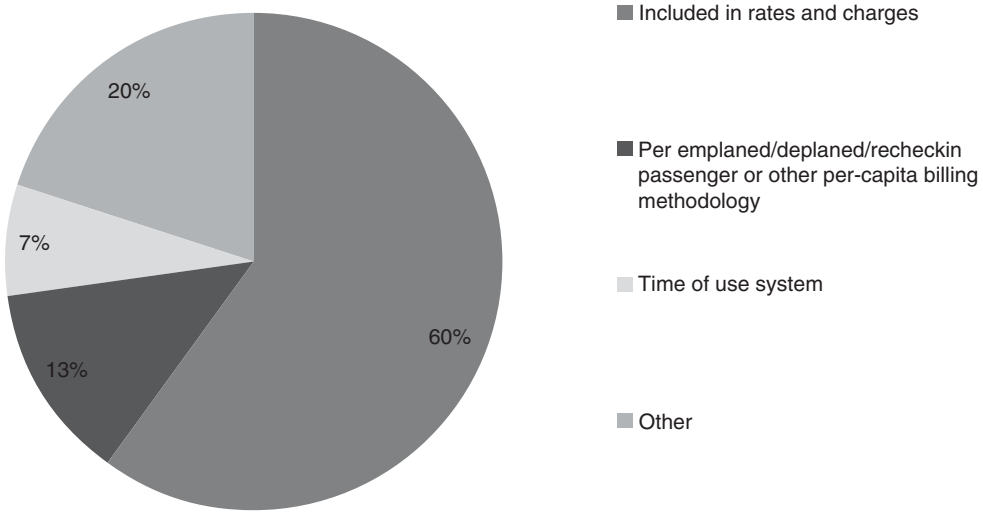


FIGURE 19 Costing models for common use.

making the decision to move along the common use continuum. Passenger flow and customer service ranked second in importance, and combined they are the largest factor for implementing common use strategies, since passenger flow is related to customer service. Limitations to growth and other factors were not as important as these in the opinions of the airport operators surveyed (see Figure 20).

One airport responded to the survey that they did not have common use and had no plans to implement any common use

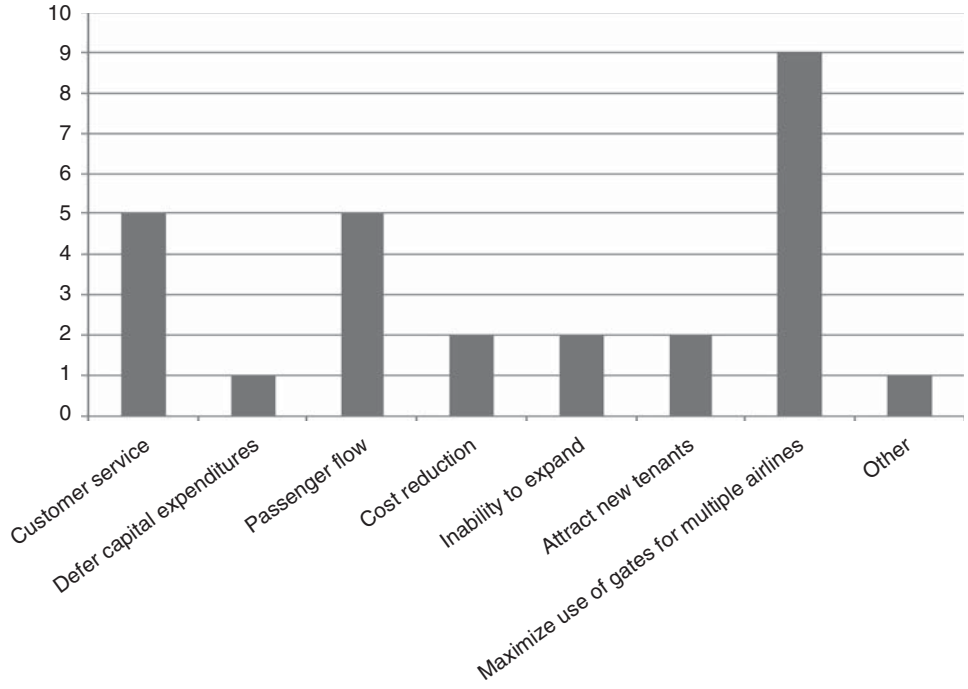


FIGURE 20 Reasons to move along the common use continuum.

strategies. The response indicated that because the airport was a hub for a single airline there was no need to implement common use. This also supports the need to review an airport's airline make-up to determine if a common use strategy would make sense to implement.

When asked about Common Use Passenger Processing Systems (CUPPS), 92% of airlines and 95% of airport operators responded that they were aware of the initiative. When asked if they supported the CUPPS initiative, 92% of airlines stated they were in support of CUPPS.

This shows that there has been a tremendous amount of education done on the CUPPS initiative and there is a high level of awareness and support within the industry. Several airlines have stated both in survey results as well as in official company positions, that they fully support CUPPS and are actively participating in the development of the standard. The CUPPS standard, set to go before the Joint Passengers Service Committee (JPSC) in September of 2007, is supported across industry organizations. IATA, ATA, and ACI have agreed to support the final recommended practice, and each has reserved a number in their recommended practices for inclusion of the CUPPS standard.

LITERATURE

As stated in previous chapters, the amount of published literature on common use currently available is limited in nature and scope. One interesting source of information is the procurement documents produced by airport operators that have begun the migration along the common use continuum. While these documents tend to be large and have a lot of contractual information, they also contain a wealth of knowledge about what airport operators are searching for to meet their common use strategies. Many of these documents are available through Freedom of Information Act requests to the respective governmental institutions.

INDUSTRY SOURCES AND EXPERIENCE

The aviation industry, in general, has a large amount of "tribal knowledge" that has not been documented. This knowledge is passed through experience from person to person. As a result, it becomes important to develop relationships with people across the industry to gather information on topics of interest. For this purpose it has become common practice to meet through industry associations, conferences, and training opportunities. Credible and useful sources of information include IATA, ATA, ACI, and AAAE. Each of these organizations provides opportunities for airlines and airport operators to share knowledge as well as learn about the state of the industry.

IATA continues to work with its members to create specifications and recommended practices for the industry. Among the specifications and recommended practices that IATA has created are the specifications for Common Use Terminal Equipment (CUTE), Common Use Self-Service (CUSS), and other common use specifications.

These specifications and recommended practices shape the industry and the manner in which common use is implemented at airports. IATA continues to review specifications and recommended practices, updating or replacing them as

necessary. One recommended practice currently being updated is the CUTE RP. The replacement to CUTE is known as Common Use Passenger Processing System (CUPPS).

The guiding principles for CUPPS are:

1. Applications that run on any platform
2. CUPPS facilitates business processes rather than mandates
3. CUPPS platform with minimum and defined functionality
4. Affordability
5. Serviceability
6. Predictability.

The CUPPS Recommended Practice is planned to go before the Joint Passenger Services Committee for approval in September 2007.

Through experience, airports are learning about many of the concerns an airline may have that are inhibiting common use strategies. It is important to be ready to address these concerns if the move along the common use continuum is to be successful. Listed here are common concerns that have been raised through the implementation of a common use strategy. Although there are many possible resolutions, some suggestions are offered here to aide in the process.

Concern: Although common use strategies are widely accepted in Europe, the whole basis of the relationship between airport and air carrier is different in the United States. It is not the way in which the U.S. airlines are accustomed to working, and there can be some resistance.

Response: Work closely with the airport and the airlines on the original installation, working around the airlines' schedules so that there is minimal disruption to operation of the airport. Develop a timeline with each airline to ensure they can successfully convert to the common use environment, but within a timeframe to which they have agreed.

Concern: Airlines can perceive common-use as an infringement of their control.

Response: Before installation, perform even more-then-perceived as necessary consultation sessions with the airlines to obtain stakeholder involvement. This can contribute greatly to the success of the acceptance of the project. Make one of the selection criteria for the successful Platform Provider that they support the majority of the airlines at that airport.

Concern: Service support after installation can be costly and/or poor. Response time seldom meets the near-immediate needs of the airlines.

Response: Whether service is provided by platform provider, in-house, or third party, this service should be competitively bid, and assurances made (SLAs) for single-point of contact, access to a pool of trained engineers, and 24-7 support for the airport. In addition, the selection criteria for support services should not be based on cost, but the majority of the points should be based on experience and knowledge.

Concern: Our full system functionality will not be available unless you use our peripherals.

Response: CUTE uses a common set of peripherals that all airlines must use. There are cases where one or two airlines need specialized equipment or peripherals. In these cases, the platform providers have certified hardware that provides the functionality required. If they do not, the platform providers have a method to certify peripherals as necessary. In addition, since the airline is responsible for the common use application, all functionality is based on the application that they create, or that is created for them by a vendor.

Concern: Airlines do not want to pay for the more expensive system equipment other airlines may be using.

Response: Some airport operators have required that specialized equipment be purchased by the airline that requires it, rather than embedding that cost in the PFC charges for all airlines. Other airport operators have accepted this cost as the cost of doing business and do not pass the charges on to the airlines. Still others have added a nominal increase to the PFCs. Airport operators and airlines must work up front and throughout the process in an open-discussion atmosphere as to how to distribute costs.

Concern: The system will end up either being the least common denominator from a technology side or it will end up being more costly for low cost air carriers.

Response: All major airlines now have CUTE applications and are supporting them for other airports. The small commuter airlines, and some foreign airlines, mostly from South and Central America, do not have CUTE applications and will need to have other facilities provided for them. Support costs for those airlines that already have CUTE applications are already accounted for in their cost models.

Concern: Facilitating is better than mandating. We have immediate needs across many airports and we do not like being told what to do at any particular airport.

Response: Develop a timeline with each airline to ensure they can successfully convert to the common use environment, but within a timeframe to which they have agreed.

Concern: We need the ability to understand costs. Cost transparency is always necessary. No additional

cost for updates and software delivery, either local or through provider. Cost per passenger should be known. The airport should provide equal treatment for all IT users in all billing, charging, and invoicing issues.

Response: Airport policy will dictate the sharing of cost information with airlines. However, upgrade costs and software costs should be included in the original contract with the platform provider. Any costs associated with the airline's application should already be accounted for in their costing models.

Concern: We need the installation of a local IT member board to communicate with the airlines, IT provider(s), and airports for problem solutions, further developments, and provider RFPs.

Response: The inclusion and support of airline IT members early in the process should be encouraged and facilitates a cooperative environment. This member(s) should be a part of all phases of the process through installation and acceptance.

Concern: CUTE is a "great system" suited to international Air Carriers, but not so great for domestic carriers. "CUTE is the common way of accessing information within international terminals."

Response: Many domestic carriers also fly international or will be flying international (Canada and Mexico). CUTE is also used for domestic flights in airports that are constrained in the current facilities and space that they have in which to operate.

CHAPTER NINE

SUMMARY OF FINDINGS AND SUGGESTIONS FOR FURTHER RESEARCH

The common use continuum continues to develop and the benefits continue to increase. From its beginnings in 1984, the common use movement and the growth of the continuum have benefited the industry. As airport operators continue to struggle with the best use of their constrained space, vendors, airlines, airports, and other interested parties continue to push the limits of the common use continuum. The following conclusions are based on this continued change and the results of the literature and knowledge search contained in this synthesis.

- Industry-Wide Importance and Benefits of the Common Use Continuum

Common use is of growing interest to airports and airlines. Although the literature and available recorded knowledge is limited, it is an important field and has a great impact on the airport and airline community. Both airport operators and airlines stand to benefit from the implementation of common use. Airport operators gain by greater efficiency and more flexibility in using their space, expanded airport capacity, opportunities for increased competition, and an environment that is easier to maintain. Airlines gain more flexibility in changing schedules, opportunities to lower costs, and a potentially lower cost of entry into a new market. The converse is also true, in that if a common use implementation is poorly planned and implemented, airport operators and airlines stand to lose.

Passengers also recognize the benefits of common use when an airport operator moves along the common use continuum. Common use enables airport operators and airlines to move the check-in process farther from the airport, thus allowing passengers to perform at least part of the process remotely. In some cases, the passenger can complete the check-in process, including baggage check, before ever entering the airport. This allows passengers to travel lighter. It also affords passengers a more leisurely trip to the airport, allowing them to enjoy their vacation a little longer, and with less stress. Passengers arriving at an airport that has implemented common use have more time to spend getting to their gate and may not feel as rushed and frustrated by the travelling experience. A positive experience translates into a positive image for both the airport and the airline. Such an experience can lead to recognition and awards for the airlines and the airport operators.

- Lack of Information Resources

Throughout this process, it has become evident that the lack of formal, documented studies; educational resources; and published materials about common use systems and strategies compels anyone interested in learning about common use to do so through trial and error, acquiring knowledge through first-hand experience. There is considerable "tribal" knowledge in the focused portion of the industry, but it has not been formally gathered.

Much of the documented information available is provided by vendors in the form of marketing material. Although information can be gleaned from these documents, they do not present a balanced picture of the common use continuum to assist stakeholders in learning about common use. Unlike some topics, there was no central location to go to learn about the topic of common use. Information available from industry organizations, such as the International Air Transport Association (IATA), is provided at a very high level or is not freely available.

- The Need for Careful Planning and Open Communications

It is important that any movement along the common use continuum be carefully considered to address the benefits and concerns of all parties. Airport operators must consider whether or not common use would be appropriate at their airport. If the airport has one or two dominant carriers, it may not make sense to move too far along the common use continuum. Airports and airlines must work closely during the design of the common use strategy to ensure that the passengers receive the benefit of the effort. It is the airline that brings the customer to the airport, but it is the airport that allows the airline to operate in a given market.

Both airlines and airport operators must communicate openly and honestly when introducing common use. If airport operators include airlines in the design process, then all interested parties are able to affect the outcome of the strategy for the better. Airport operators could make the extra effort to ensure that airline participation is facilitated. Scheduling both remote meetings and face-to-face meetings is one way to put in the effort needed to include airline staff. Airlines, likewise, need to make a commitment to participate in the process. When an airport operator moves along the common use continuum, it is in the best interest of the airline to participate in the design.

- Understanding the Airline's Resistance to the Common Use Continuum

Airlines generally have a somewhat negative view of common use initiatives, for several reasons. As has been shown in this report, when a non-U.S. airport operator views common use as a profit center, the airlines are not in favor of the initiative. Also, when airport operators move along the common use continuum without the input of the airlines currently serving that airport there can be distrust in the motivation and a concern that the airport's strategy will not support the airline business processes put in place to support its passengers. The converse can also be true, in that airport operators that engage the airlines in the process generally succeed in their common use initiatives.

This review of the common use continuum highlights six areas for continued study. A discussion of these areas follows.

1. Complete a Full Common Use Continuum Analysis—This synthesis generally defines the common use continuum and gives it a high-level overview. It is recommended that a full analysis of the common use continuum be performed. Such an analysis would examine each of the elements of common use, from technology to facilities, and from physical modifications to personnel requirements. The analysis of the common use continuum would identify which elements need to be addressed to move along the common use continuum. Additionally, this analysis could identify other areas where common use solutions need to be developed for future migration along the common use continuum. The results of this analysis itself could help the industry better understand the benefits, impacts, and concerns of common use initiatives. Also, the results of such an analysis could have direct input to the following recommendations.

   This analysis could consider space planning review to ensure that growth on the common use continuum does not exceed the inherent limitations of the airport space or operations. Two such examples include:

   - Common use ticket counter design—It is possible to design too much counter utilization, such that the baggage conveyor systems are rendered inadequate to accommodate the full implementation of the common use counters.
   - Gate utilization and off-gate parking models—As an airport moves along the common use continuum, gate utilization becomes much more granular and off-gate parking becomes much more important. Airports need to have a model that can assist them in calculating efficient gate utilization. The model also needs to identify the ratio of off-gate parking to the number of airlines operating at an airport. The ratio of off-gate parking also needs to be compared with the number of gates and the number of aircraft turns per gate. This model could add value to the analysis process of determining whether a common use strategy should be implemented. Furthermore, this model could help airports account for needed off-gate parking to facilitate further growth of the passenger activity at the airport.

   This analysis could also consider certification and deployment models for common use applications that have been identified as an area of concern within the industry. Current certification and deployment models are looked on today with varying degrees of success.

   A valuable area of research might be to identify other industries with similar certification and deployment needs, and determine how their models of certification and deployment would be applied to the airline industry. Opportunity exists for improving the certification and deployment process and ensuring that the time that it takes to release a certified application is reduced to the shortest time possible.

   As a final element of the analysis, a cost-recovery model should be developed. Common use strategies have implementation costs. Some airlines argue that the common use strategies should be implemented by airport operators without cost to the airlines. Many airport operators are unable to give goods or services for free owing to municipal, state, or federal government laws. Airport operators may need to charge airlines on a cost-recovery basis. This information, along with the cost/benefit analysis, could provide airports with the ability to properly charge for a common use strategy, allowing airlines and airports to receive benefit from the implementation of the common use strategy.
2. Prepare a Cost/Benefit Analysis Template—Creation of a cost/benefit analysis template could enable both airport operators and airlines to review the benefits of a common use strategy. The identified benefits of this strategy have not been clearly tied to costs that could be incurred when making a move along the common use continuum. Each airport installation will be different; however, there are some common costs and benefits that could be analyzed and made available to the industry. It could also be beneficial to conduct a review of the costs associated with proprietary airline systems and develop a comparative cost model where implementation of a common use strategy could be compared with the airline expenses for installing and maintaining dedicated systems. This would be a general assessment that would include quantitative and qualitative system factors. Although individual airlines deploy differing systems with differential investments, a generalized comparative assessment could be a demonstration of cost compatibility. Preparation of the cost/benefit analysis template could be conducted in coordination with the preparation of the design guidelines.
3. Establish a Common Use Knowledge Base and Users Group—The amount of information available to educate and share on common use is limited. Tools and

forums exist today for people to share information about topics of mutual interest. A common use knowledge base would allow airports and airlines the ability to research industry knowledge that is currently available, but not well documented. A user group for the common use continuum would allow airports and airlines to share experience, answer questions, and gain knowledge about common use strategies and how to implement them successfully.

The knowledge base could consist of its own website, electronic library, and on-line user group. A global organization could solicit endorsement/sponsorship from the existing professional organizations such that user group sessions could be held in coordination with annual conferences. The documentation resources identified in this synthesis can be a starting point, along with the results of the full analysis. Continuing feedback from this knowledge base and user group would benefit all stakeholders in preparation of design guidelines as recommended here.

4. Prepare a Common Use Design and Implementation Guide—IATA has created a Common Use Self-Service (CUSS) implementation guide that can be of assistance to airports wanting to implement CUSS. Similarly, IATA has introduced intelligence tools such as AirportIS, which help airport operators understand market dynamics and peer-to-peer comparisons. Through such tools, the end user can conduct various analyses to identify and evaluate new ideas, benchmark one airport against another, and improve design-related techniques. It is recommended that the preparation of these guidelines take the same approach, so that an airport operator could have one document at its disposal to begin a common use strategy and design process. A common use design and implementation guide would provide the tools necessary for the airport operators to determine what elements of a common use strategy to implement and the benefit of those implementations. The design and implementation guide could provide best practices, answer common questions, and assist in the initial design and implementation of a common use strategy. It could also give airport operators some guidance about the order in which to implement common use strategies to make the most effective use of capital expenditures. The guide could also be timed with the release of the IATA/ATA/ACI recommended practice for the Common Use Passenger Processing System (CUPPS) so as to take into account the implementation requirements of CUPPS.
5. Establish Best Practices in Support and Maintenance—Support and maintenance of common use strategies and solutions are important to their success and require best practices research. Such research could examine account processes, such as ITIL and ISO, as well as review support and maintenance practices in other industries. The best practices could then be gathered and presented to the industry so that support and maintenance would be at levels that exceed the expectations of the industry.
6. Develop a Funding Model—Airport operators need to identify sources of funding common use initiatives. Along with identifying potential sources of funding, they also need to develop a model that will aid them in determining the feasibility of implementing common use. This model would allow airport operators to determine appropriate funding sources, as well as determine the business model, costing, etc., of a common use system. Based on the variables defined in the model, the airport operator would be able to determine the potential benefits of implementing common use.

GLOSSARY

Access control—Practice of restricting entrance to a property, a building, or a room to authorized persons only.

Air Operations Database (AODB)—Central database to be used for collecting, analyzing, and sharing the airports operational data among the approved users and other applications.

Airports Council International (ACI)—Worldwide airport organization that focuses primarily on international aviation issues while concurrently supporting the services and programs of the members in each of its five regions.

Air Transport Association (ATA)—Trade association of U.S. airlines. Its primary purpose is to represent the airlines in government decisions regarding aviation.

American Association of Airport Executives (AAAE)—Professional organization of airport executives, whose primary goal is to assist airport executives in fulfilling their responsibilities to the airports and communities they serve.

Application provider—Entity responsible for the provision and management of its applications accessible from a CUPPS workstation; for example, an airline or third party.

Application supplier—Entity responsible for the development and/or support of an application.

Association of European Airlines (AEA)—Commonly refers to the ATB and BTP printer specifications maintained by AEA.

Baggage Reconciliation System (BRS)—Automated system designed to provide for the electronic tracking and matching of baggage.

Baggage reconciliation/tracking—Method of baggage management that creates a bag tag and tracks the baggage throughout the sortation process until it is delivered to the aircraft or the baggage belt.

Building management systems—Building management systems are the systems necessary to operate a building. These systems include heating, ventilation, and air conditioning (HVAC); energy management control systems; fire detection systems; standby power systems; lighting systems; etc.

Closed circuit television (CCTV)—Surveillance equipment used to monitor activities within a required area.

Common use—Process, systems, and physical changes needed at an airport to make gates useable by multiple airlines.

Common use continuum—Method of measuring the capacity of common use changes at an airport.

Common Use Passenger Processing (CUPPS)—Describes the range of services, specifications, and standards enacted to enable multiple airlines to share physical check-in and/or gate podium positions (whether simultaneously or consecutively).

Common Use Self-Service (CUSS)—Standard for multiple airlines to provide a check-in application for use by passengers on a single device. IATA and ATA adopted this new standard during the Joint Passenger Service Conference in November 2000. The IATA reference is RP1706C and the ATA reference is 30.100.

Common use strategy—Plans put together by an airport or an airline to execute common use solutions.

Common use technical equipment (CUTE)—Computer system provided to airlines by the airport that allows airline staff to access their own computer systems without having their own dedicated equipment, while allowing more flexible and efficient use of airport facilities.

CUPPS application—Certified business application that will run on all CUPPS certified platforms. The CUPPS application is the essential part of the CUPPS system providing the functionality the CUPPS workstation offers. It depends on the CUPPS application whether a workstation can be used for ticketing, as a gate podium workstation, jet way podium, or anything else. There is theoretically no limitation as to the nature and number of applications that can be offered on a CUPPS system. The provider of the CUPPS application could be an airline, airport, or a third party.

CUPPS management group—A CUPPS management group comprised of airlines, airports and IATA partners will be responsible for managing the certification process and amending CUPPS standards.

CUPPS platform—This defined environment supports applications for one or more airlines and conforms to the standards as described in this Recommended Practice.

CUTE CLUB—Cute Local User Board.

Dynamic signage—Signage using electronic screens such as liquid crystal display (LCD) or plasma screens that can be used to display information to passengers. The information on these screens can change, thus making them dynamic.

Gate management system (GMS)—Automated system used to manage, consistent with specified airport/airline business goals, the assignment of airport gates for use by aircraft and potentially services through different airlines. A GMS allows an airport operator or airline to plan, operate, manage, and document the usage of the gates. Depending on sophistication, a GMS can also manage the many resources critical to the movement of aircraft at airport gates. Highly sophisticated systems are better known as resource management systems.

GIDs—Gate information displays.

GIS—Geographical information system.

Hard stand—Hard-surfaced area for parking aircraft or ground vehicles, usually away from the gates.

Information Technology Infrastructure Library (ITIL)—Set of concepts and techniques for managing information technology (IT) infrastructure, development, and operations.

International Air Transport Association (IATA)—Global trade organization for airlines whose mission is to represent, lead, and serve the airline industry.

Joint Passenger Services Committee (JPSC)—Joint committee between IATA and ATA.

Local Boarding Application (LBA)—Allows each airline to communicate with its own host computer system.

Local Departure Control System (LDCS)—Facilitates reconciliation of passenger check-in with reservations, records seat assignments, and prints boarding passes, bag tags, and flight manifests. An LDCS is intended for use by airlines that are not linked to a host system.

MOU—Memorandum of Understanding.

Multi-User Baggage Information Display System (MUBIDS)—Dynamic display that shows baggage carousel locations for all incoming flights.

Multi-User Flight Information Display System (MUFIDS)—Dynamic display that shows consolidated flight information for all flight activity at an airport for a defined period of time.

OPDB—Operational database (see AODB).

Platform provider—Entity responsible for ongoing provision and management of the platform. The platform provider could be an airport, airline, or third party company.

Platform supplier—Entity that provides any component of the platform.

Premise Distribution System (PDS)—Engineered cable plant designed with the intent of supporting all communications systems network interconnection needs for a substantial period of time.

Remain over night (RON)—Areas of an airport used for the overnight parking and staging of an aircraft.

Service provider—Entity responsible for maintaining the operational service performance of the platform.

Simplifying the Business (StB)—Collection of the following five initiatives by IATA to improve passenger processing and airline business:

1. E-ticketing
2. Common Use Self-Service
3. Bar-coded boarding pass
4. Radio frequency ID
5. IATA e-Freight.

Telephony—Use or operation of an apparatus or device for the transmission of sounds between distinct, separate points.

Voice over IP (VoIP)—Technology used to transmit voice conversations over a data network using the Internet protocol.

Web application services—Standardized way of integrating web-based applications using standard protocols over the Internet.

REFERENCES

Behan, P., "The Case for Common Use Self Service," *International Airport Review*, Issue 1, 2006, pp. 67–68.

Broderick, S., "One for All," *Airport Magazine,* Vol. 16, No. 3, 2004, pp. 52–53.

"Common Use Facilities," Operating Procedures, Greater Orlando Aviation Authority, Orlando, Fla., 2004.

de Neufville, R. and S. Belin, "Airport Passenger Buildings: Efficiency through Shared Use of Facilities," *Journal of Transportation Engineering,* Vol. 128, No. 3, May/June 2002, pp. 201–210.

"E-Ticketing Comes of Age," *Jane's Airport Review*, Vol. 18, No. 2, Mar. 2006, pp. 28–29.

FAA Order 5100.38C—Airport Improvement Program Handbook, Federal Aviation Administration, U.S. Department of Transportation, Washington, D.C., June 28, 2005.

Finn, M., "The Common Use Journey: From LA to Athens: The Olympic Games and the Common Use Journey," *Airports International*, 2005, p. 27.

Gesell, L. and R. Sobotta, *The Administration of Public Airports*, Coast Aire Publications, Chandler, Ariz., 2007.

Guitjens, H., "Balancing Capacity Issues," *Airports International,* Vol. 39, No. 3, 2006, pp. 36–37.

Ingalls, S., "McCarran International Airport—A Case Study in Enhancing Passenger Processing Efficiency," *Journal of Airport Management*, Jan. 2007.

McCormick, C., "Uncommon-Use Kiosks," *Airports International*, Vol. 39, No. 5, 2006, pp. 36–38.

Rozario, K., "CUSS Trims Check-in Costs," *Jane's Airport Review*, Dec. 2005/Jan. 2006, pp. 30–31.

Sanders, D., "Look Ahead—Combining RFID, RTLS, and Biometrics Can Secure and Simplify Air Travel," *Airport Magazine*, Nov./Dec. 2005, pp. 57–58.

Simplifying the Business Common Use Self Service, 1st ed., Implementation Guide, International Air Transport Association, Geneva, Switzerland, 2006.

Wikipedia, *Schengen Agreement*, July 3, 2007 [Online]. Available: http://en.wikipedia.org/wiki/Schengen_Agreement [accessed July 8, 2007].

BIBLIOGRAPHY

AAAE Service Corporation, Inc., "Inline Systems: An Airline's Take," *Airport Magazine*, July 2003, pp. 43–45.

Alaska Air Group 2006 Annual Report, Alaska Air Group, Seattle, Wash., 2006.

Bates, J., "Back to the Future," *Airport World: The Magazine of the Airports Council International*, April–May 2006, pp. 27–29.

Citrinot, L., "Airports Step Up IT Spending," *Janes Airport Review*, Mar. 2006, p. 26.

Cross, B., "Checks Do a Double Take—Biometrics Provide a Second Layer of Security and Help Speed Up Passenger Flow at the Boarding Gate," *Jane's Airport Review*, Apr. 2006, pp. 10–11.

Dungan, J., "Finding Convenience," *Airports International*, Vol. 38, No. 6, pp. 20–21.

Jarrell, J., "Airport Systems Integration," *Airports International*, June 2001, pp. 37–39.

King, E., "Dubai—Managing the Future," *Airports International*, Vol. 38, No. 4, pp. 40–41.

Mansfield, J., "Network Lockdown," *Airports International*, Nov. 2006, pp. 22–23.

McCormick, C., "Modelling the Future," *Airports International*, Vol. 39, No. 5, 2006 pp. 39–41.

McCormick, C., "Halifax—Building for Growth," *Airports International*, Vol. 39, No. 3, 2006 pp. 18–19.

"Montreal Looks Forward," *Airports International*, Vol. 38, No. 6, 2005, pp. 24–25.

Planning and Design Guidelines for Airport Terminal Facilities, Advisory Circular 150/5360-13, Federal Aviation Administration, Washington, D.C., U.S. Government Printing Office, 1988.

"Preliminary Airport Traffic Results for 2006," Airports Council International, Geneva, Switzerland, Mar. 2007 [Online]. Available http://www.airports.org/aci/aci/file/Press%20Releases/2007_PRs/PR060307_PrelimResults2006.pdf (accessed July 24, 2007).

Simplifying the Business—What it Is and What it Means for Airport Operators, Bulletin for Members, Airports Council International, Geneva, Switzerland, Jan. 2006, Issue #2.

"T5 Team Shapes IT Landscape," *Jane's Airport Review*, Apr. 2006, pp. 32–33.

"The Future Shape of Maintenance," *Airports International*, Vol. 39, No. 4, 2006, pp. 36–37.

Van Verseveld, K., "Self-Esteem: KLM's Self-Service Check-In Has Revolutionised Passenger Processing at Schiphol," *Passenger Terminal World*, July 2004, pp. 43–44.

Wilson, B., "Picking Up the Pace," *International Airport Review*, Issue 2, 2006, pp. 67–68.

Yan, S., C.H. Chang, and K.C. Tang, "Minimizing Inconsistencies in Airport Common-Use Checking Counter Assignments with a Variable Number of Counters," *Journal of Air Transport Management*, 2005, pp. 107–116.

APPENDIX A

CUTE and CUSS Implementations, World-Wide

Key:

Airport has selected CUSS vendor, but has no airlines currently using CUSS.

Airport has identified airlines using CUSS, but no identified vendor.

Not applicable cell.

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
ACC	Accra Airport	Africa				Ultra
AGP	Malaga Airport	Europe				Other
AKL	Auckland Airport	Asia Pacific				SITA
ALG	Algiers Airport	Africa				RESA CREWS
AMM	Qaia (Queen Alia International Airport)	MENA	IER	RJ	Royal Jordanian	SITA
AMS	Amsterdam Schiphol	Europe	IBM	8Q	Onur Air	SITA
AMS	Amsterdam Schiphol	Europe	IBM	A9	AirZena Georgian Airways	
AMS	Amsterdam Schiphol	Europe	IBM	AT	Royal Air Maroc	
AMS	Amsterdam Schiphol	Europe	IBM	BA	British Airways	
AMS	Amsterdam Schiphol	Europe	IBM	BY	Thomsonfly	
AMS	Amsterdam Schiphol	Europe	IBM	CB	Scot Airways	
AMS	Amsterdam Schiphol	Europe	IBM	F2	Fly Air	
AMS	Amsterdam Schiphol	Europe	IBM	HV	Transavia Holland	
AMS	Amsterdam Schiphol	Europe	IBM	IB	Iberia Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	VR	Cabo Verde Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	CI	China Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	group	KLM Skyteam	
AMS	Amsterdam Schiphol	Europe	IBM	LH	Lufthansa	
AMS	Amsterdam Schiphol	Europe	IBM	N/A	Corendon Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	BD	BMI	
AMS	Amsterdam Schiphol	Europe	IBM	LO	LOT Polish Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	LS	Jet2.com	
AMS	Amsterdam Schiphol	Europe	IBM	NB	Sterling Airlines	

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
AMS	Amsterdam Schiphol	Europe	IBM	OR	Arkefly	
AMS	Amsterdam Schiphol	Europe	IBM	OU	Croatia Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	TS	Air Transat	
AMS	Amsterdam Schiphol	Europe	IBM	VG	VLM Airlines	
AMS	Amsterdam Schiphol	Europe	IBM	W6	Wizz Air	
ANE	Angers	Europe				RESA CREWS
ANG	Angouleme	Europe				RESA CREWS
AOI	Ancona	Europe				RESA CREWS
AQJ	Aqaba—King Hussein International Airport	MENA	IER	RJ	Royal Jordanian	
ARN	Stockholm—Arlanda	Europe				SITA
ATH	Athens	Europe	SITA	IB	Iberia Airlines	SITA
ATH	Athens	Europe	SITA	KL	KLM Royal Dutch Airlines	
ATH	Athens	Europe	SITA	LH	Lufthansa	
ATL	Atlanta	United States				SITA
AUH	Abu Dhabi International Airport	MENA				SITA
AYT	Antalya	MENA				Ultra
AYT	Antalya	MENA				RESA CREWS
BAH	Bahrain	MENA				Ultra
BCN	Barcelona	Europe				Other
BDA	Bermuda/Hamilton Airport	The Americas				ARINC
BES	Brest	Europe				RESA CREWS
BEY	Beirut International Airport	MENA				SITA
BFS	Belfast International Airport	Europe	SITA	BE	Flybe	
BFS	Belfast International Airport	Europe	SITA	KL	KLM Royal Dutch Airlines	
BGI	Grantley Adams International Airport	United States				ARINC
BGY	Milan-Bergamo—Oro Al Serio	Europe				RESA CREWS
BHX	Birmingham International Airport	Europe	ARINC	BE	Flybe	ARINC
BKK	Bangkok Don Muang International Airport	Asia Pacific				SITA

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
BLQ	Balogna	Europe				RESA CREWS
BLR	Bangalore	Asia Pacific				RESA CREWS
BNE	Brisbane International Airport	Asia Pacific				SITA
BOD	Bordeaux—Merignac	Europe				RESA CREWS
BOH	Bournemouth International	Europe				Ultra
BOM	Mumbai	Asia Pacific		KL	KLM Royal Dutch Airlines	SITA
BOM	Mumbai	Asia Pacific		NW	Northwest Airlines	
BOS	Boston Logan International Airport	United States				SITA
BRE	Bremen Airport—Flughafen Bremen	Europe				SITA
BRU	Brussels	Europe	IER	IB	Iberia Airlines	RESA CREWS
BRU	Brussels	Europe	IER	LH	Lufthansa	
BRU	Brussels	Europe	IER	BD	BMI	
BRU	Brussels	Europe	IER	SN	Brussels Airlines	
BSL	Basil EuroAirport	Europe	SITA	LX	Swiss International Air Lines	
BUD	Budapest	Europe	SITA	MA	Malev Hungarian Airlines	SITA
CAI	Cairo	MENA	ARINC			SITA
CAN	Guangzhou Baiyun International Airport	North Asia				SITA
CAY	Cayenne	Africa				RESA CREWS
CDG	Paris Charles De Gaulle	Europe	IER	JP	Adria Airlines	RESA CREWS
CDG	Paris Charles De Gaulle	Europe	IER	KF	Blue1 (SAS)	
CDG	Paris Charles De Gaulle	Europe	IER	LH	Lufthansa	
CDG	Paris Charles De Gaulle	Europe	IER	LO	LOT Polish Airlines	
CDG	Paris Charles De Gaulle	Europe	IER	OU	Croatia Airlines	
CDG	Paris Charles De Gaulle	Europe	IER	SK	Scandinavian Airline System	
CFE	Clarmont Ferrand Auvergne	Europe				RESA CREWS
CGN	Konrad Adenaur—Cologne	Europe	Materna	4U	German Wings	
CHC	Christchurch International Airport Ltd	Asia Pacific				SITA
CHD	Chandler Williams Gateway	United States				Ultra

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
CIA	Ciampino—Roma	Europe				RESA CREWS
CMF	Chambery (Aix les Bains)	Europe				RESA CREWS
CMN	Mohammed V Airport	MENA				SITA
CPH	Copenhagen	Europe	IBM	1I	Novair	SITA
CPH	Copenhagen	Europe	IBM	AZ	Alitalia	
CPH	Copenhagen	Europe	IBM	BA	British Airways	
CPH	Copenhagen	Europe	IBM	FI	Iclandair	
CPH	Copenhagen	Europe	IBM	IB	Iberia Airlines	
CPH	Copenhagen	Europe	IBM	KL	KLM Royal Dutch Airlines	
CPH	Copenhagen	Europe	IBM	LF	Flynordic	
CPH	Copenhagen	Europe	IBM	NB	Sterling Airlines	
CPH	Copenhagen	Europe	IBM	U2	Easyjet	
CPH	Copenhagen	Europe	IBM	UG	Tuninter	
CPH	Copenhagen	Europe	IBM	VKG	Mytravel	
CPT	Cape Town International Airport	Africa	SITA	KL	KLM Royal Dutch Airlines	SITA
CPT	Cape Town International Airport	Africa	SITA	KQ	Kenya Airways	
CTA	Catania	Europe				RESA CREWS
CUF	Cuneo	Europe				RESA CREWS
CUN	Cancun	The Americas	SITA			SITA
DAC	Dhaka	Asia Pacific				SITA
DEL	Delhi	Asia Pacific				SITA
DEN	Denver International Airport	United States				SITA
DFW	Dallas/Fort Worth International Airport	United States	ARINC/IBM	AA	American Airlines	
DFW	Dallas/Fort Worth International Airport	United States	ARINC/IBM	AC	Air Canada	
DHA	Dhahran International Airport	MENA				SITA
DJE	Djerba Zarzis Airport	Africa				Ultra
DKR	Dakar	Africa				RESA CREWS
DLA	Douala	Africa				RESA CREWS
DLM	Dalaman	Europe				RESA CREWS

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
DME	Moscow Domededovo	CIS				Ultra
DSA	Doncaster	Europe				Ultra
DUB	Dublin	Europe				Ultra
DUR	Durban Airport	Africa	SITA			SITA
DUS	Dusseldorph	Europe				SITA
DXB	Dubai	MENA				SITA
EBB	Entebbe	Africa				RESA CREWS
EDI	Edinburgh	Europe				SITA
EMA	Nottingham East Midlands Airport	Europe	ARINC	KL	KLM Royal Dutch Airlines	
EMA	Nottingham East Midlands Airport	Europe	ARINC	WW	bmibaby	
EWR	New York Newark	United States				SITA
EZE	Ministro Pistarini Airport	The Americas				SITA
FCO	Rome—Leonardo da Vinci Fiumicino Airport	Europe				RESA CREWS
FDF	Fort de France, Martinique	The Americas				RESA CREWS
FLO	Florence	Europe				RESA CREWS
FMO	Munster Osnabruck Airport	Europe				ARINC
FNI	Nimes	Europe				RESA CREWS
FPO	Freeport (Bahamas)	The Americas				Ultra
FRA	Frankfurt Airport	Europe	SITA	AA	American Airlines	SITA
FRA	Frankfurt Airport	Europe	SITA	AC	Air Canada	
FRA	Frankfurt Airport	Europe	SITA	BA	British Airways	
FRA	Frankfurt Airport	Europe	SITA	IB	Iberia Airlines	
FRA	Frankfurt Airport	Europe	SITA	NW	Northwest Airlines	
FRL	Forli L. Ridolfi	Europe				RESA CREWS
GIG	Rio De Janeiro	The Americas				SITA
GLA	Glasgow	Europe				Ultra
GNB	Grenobel	Europe				RESA CREWS
GOA	Genoa	Europe				RESA CREWS

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
GRU	Sao Paulo	The Americas				SITA
GVA	Geneva	Europe	SITA	BA	British Airways	
GVA	Geneva	Europe	SITA	LH	Lufthansa	
GVA	Geneva	Europe	SITA	LO	LOT Polish Airlines	
GVA	Geneva	Europe	SITA	LX	Swiss International Air Lines	
GVA	Geneva	Europe	SITA	OS	Austrian Airlines	
GVA	Geneva	Europe	SITA	TP	TAP Portugal	
HAJ	Hannover Airport	Europe				SITA
HAK	Haikou Airport	North Asia	Travelsky/IER	CA	Air China	
HAK	Haikou Airport	North Asia	Travelsky/IER	MU	China Eastern Airlines	
HAM	Hamburg	Europe				SITA
HAN	Hanoi	Asia Pacific				RESA CREWS
HEL	Helsinki	Europe	IBM			RESA CREWS
HGH	Hangzhou	North Asia				Ultra
HKG	Hong Kong	North Asia				SITA
HND	Tokyo–Haneda International Airport	Asia Pacific	ARINC	JL	Japan Airlines	
HNL	Honolulu Airport	United States				SITA
HPN	Westchester County Airport	United States	ARINC/IBM	AA	American Airlines	
HPN	Westchester County Airport	United States	ARINC/IBM	AC	Air Canada	
HPN	Westchester County Airport	United States	ARINC/IBM	NW	Northwest Airlines	
HRE	Harare	Africa				RESA CREWS
HUY	Humberside International Airport Ltd.	Europe	ARINC	KL	KLM Royal Dutch Airlines	
HYD	Hyderabad–Begumpet	Asia Pacific				RESA CREWS
IAD	Washington Dulles	United States				ARINC
IAH	Houston—George Bush Intercontinental	United States				SITA
ICN	Seoul—Incheon International Airport	Asia Pacific	SITA	CX	Cathay Pacific	ARINC
ICN	Seoul—Incheon International Airport	Asia Pacific	SITA	KE	Korean Air	
ICN	Seoul—Incheon International Airport	Asia Pacific	SITA	OZ	Asiana Airlines	

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
ILE	Killeen	United States				Ultra
ISB	Islamabad International Airport	Asia Pacific				SITA
JED	Jeddah–King Abdulaziz International Airport	MENA				Ultra
JFK	New York JFK International Airport	United States	SITA	LX	Swiss International Air Lines	
JNB	Johannesburg	Africa	SITA	KL	KLM Royal Dutch Airlines	SITA
JNB	Johannesburg	Africa	SITA	KQ	Kenya Airways	
KBP	Kiev Boryspil	CIS				SITA
KEF	Keflavik Airport	Europe	IER	BA	British Airways	
KEF	Keflavik Airport	Europe	IER	FI	Iclandair	
KEF	Keflavik Airport	Europe	IER	SK	Scandinavian Airline System	
KHI	Quaid-E–Azam International Airport	Asia Pacific				SITA
KIX	Kansai	Asia Pacific	ARINC	JL	Japan Airlines	
KMG	Kunming Airport	North Asia	Travelsky/IER	CA	Air China	
KMG	Kunming Airport	North Asia	Travelsky/IER	MU	China Eastern Airlines	
KRK	Krakow	Europe				SITA
KUL	Kuala Lumpur Airport	Asia Pacific				SITA
KWI	Kuwait International Airport	MENA				SITA
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	AA	American Airlines	ARINC
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	AQ	Aloha Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	AS	Alaska Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	B6	JetBlue Airways	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	CO	Continental Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	DL	Delta Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	F9	Frontier Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	FL	AirTran Airways	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	HP	America West Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	NW	Northwest Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	UA	United Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	US	US Airways	

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	WN	Southwest Airlines	
LAS	Las Vegas–McCarran International Airport	United States	ARINC/IBM	YX	Midwest Airlines	
LAX	Los Angeles International Airport	United States				SITA
LCA	Larnaca	Europe				SITA
LDE	Lourdes—Tarbes	Europe				RESA CREWS
LED	St. Petersburg Pulkovo	CIS				Ultra
LGW	London Gatwick	Europe	IER	BY	Thomsonfly	
LGW	London Gatwick	Europe	IER	VS	Virgin Atlantic Airways	
LHR	London Heathrow	Europe	IER	AA	American Airlines	
LHR	London Heathrow	Europe	IER	AC	Air Canada	
LHR	London Heathrow	Europe	IER	BA	British Airways	
LHR	London Heathrow	Europe	IER	CX	Cathay Pacific	
LHR	London Heathrow	Europe	IER	EK	Emirates	
LHR	London Heathrow	Europe	IER	JL	Japan Airlines	
LHR	London Heathrow	Europe	IER	KL	KLM Royal Dutch Airlines	
LHR	London Heathrow	Europe	IER	UA	United Airlines	
LIG	Limoges	Europe				RESA CREWS
LIL	Lile	Europe				RESA CREWS
LIM	J Chavez International Airport	The Americas				SITA
LIN	Milan Linate	Europe				ARINC
LIS	Lisbon	Europe				SITA
LMP	Lampedusa	Europe				RESA CREWS
LOS	Lagos	Africa				RESA CREWS
LOS	Lagos	Africa				Ultra
LRM	Casa de Campo—La romana	The Americas				RESA CREWS
LRT	Lorient	Europe				RESA CREWS
LTN	London–Luton	Europe				Ultra
LTQ	Le Touquet Paris Plag	Europe				RESA CREWS
LUX	Luxembourg	Europe				RESA CREWS

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
LYS	Lyon Saint Exupéry	Europe				RESA CREWS
MAA	Chennai	Asia Pacific				SITA
MAD	Madrid	Europe	IER	BA	British Airways	
MAD	Madrid	Europe	IER	IB	Iberia Airlines	
MAN	Manchester	Europe	ARINC	BA	British Airways	
MAN	Manchester	Europe	ARINC	LH	Lufthansa	
MAN	Manchester	Europe	ARINC	BE	Flybe	
MAN	Manchester	Europe	ARINC	KL	KLM Royal Dutch Airlines	
MAN	Manchester	Europe	ARINC	VS	Virgin Atlantic Airways	
MCO	Orlando	United States				SITA
MEL	Tullamarine Airport	Asia Pacific				ARINC
MEX	Mexico City	The Americas				SITA
MGM	Montgomery	United States				Ultra
MIA	Miami International Airport	United States				SITA
MIL	Milan	Europe				RESA CREWS
MIR	Monastir	Africa				Ultra
MLH	Basel–Mulhouse	Europe				RESA CREWS
MME	Teesside	Europe				Ultra
MNL	Ninoy Aquino International Airport	Asia Pacific				SITA
MPL	Montpelier–Frejorgues	Europe				RESA CREWS
MRS	Aéroport Marseille Provence	Europe				RESA CREWS
MSP	Minneapolis International Airport	United States				Ultra
MUC	Munich	Europe				SITA
MXP	Milan Malpensa	Europe				ARINC
MZM	Metz	Europe				RESA CREWS
NAN	Nadi International Airport	Asia Pacific				ARINC
NAP	Naples	Europe				RESA CREWS
NBO	Nairobi	Africa				SITA

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
NCE	Nice	Europe	IER	AF	Air France	RESA CREWS
NCE	Nice	Europe	IER	BA	British Airways	
NCL	Newcastle Airport	Europe	SITA	KL	KLM Royal Dutch Airlines	
NGO	Nagoya—Centrair International Airport	Asia Pacific		JL	Japan Airlines	ARINC
NOU	Noumea	Asia Pacific				RESA CREWS
NRT	Tokyo Narita	Asia Pacific	ARINC	AC	Air Canada	ARINC
NRT	Tokyo Narita	Asia Pacific	ARINC	NH	All Nippon Airways	
NRT	Tokyo Narita	Asia Pacific	ARINC	OS	Austrian Airlines	
NRT	Tokyo Narita	Asia Pacific	ARINC	LH	Lufthansa	
NRT	Tokyo Narita	Asia Pacific	ARINC	NW	Northwest Airlines	
NRT	Tokyo Narita	Asia Pacific	ARINC	JL	Japan Airlines	
NRT	Tokyo Narita	Asia Pacific	ARINC	UA	United Airlines	
NTE	Nantes	Europe				RESA CREWS
NUE	Nuremberg	Europe	Materna	AB	Air Berlin	ARINC
NUE	Nuremberg	Europe	Materna	KL	KLM Royal Dutch Airlines	
ODS	Odessa	CIS				RESA CREWS
OLB	Olbia	Europe				RESA CREWS
ORD	Chicago	United States				SITA
ORY	Paris Orly	Europe	IER	AT	Royal Air Maroc	RESA CREWS
ORY	Paris Orly	Europe	IER	TU	Tunisair	
ORY	Paris Orly	Europe	IER	UX	Air Europa	
OSL	Oslo	Europe	ARINC	AF	Air France	
OSL	Oslo	Europe	ARINC	KL	KLM Royal Dutch Airlines	
OSL	Oslo	Europe	ARINC	NB	Sterling Airlines	
PEK	Beijing	North Asia	IER	CA	Air China	SITA
PEK	Beijing	North Asia	IER	MU	China Eastern Airlines	
PER	Perth	Asia Pacific				SITA
PGF	Perpignan	Europe				RESA CREWS
PHX	Phoenix Sky Harbor International Airport	United States				SITA

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
PIT	Pittsburgh International Airport	United States	ARINC	B6	JetBlue Airways	
PIT	Pittsburgh International Airport	United States	ARINC	US	US Airways	
PLZ	Port Elezabeth Airport	Africa	SITA			SITA
PMF	Parma	Europe				RESA CREWS
PMI	Palma Mallorca	Europe		AB	Air Berlin	Other
PMO	Palermo Punta Raisi	Europe				RESA CREWS
PMV	Porlamar—Margarita	The Americas				Ultra
PNL	Pantelleria	Europe				RESA CREWS
PRG	Prague	Europe				SITA
PSA	Pisa—Galileo Galilei	Europe				RESA CREWS
PTP	Pointe-a-Pitre	The Americas				RESA CREWS
PVG	Shanghai Pu Dong	North Asia				SITA
PTY	Panama City Tocumen International	The Americas				Ultra
PUJ	Punta Cana International Airport	The Americas				RESA CREWS
QUF	Tallinn—Pirita Harbour	CIS				RESA CREWS
REG	Reggio Calabria	Europe				RESA CREWS
RFD	Rockford	United States				AirIT
RIX	Riga	Europe				RESA CREWS
RMI	Rimini	Europe				RESA CREWS
RNS	Rennes	Europe				RESA CREWS
RSW	Fort Myers Southwest Florida Reg	United States				Ultra
RTM	Rotterdam	Europe				RESA CREWS
RUH	Riyadh–King Khaled International	MENA				Ultra
RUN	Saint Denis de la Reunion	Africa				RESA CREWS
SCL	Santiago Airport	The Americas				SITA
SDQ	Santo Domingo—Las Americas	The Americas				ARINC
SFA	Safaqis	Africa				RESA CREWS
SFB	Orlando Sanford	United States				Ultra

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
SFO	San Francisco International Airport	United States	IER	UA	United Airlines	ARINC
SFO	San Francisco International Airport	United States	IER	BA	British Airways	
SFO	San Francisco International Airport	United States	IER	CX	Cathay Pacific	
SFO	San Francisco International Airport	United States	IER	B6	JetBlue Airways	
SGN	Ho Chi Minh City Airport	Asia Pacific				ARINC
SHE	Shenyang	North Asia				Ultra
SIN	Singapore	Asia Pacific				SITA
SJC	San Jose	United States				AirIT
SMF	Sacramento	United States				AirIT
SRQ	Sarasota–Bradenton	United States				AirIT
STI	Santiago Cibao International	The Americas				Ultra
STN	London—Stansted	Europe		AB	Air Berlin	
STR	Stuttgart	Europe				SITA
SUF	Lamezia Terne	Europe				RESA CREWS
SVO	Moscow Sheremetievo	CIS				ARINC
SXB	Strasbourg	Europe				RESA CREWS
SYD	Sydney	Asia Pacific				SITA
SZX	Shenzhen—Baoan International Airport	North Asia	IER	CA	Air China	
TAO	Qingdao Liuting International Airport	North Asia		3U	Si Chuan Airlines	Ultra
TAO	Qingdao Liuting International Airport	North Asia		CA	Air China	
TAO	Qingdao Liuting International Airport	North Asia		EU	Empresa Ecuatoriana De Aviacion	
TAO	Qingdao Liuting International Airport	North Asia		FH	Futura International Airways	
TAO	Qingdao Liuting International Airport	North Asia		MF	Xiamen Airlines	
TAO	Qingdao Liuting International Airport	North Asia		MU	China Eastern Airlines	
TAO	Qingdao Liuting International Airport	North Asia		NH	All Nippon Airways	
TAO	Qingdao Liuting International Airport	North Asia		SC	Shandong Airlines	
TAO	Qingdao Liuting International Airport	North Asia		ZH	Shenzhen Airlines	
THR	Tehran (Teheran) Mehrabad	MENA				RESA CREWS
TLN	Toulon—Hyeres	Europe				RESA CREWS

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
TLS	Toulouse—Blagnac	Europe				RESA CREWS
TLV	Tel Aviv	Europe				SITA
TPE	Taipei	North Asia				SITA
TPS	Trapani–Birgi	Europe				RESA CREWS
TRN	Turin	Europe				RESA CREWS
TUN	Tunis Carthage	Africa				Ultra
TUR	Tucurui	The Americas				SITA
TXL	Berlin Tegel	Europe				SITA
UIO	Quito	The Americas				Ultra
VCE	Venice	Europe				SITA
VIE	Vienna	Europe	Materna	IB	Iberia Airlines	SITA
VIE	Vienna	Europe	Materna	AF	Air France	
VIE	Vienna	Europe	Materna	AB	Air Berlin	
VIE	Vienna	Europe	Materna	HG	Fly Niki	
VIE	Vienna	Europe	Materna	LX	Swiss International Air Lines	
VIE	Vienna	Europe	Materna	KL	KLM Royal Dutch Airlines	
VIE	Vienna	Europe	Materna	OS	Austrian Airlines	
VRN	Verona–Villafranca	Europe				Ultra
WAW	Warsaw	Europe				SITA
WDH	Windhoek—Jg Strijdom Airport	Africa				SITA
~~WNZ~~	~~Wenzhou Yongqiang Airport~~	~~North Asia~~	~~IER~~			
~~WUH~~	~~Wuhan Tianhe Airport~~	~~North Asia~~	~~IER~~			
XIY	Xi'an–Xianyang	North Asia				Ultra
YAO	Yaounde	Africa				RESA CREWS
YEG	Edmonton International Airport	The Americas	ARINC/IBM	AC	Air Canada	
YHM	Hamilton Airport	The Americas	ARINC	AC	Air Canada	
YHM	Hamilton Airport	The Americas	ARINC	WJ	Air Labrador	
YHZ	Halifax International Airport	The Americas	ARINC/IBM	AC	Air Canada	ARINC
YLW	City of Kelowna Airport	The Americas	IBM	AC	Air Canada	
YLW	City of Kelowna Airport	The Americas	IBM	WS	WestJet	

Airport Code	Airport	Region	CUSS Vendor	Airline Code—CUSS	Airline—CUSS	CUTE Vendor
YUL	Montreal Pierre Trudeau Airport/Dorval	The Americas	SITA	AA	American Airlines	
YUL	Montreal Pierre Trudeau Airport/Dorval	The Americas	SITA	AC	Air Canada	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	AA	American Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	AC	Air Canada	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	AS	Alaska Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	CI	China Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	CO	Continental Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	KL	KLM Royal Dutch Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	NW	Northwest Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	QK	Air Canada Jazz	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	QX	Horizon Air	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	UA	United Airlines	
YVR	Vancouver International Airport	The Americas	ARINC/IBM	WS	WestJet	
YYC	Calgary International Airport	The Americas	ARINC/IBM	AA	American Airlines	ARINC
YYC	Calgary International Airport	The Americas	ARINC/IBM	AC	Air Canada	
YYC	Calgary International Airport	The Americas	ARINC/IBM	BA	British Airways	
YYC	Calgary International Airport	The Americas	ARINC/IBM	NW	Northwest Airlines	
YYC	Calgary International Airport	The Americas	ARINC/IBM	UA	United Airlines	
YYC	Calgary International Airport	The Americas	ARINC/IBM	WS	WestJet	
YYJ	Victoria International Airport	The Americas	ARINC/IBM	AC	Air Canada	
YYJ	Victoria International Airport	The Americas	ARINC/IBM	WS	WestJet	
YYZ	Toronto Lester B. Pearson International Airport	The Americas	SITA	AA	American Airlines	
YYZ	Toronto Lester B. Pearson International Airport	The Americas	SITA	AC	Air Canada	
YYZ	Toronto Lester B. Pearson International Airport	The Americas	SITA	QK	Air Canada Jazz	
YYZ	Toronto Lester B. Pearson International Airport	The Americas	SITA	WS	WestJet	
ZAG	Zagreb Airport	CIS	ARINC	LH	Lufthansa	
ZRH	Zurich	Europe	ARINC	BA	British Airways	SITA
ZRH	Zurich	Europe	ARINC	AB	Air Berlin	
ZRH	Zurich	Europe	ARINC	KL	KLM Royal Dutch Airlines	
ZRH	Zurich	Europe	ARINC	LX	Swiss International Air Lines	

APPENDIX B
Case Studies

ALASKA AIRLINES—TECHNOLOGY ENABLING BUSINESS

Interview Participants

Bill Hepner
Loesje de Groen

Summary

Alaska Airlines strives to differentiate itself by using technology to enable business processes. As Alaska Airlines continually reviews business processes for improvement, they look for areas where technology can play a role in facilitating, or improving, that business process. If there is no technology solution available to affect the business process, then Alaska Airlines creates the solution themselves. When the industry establishes a standard to perform the task that Alaska Airlines has already improved, they prepare a plan to migrate to the standard.

Alaska Airlines Profile

The foundation for Alaska Airlines was laid in 1932, when Mac McGhee began flying in Alaska. In 1934, McGhee Airlines merged with another airline, and then after several more mergers, Alaska Airlines was born. In 1952, Alaska Airlines began scheduled service to the lower 48 states. In 1995, Alaska Airlines became the first U.S. airline to sell tickets via the Internet. In 2006, Alaska Airlines carried 17.2 million passengers (*Alaska Air Group* . . . 2006).

Situation

Alaska Airlines is an innovator in both aviation and aviation technology. It has continually been among the first to implement new technologies to improve airline efficiency and passenger satisfaction. Because of this pioneering spirit, Alaska Airlines tends to be in a position to create new technologies and then work with the industry to create the standards around those new technologies.

Alaska Airlines is based in Seattle, Washington, and services mostly the western United States, Canada, and Mexico. This service area has limited their exposure to common use. In spite of this, Alaska Airlines has been using common use systems, and developing their own common use applications, for about five years.

There are two main reasons for Alaska Airlines' late entry into the common use environment. First, many of the airports they service have not implemented common use.

Second, because of their pioneering spirit in technology, many of the business processes that they developed prior to common use utilized technology solutions that were not supported by common use systems. This situation is changing, as more airports adopt common use. Alaska Airlines will only adopt technology where it will facilitate, or improve, their business processes.

The goal for Alaska Airlines is to improve customer service, building upon their award-winning customer service reputation. Technology plays an important role in that goal. Alaska Airlines is very interested when one of the airports in the 48 destinations that it services is considering a common use strategy. The main focus for their interest is how it will affect customer service. Alaska Airlines is concerned that when an airport moves along the common use continuum, it could cause difficulties and thus negatively impact the experience of Alaska Airlines' customers.

Alaska Airlines sees many benefits with common use. For example, at some airports, Alaska Airlines has to arrive as an international flight. Its passengers must deplane and proceed through customs and immigration, only to enplane at another gate. The passengers and the aircraft must be transported to another gate, sometimes at another terminal, to continue the flight. Common use would improve this process by allowing the airline to stay at the gate and thus be able to turn the flight faster.

Alaska Airlines likes to be involved early on in the design discussions with airports that are considering moving along the common use continuum. The airline wants to ensure their success by protecting their business processes, and making sure that customer service is not negatively impacted by the common use strategy. Alaska Airlines likes to look at each airport independently. The same common use strategy that applies at one airport may not apply to another. It is important to Alaska Airlines to ensure that each airport station that Alaska Airlines operates is efficient, and is providing award-winning customer service.

AMERICAN AIRLINES—A CALL FOR IMPROVED STANDARDS

Interview Participants

Tim McGraw

Summary

American Airlines has been testing and implementing self-service devices since the early 1980s, with a focus to improve customer service. When IATA began creating standards for common use, American Airlines was involved because of their focus on customer service. American Airlines has continued to work on both their proprietary self-service applications and with the industry to improve the common use standards. They continue to support developing the standards so that as the industry matures in common use, they will be there defining the functionality required to meet customer service.

American Airlines Profile

In 1926, Charles A. Lindbergh was the chief pilot of Robertson Aircraft Corporation. By 1929, Robertson Aircraft Corporation was acquired by The Aviation Corporation, along with many other young aviation companies. By 1930, The Aviation Corporation was incorporated into American Airways, Inc., and in 1934 American Airways became American Airlines, Inc. In 2006, American Airlines carried 99.835 million passengers (*World Air Transport Statistics*, 51st ed., IATA, May 2006), making it the largest air carrier in the world, by number of passengers carried.

Situation

American Airlines has always looked at information technology as a way to facilitate passenger service. In 1984, American Airlines

was one of the first airlines to implement a self-service, passenger facing kiosk. The system was installed in several airports, but eventually it was decommissioned. Through this implementation, American Airlines learned many lessons in self-service. In 1995, American Airlines began investigating e-ticketing. About that time, they were also experimenting with self-service at the gate, allowing passengers to check themselves in directly at the gate and board the airplane. This implementation was limited to their Admiral's Club members, with plans to roll out to all passengers at some point in the future.

In 1998, American Airlines opened Love Field and needed to facilitate curbside check-in. This need also facilitated the next generation in American Airlines' self-service kiosks. These kiosks were designed to work with AAdvantage members, and at the time only supported flights from Love Field and other destinations.

The application was not able to print boarding passes for connecting flights to continuing destinations. When American Airlines started service at Dallas Terminal B, it modified the application to support connecting flights.

At the same time, other airlines were pursuing self-service kiosks. The airlines and IATA recognized that it was necessary to create a standard to control the proliferation of these kiosks, and the CUSS specification was born. The committee to create this industry initiative was comprised of airlines, airports, and vendors. It was through this process of creating CUSS that IATA recognized the need for a rewrite of the CUTE recommended practice. Throughout this process, American Airlines has participated in the committees and provided expertise and input. In addition, American Airlines is also participating with TRB to study and bring a better understanding of common use to the industry.

Although American Airlines believes that the standards are required to create a better environment for airlines and airports to efficiently operate in today's environment, it also recognizes that the current standards and implementations are not achieving its goals. American Airlines continues to work with the standards organizations to create standards that improve the use of the airport, allow for a timely distribution of applications updates, and are transparent to the airlines. Even so, until common use systems meet these requirements, it will continue to look toward proprietary systems to facilitate its business process.

AMSTERDAM AIRPORT SCHIPHOL—ADVANCED PASSENGER PROCESSING

Interview Participants

Annemieke Nuesink

Summary

Amsterdam Airport Schiphol is constantly looking to the future to improve their business and service to passengers. Amsterdam Airport Schiphol has a history of being on the leading edge of technology. As they continue to improve their customer service, they look for ways to implement technology to gain competitive advantages. If there is no current technology that does what Amsterdam Airport Schiphol is attempting to do, they will create it themselves.

Amsterdam Airport Schiphol Profile

Amsterdam Airport Schiphol started in 1916 as a military airbase, and was used for military operations exclusively until 1920. The airport derives its name from a former fortification, named Fort Schiphol, which was part of the Amsterdam defense works. The airport sits below sea-level and is the world's lowest major commercial airport. Amsterdam Airport Schiphol has five main runways, and an additional runway used for general aviation only. In 1996, Amsterdam Airport Schiphol was ranked 12th in the world in terms of passenger traffic, with a total passenger count of 46,088,211 (Airports Council International 2007).

Situation

Amsterdam Airport Schiphol is competing for passengers with other major airports in the region. Amsterdam has a strategic plan to become a main port for both The Netherlands and Europe, and is competing for cargo and passenger traffic with Heathrow, Fraport, and Charles de Gaulle airports. To reach this goal, Amsterdam Airport Schiphol has employed technology. To continue to grow in passenger traffic, Amsterdam Airport Schiphol needed to improve passenger processing and passenger flow. In July 2006, Amsterdam Airport Schiphol released a storyboard outlining the vision for improving passenger processing. Their vision goes beyond improving passenger processing, but they intend to completely redesign passenger processing at the Amsterdam Airport Schiphol.

A major step in the redesign of passenger processing was taken when Amsterdam Airport Schiphol installed Common Use Self-service (CUSS) kiosks. These kiosks have enabled passengers to check themselves in for flights, and then proceed to a check-in desk to have their baggage tagged and injected into the baggage system. Amsterdam Airport Schiphol continues to expand the number of kiosks, and currently has 23 airline applications installed on its CUSS kiosks.

Any passenger for one of the 23 airlines simply needs to find an open kiosk for flight check-in and proceed to baggage check-in at their airline.

Amsterdam Airport Schiphol has also installed Common Use Terminal Equipment (CUTE) to allow its check-in desks to be common use. This flexibility allows Amsterdam Airport Schiphol to facilitate the expansion, movement, or addition of airlines without having to have dedicated kiosks or dedicated check-in desks. Although the major carrier, KLM, still has dedicated space, many other carriers are using common use space. As new airlines are added into the airport, they can be added to the common use systems and integrated into the CUSS kiosks.

Amsterdam Airport Schiphol plans to complete the redesign of passenger processing by 2011. The culmination of this redesign is a completely automated passenger check-in process. The automated process will allow passengers to authorize themselves to cross the border with their passport, label their own baggage, and place it onto the baggage belt. Passenger processing will eventually have all of the processes linked and integrated so that the number of times a passenger has to identify themselves is reduced. The goal is to alert passengers only if something goes wrong and to eliminate the need of any aid from a ground host/hostess.

The stated goals of this redesign is to eliminate most queues, enable the airport to handle 60 million passengers within the current terminal building, and implement cost savings throughout the process for both the airport and airlines. The elements that are going to facilitate this vision are the self-service Internet check-in, self-service baggage drop-off, self-service border authorization, and high secure boarding. As Amsterdam Airport Schiphol moves toward fundamentally changing the way the airport works in five years, technology will play a key role.

BRITISH AIRWAYS—SIMPLY COMMON USE BY NECESSITY

Interview Participants

Julian Lloyd
Rhonda Rose

Summary

British Airways (BA) has pursued Common Use out of necessity. As international airports began installing Common Use Terminal Equipment (CUTE) systems, British Airways pursued developing applications for CUTE systems. British Airways had no technology need to implement CUTE, however they made a strategic decision to migrate away from all proprietary agent facing check-in equipment and focus solely on their CUTE applications to reduce the duplication of support issues that were being driven by the common use implementations at airports it was servicing.

British Airways Profile

British Airways can trace its history back to the start of civil aviation. The forerunner to British Airways, Aircraft Transport and Travel Limited, launched the world's first daily international scheduled air service between London and Paris in 1919. In 1935, several small airlines offering services within the United Kingdom merged and formed the original privately owned British Airways Limited. In 1939, the airlines were nationalized to form British Overseas Airways Corporation. In 1987, British Airways was privatized. In 2006, British Airways carried 29.498 million passengers (*World Air Transport Statistics*, 51st ed., IATA, May 2006), making it the fourth largest international carrier, by number of enplaned passengers, in the world.

Situation

British Airways entered the CUTE development life cycle out of necessity because many of the airports British Airways serviced were migrating to CUTE. CUTE is installed at many of the 150 airports that British Airways serves. British Airways decided to create their CUTE applications to support these airports. Now, British Airways, along with Lufthansa, KLM, and Air France, are the largest international CUTE users, by number of installed sites. British Airways has created a PRS Terminal Emulator that allows it to release updated code and product enhancements every 8 weeks. British Airways considers CUTE as a necessary part of doing business in today's airline industry. In British Airway's opinion, CUTE is more expensive than proprietary equipment at large-scale installations. At smaller stations, where British Airways does not have the support staff necessary to maintain equipment, CUTE installations are less expensive to support and maintain because British Airways does not need to dispatch support to the smaller, and possibly remote, stations.

British Airways has developed their CUTE code base where they deploy a single application for all CUTE vendors' platforms. The application determines the configuration, platform, and release level and automatically loads the correct code. The code is deployed on the CUTE platform in a matter of seconds, enabling the airline agent to use the system immediately. Access to the airline's host system is emulated and the passenger check-in process is flawlessly executed.

CUTE platforms require either vendor or airport support. British Airways maintains local IT support for their non-CUTE back office applications such as e-mail access, enterprise business applications, and other applications not needed for the check-in or boarding process. In the case of small installations, British Airways may issue a laptop and a dial-up connection to facilitate the back office applications. In these instances, local support is limited.

Although British Airways has developed a sophisticated application to keep their development and deployment costs down, trouble-shooting and problem resolution continue to be difficult. With more than 150 locations, determining the source of problems with a release is complicated by the complexities of the network. Each location has different support mechanisms and may also have multiple parties involved in the separate elements of the problem. Communication between the various entities involved can cause delays in finally resolving the problems.

Each airport has a unique configuration of equipment, support, and expertise. To address the problem of delays in trouble shooting, British Airways makes every attempt to get to know the local CUTE technical support personnel. The airline believes that personal relationships are key to troubleshooting and fixing problems that occur in the field.

FRANKFURT AIRPORT—EARLY COMMON USE

Interview Participants

Stefan Meyer
Mira Seitz

Summary

Frankfurt Airport has been using common use almost as long as common use has been in existence. They were one of the first airports worldwide, and one of the first airports in Europe to recognize the benefits of common use to more efficiently utilize the limited terminal space that was available. In partnership with its largest carrier, Lufthansa, Frankfurt Airport continues to look at ways in implementing common use to benefit passengers, airlines, and the airport.

Frankfurt Airport Profile

Frankfurt Airport started in 1936 as the Rhein-Main Airport and Airship base. During World War II, the airport was almost completely destroyed. In 1945, a United States air base was created at the old site, and in 1947, Verkehrsaktiengesellschaft Rhein-Main was founded. In 1972, the new terminal, now known as Terminal 1, was inaugurated and became the start of the international hub that is Frankfurt Airport. In 1996, Frankfurt Airport was ranked 8th in the world in terms of passenger traffic, with a total passenger count of 52,810,683 (Airports Council International 2007).

Situation

Frankfurt Airport installed its first Common Use Terminal Equipment (CUTE) system in 1985. By some accounts, this was SITA's first CUTE installation in Europe. The driving force for CUTE at Frankfurt Airport was Lufthansa AG's desire to migrate their systems to CUTE for cost savings and uniformity. Since that time, Frankfurt Airport has installed more than 1,500 CUTE terminals in Terminal 1, making it the largest SITA installation in the world.

Frankfurt Airport's CUTE installation is managed as a CUTE CLUB site. Airlines and ground handlers are members of the CUTE CLUB and each has one vote to determine the future changes to the CUTE system. Because Fraport, the management company of the Frankfurt Airport, also provides ground handling, they are a member of the CUTE CLUB. CUTE CLUB members determine the cost increases for the CUTE system and make decisions to upgrade, migrate, add new stations, etc.

Fraport, as the airport management company, only provides Local Area Network (LAN) infrastructure to support the CUTE installation. All other components of the CUTE installation are provided by the CUTE CLUB.

Fraport charges the airlines a usage fee for the network that is based on a formula utilizing passenger counts. The airport has a concession agreement with SITA, and has built a good relationship with its servicing airlines. Through these relationships Fraport is able to improve the passenger experience and passenger travel through the airport.

Fraport has also installed Common Use Self-Service (CUSS) kiosks, but only on a trial basis. The airport has 14 CUSS kiosks throughout its airport campus. Fraport has 5 of its 44 CUTE CLUB member carrier applications installed on its CUSS kiosks. The CUSS installation is also a part of the CUTE CLUB, and is managed by the airlines. In this arrangement, all airlines are paying equally for the CUSS installation, even though many of them are not using the system. It was determined by the CUTE CLUB that this would be the best arrangement.

Fraport works with the airlines that service Frankfurt Airport to ensure that the airport is efficiently utilized. They continue to evaluate technology, with their airport partners, to determine if the technology can make the airport operate more efficiently. One technology of interest to Fraport is common bag drop. However, Fraport is currently not pursuing a common bag drop solution because IATA does not currently have a standard for it. Fraport believes that for any common use strategy to be successful, the airlines must see benefits for that strategy.

LAS VEGAS MCCARRAN INTERNATIONAL AIRPORT—COMMON USE BY NECESSITY

Interview Participants

Samuel Ingalls

Summary

Las Vegas McCarran International Airport has become one of the foremost common use airports in the world. Implementing common use strategies started during construction of the D gates concourse. To make their move, Las Vegas McCarran International Airport took the then unusual step of joining with airlines and airline organizations to help develop standards for common use. Today, they are recognized for their forward thinking and impact on the industry to adopt common use and helping to write specifications for its future.

Las Vegas McCarran International Airport Profile

Las Vegas McCarran International Airport started out as a private airstrip owned by George Crockett, a descendant of the legendary Davey Crockett. In 1947, Clark County purchased the remote airstrip, much to the dismay of the local residents. In 1948, the airport was renamed McCarran Field, after U.S. Senator Pat McCarran. Over the years, Las Vegas McCarran International Airport has continued to grow and in 2006 was the 11th largest airport in the world, in terms of passenger traffic, handling 46,194,882 passengers (Airports Council International 2007).

Situation

In 1978, Las Vegas McCarran International Airport adopted a plan called McCarran 2000. The purpose of this plan was to increase the capacity and efficiency of the airport. Part of this plan became the use of technology to allow flexibility, efficiency, capacity, and competition at the airport. In the 1990s, a crucial meeting with the Airport Director was conducted over construction of new gates. As the staff was discussing the need for additional gates at the airport because capacity had been reached, the participants looked out the window and saw 60–70 gates empty at that very moment. It was then that Las Vegas McCarran International Airport identified the need to implement a common use strategy.

Las Vegas McCarran International Airport became exposed to Common Use Terminal Equipment (CUTE) through ACI-NA, and realized that this technology could help the airport meet its goals for capacity and efficiency. In 1997, Las Vegas McCarran International Airport became the first U.S. airport to implement CUTE.

Although the initial design and implementation of CUTE cost the equivalent of the cost of constructing a new gate, Las Vegas McCarran International Airport realized the capacity and efficiency equal to constructing 14 gates. Las Vegas McCarran International Airport initially installed CUTE at the gates and only later installed it at the ticket counters, when requested by the air carriers.

Las Vegas McCarran International Airport included the airlines in the design process for all of the common use strategies that were implemented over the years. This has helped Las Vegas McCarran International Airport to be very successful in implementing a common use strategy. Early on, the airport was interested in making all gates fully common use, with no gate assignments. However, as a compromise with the airlines, Las Vegas McCarran International Airport agreed to use a preferential lease arrangement.

The next major common use strategy for Las Vegas McCarran International Airport came with the implementation of Common Use Self-Service (CUSS) kiosks. Las Vegas McCarran International Airport was driven to this new technology because airlines were installing proprietary kiosks and defeating the initiatives to make the ticketing counters common use. CUSS implementation allowed Las Vegas McCarran International Airport to improve the passenger processing experience by moving the ticketing process away from the traditional check-in desks, to outside the terminal, such as parking lots, the rental car center, and even off-site locations.

The off-site locations have enabled Las Vegas McCarran International Airport to take its next major implementation of a common use strategy. The airport has installed remote, off-site bag check for passengers, allowing passengers to check their bags prior to arriving at the airport. Passengers may now fully check in and be ready for their flight before leaving their hotel or the convention center. This allows passengers to take a more leisurely trip to the airport, without having to carry baggage and without needing to rush to the airport for the check-in process. Las Vegas McCarran International Airport has proven that implementing common use strategies improves customer satisfaction. The airport recently won the coveted 2006 J.D. Power & Associates award for customer service.

LUFTHANSA—COMMON USE ADVANTAGE

Interview Participants

Thomas Jeske
Carsten Fuhrmann
Siegfried Schulz

Summary

Lufthansa Airlines (LH) is continually looking to grow its business through expanding service at their existing airports and initiating service to new airports. Part of their strategy to facilitate this growth

is to utilize Common Use Terminal Equipment (CUTE) installations. Lufthansa views CUTE as part of their competitive advantage, and encourages the airports they service to install CUTE.

Lufthansa Profile

Lufthansa was formed in 1926 as *Deutsche Luft Hansa Aktiengesellschaft* (later renamed Lufthansa) by the merger of *Deutsche Aero Lloyd* (*DAL*) and *Junkers Luftverkehr*. In Lufthansa's early years, they were influential in the creation of several airlines, including Iberia, Syndicato Condor, and Eurasia airlines. After a brief hiatus during World War II, Lufthansa began flying scheduled flights again in 1955. In 2006, Lufthansa carried 51.213 million passengers (World Air Transport Statistics, 51st ed., IATA, May 2006), making it the sixth largest airline, by number of enplaned passengers, in the world.

Situation

When Lufthansa Airlines is considering starting service to a new airport, one of the questions it asks is if that airport has CUTE. If the airport does not, Lufthansa works with the airport authorities to determine if it makes sense for the airport to install a CUTE system. For Lufthansa, the startup and operating costs of a CUTE airport are significantly less than the startup and operating costs of a dedicated, proprietary system installation at an airport of similar scope and size because Lufthansa does not have to incur the costs of installing cabling, infrastructure, computers, and other equipment provided by a CUTE installation.

When Lufthansa considers the cost of starting and operating a station, they include the costs associated with support of the IT systems necessary to process passengers and prepare them to board Lufthansa's airplanes. Part of the cost equation is the cost of providing system support, which is especially higher on a per flight basis in smaller stations where they may only have one or two flights a week. Lufthansa seeks to minimize support costs for the start up and operation of a station.

CUTE allows Lufthansa to obtain support from the local airport staff, from the vendor, or from remote, centralized support centers. In all of these cases, the support cost is much less than the cost of having to dispatch a technician to support a small station in terms of flight activity.

Lufthansa seems to be unique in this approach. From a U.S. carrier-based perspective, CUTE systems are less likely to be supported than dedicated, proprietary systems. This may be due in part to the fact that Lufthansa has been working with CUTE systems since the founding of CUTE in 1985. They have a long history and a deep understanding of the CUTE recommendations (IATA RP 1797) and are considered one of the founding members of the CUTE requirements.

Lufthansa Airlines has built an extensive support structure to design, test, implement, and deploy their CUTE application at airports. Lufthansa has a team responsible for writing and maintaining the CUTE application code. Once the code is ready, it is transferred to Lufthansa Systems for certification testing. Lufthansa Systems then works closely with all of the CUTE platform suppliers to ensure that the code produced by Lufthansa is fully certified by all of the vendors that provide CUTE systems at the airports Lufthansa services. Once certified, Lufthansa Systems works with each site to deploy the application. Throughout the entire development, certification, and deployment process, Lufthansa follows a very rigorous quality process to ensure success.

Lufthansa is also very particular about the quality of the paper and printing of their boarding passes. They view the quality of their boarding passes as a reflection on the quality of service to the customers, and Lufthansa works with Lufthansa Systems to ensure that the quality of the printers, paper, and print quality meet the exacting standards of Lufthansa. Lufthansa works with all airports it services to ensure that the printers associated with the CUTE systems are able to print Lufthansa's boarding card stock. In addition, the boarding stock is viewed as part of the flying experience for their passengers. Lufthansa believes that passengers are choosing to fly on their airline for the service and experience, and the boarding card stock plays an important role.

Lufthansa is active in the current Common Use Passenger Processing Systems (CUPPS) initiative to update the existing IATA 1797 recommended practice. The airline serves as the co-vice chair for the team working on completing the update. With their history in implementing CUTE, and their leadership on the update to the IATA RP 1797, Lufthansa continues to ensure that agent facing common use systems will be a part of their competitive advantage moving forward.

APPENDIX C

Survey Instrument

SURVEY INSTRUMENT

FOR

ACRP SYNTHESIS S10-02

COMMON USE FACILITIES AND EQUIPMENT AT AIRPORTS

The purpose of this Transportation Research Board Synthesis Report is to survey and collect information about common use practices from a diverse group of airports and airlines. The synthesis will also include a review of currently published, relevant literature.

The attached survey is designed to gather a variety of information that will lead to the final synthesis report. The report will include common use strategies for airports and airlines. The survey includes questions about airport and airline common use strategies and philosophies. For the purposes of this survey, common use relates to the facilities and physical plant changes required to enable airport space to be utilized by more than one tenant (non-exclusive use) as well as support of IATA common use standards and the physical plant changes required to facilitate common use.

The survey attempts to cover as many aspects of common use as possible; however, given the diversity of recipients of this survey, some sections may not be applicable. Please attempt to fill out as much of the survey as possible. If any question does not apply to your operation, please answer "N/A."

An important part of the synthesis will be follow-on interviews with selected airports and individuals to identify relevant case studies and industry best practices. Based on the answers received you may be contacted for further information. Thank you in advance for your participation in this survey. If you have any questions, please contact Rick Belliotti at 602.919.0348 or via e-mail at rickb@barich.net.

Respondent Information

Date: _____

Name and Title of Respondent: _____

Organization Name: _____

Respondent Telephone Number: _____

Respondent E-Mail Address: _____

Airlines

1. Does your airline have a common use strategy?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure

2. Is your airline operating in a Common Use Terminal Equipment (CUTE) environment at any of the airports which you service?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure

3. Is your airline operating in a Common Use Self-Service (CUSS) environment at any of the airports which you service?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure

4. Approximately what percent of your passengers check in on the Internet prior to arrival at an airport?
   _____%

5. How did your airline arrive at this number?
   - ☐ Professional estimate
   - ☐ Actual counts
   - ☐ Other: _____

6. For which of the following vendor's platforms do you have a CUTE application? Please mark all that apply.
   - ☐ ARINC ☐ MATERNA ☐ SITA
   - ☐ Ultra electronics ☐ AirIT ☐ Resa
   - ☐ IER ☐ Other: _____

7. For which of the following vendors do you have a CUSS compliant application? (check box)
   - ☐ ARINC ☐ MATERNA ☐ SITA
   - ☐ IBM ☐ Other: _____

8. We are identifying 4 divisions to the common use development process. Please rank these in order of most expensive, in your view. For the purposes of this question, 1 equals most expensive, 4 equals least expensive.

   a. Common Use Terminal Emulation (CUTE):
      - ___ Development
      - ___ Certification
      - ___ Deployment
      - ___ Maintenance

   b. Common Use Self-Service (CUSS)
      - ___ Development
      - ___ Certification
      - ___ Deployment
      - ___ Maintenance

9. Does your airline have a service level agreement with the common use provider (CUTE and CUSS) to provide timely application distributions and updates?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure

10. Please rank the following common use inhibitors from most (1) to least (6).

    a. Common Use Terminal Emulation (CUTE):
       ___ Costs too much
       ___ Difficult to deploy
       ___ Difficult to certify
       ___ Loss of branding ability
       ___ Lack of control
       ___ Maintenance/support
    b. Common Use Self-Service (CUSS)
       ___ Costs too much
       ___ Difficult to deploy
       ___ Difficult to certify
       ___ Loss of branding ability
       ___ Lack of control
       ___ Maintenance/support

11. Please rank the following reasons why your airline would choose to use a CUTE system at a particular airport from most important (1) to least important (8):
       ___ Cost of deploying airline equipment and infrastructure
       ___ Need to share gates
       ___ Code share agreement with another airline
       ___ Airline alliance
       ___ Allows entry into a new airport/market
       ___ Need to use existing gates more efficiently
       ___ Need to speed entry into new market
       ___ Airport required

12. Does your airline have an official policy or statement with respect to common use?
    ☐ Yes
    ☐ No
    ☐ Not sure

13. If yes, can you provide this official policy or statement to the surveyor?
    ☐ Yes
    ☐ No
    ☐ Not sure

14. Does your airline prefer to provide the common use equipment, provide a CLUB arrangement, or does your airline prefer the airport to provide?
    ☐ Airline provided
    ☐ Airport provided
    ☐ Prefer CLUB arrangement
    ☐ Depends on the location

15. In your airline's view, what are airports doing well in the deployment of common use?
    _____
    _____
    _____

16. What are airports not doing well in the deployment of common use?
    _____
    _____
    _____

17. What facility changes would your airline anticipate in the implementation of common use (e.g., better dynamic signage to support branding needs, new ticket counter positions with embedded kiosks, etc.)?
    _____
    _____
    _____

18. How would these changes affect the usage of existing facilities?
    Why do you feel that way?
    _____
    _____
    _____

19. Is your airline aware of the IATA focus initiatives, such as e-ticketing, Bar Code Boarding Passes (BCBP), and CUSS?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

20. Does your airline use/support or have plans to support 2D barcode?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

21. Is your airline planning on providing 2D barcode check-in via cell phone?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

22. Does your airline use/support or have plans to support e-ticketing?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

23. Does your airline use/support or have plans to support CUSS?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

24. What supporting technologies have helped to improve the implementation and use of a common use model?
    - ☐ Voice over IP phone
    - ☐ Gate management system
    - ☐ Integrated paging
    - ☐ MUFIDS
    - ☐ MUBIDS
    - ☐ Other: _____

25. What is the maximum response time your airline expects for support on common use technology systems for major failures?
    - ☐ 4 hours
    - ☐ 3 hours
    - ☐ 2 hours
    - ☐ 1 hour
    - ☐ Other: _____

26. What is the maximum response time your airline expects for support on common use technology systems for minor failures?
    - ☐ 4 hours
    - ☐ 3 hours
    - ☐ 2 hours
    - ☐ 1 hour
    - ☐ Other: _____

27. What is the maximum response time your airline expects for support on common use facilities (e.g., hold rooms, ticketing counters, and club spaces)?
    - ☐ 4 hours
    - ☐ 3 hours
    - ☐ 2 hours
    - ☐ 1 hour
    - ☐ Other: _____

28. Are there any areas of an airport that your airline would not be in favor of having common use activities?
    _____
    _____
    _____

29. Does your airline utilize common use space at any airports you service (club space, baggage handling, check-in agents/multi-airline check-in, other…)?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

30. Does your airline utilize any common use office space (back office, baggage service office, or other)?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

31. Is your airline aware of the Common Use Passenger Processing Systems (CUPPS) project (RP 1797) currently being undertaken by IATA?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

32. Is your airline in favor of the CUPPS initiative?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

33. Does your airline have an official position on CUPPS?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

34. If we have any clarifying questions or require additional information, may we contact you?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

Airports

1. Is your airport a hub airport or a destination airport?
    - ☐ Hub airport
    - ☐ Destination airport
    - ☐ Other: _____

2. Is your airport required to create a competition plan (U.S. airport only)?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

3. Do you provide a common network backbone for all systems or do you have discrete networks for each system?
    - ☐ Common network backbone
    - ☐ Discrete network
    - ☐ Combination of both common network and discrete network
    - ☐ Other: _____

4. Does your airport provide common baggage make-up area?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

5. Does your airport provide gate management services?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

6. Does you airport provide a local departure control system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

7. Does your airport provide common baggage drop-off at a single location for all airlines? This excludes off-site bag drop.
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

8. Do you provide dedicated space, preferential space, or other?
   - ☐ Dedicated space
   - ☐ Preferential space
   - ☐ Both
   - ☐ Other: _____

9. Is your airport aware of the Common Use Passenger Processing Systems (CUPPS) project (RP 1797) currently being undertaken by IATA, ATA, and ACI?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure
   - ☐ Other: _____

10. Has your airport implemented any common use models? By common use models we mean any systems or areas of your airport that are identified as common use by all operating airlines in that terminal, concourse, etc.
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

11. Do you have common use in international gates/check-in counters?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

12. How many international gates (of the total available) are common use (example answer: 20 of 27)?

    _____

13. How many international ticketing counters (of the total available) are common use (example answer: 15 of 19)?

    _____

14. Do you have other common use systems in your international gates (please list)?

    _____

15. Do you have common use in domestic gates/check-in counters?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

16. How many domestic gates (of the total available) are common use (example answer: 15 of 17)?

    _____

17. How many domestic ticketing counters (of the total available) are common use? (example answer: 15 of 17)?

    _____

18. Do you have other common use systems in use in your domestic gates (please list)?

    _____

19. Do you have common use at off-site locations?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

20. How many different locations?

    _____

21. Do you have common use at curbside check-in locations?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

22. How many curbside locations (of the total available) are common use (example answer: 37 of 37)?

    _____

23. Does your airport have mobile common use terminals?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

24. Does your airport have CUSS check-in locations?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

25. How are airlines charged for the use of the installed common use systems?
    - ☐ Included in rates and charges
    - ☐ Per enplaned/deplaned/rechecking passenger or other per-capita billing methodology
    - ☐ Time of use of system
    - ☐ Equally shared and billed separately from rates and charges
    - ☐ Other: _____

26. What is/was the most expensive portion of your common use system?

    _____
    _____
    _____

27. What is/was the most difficult portion of your common use system to support?

    _____
    _____
    _____

28. Do you provide phone service as a part of your common use system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

29. What type of phone service do you provide?

    _____ Standard analog _____ Voice over IP _____ Digital

30. Do you provide WiFi for operational use, either in-building or exterior to the building, as a part of your common use system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

31. Are you planning on offering WiFi for operational use, either in-building or exterior to the building, as part of your common use system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

32. Do you provide WiFi for Internet access within public concourses for use by the public?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

33. What business model do you use for your WiFi access for passenger use?

    _____ Free to passengers _____ Pay for use

34. Does your airport provide other shared/common services (baggage handling, check-in agents/multi-airline check-in, other)?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

35. Please list any shared/common services that your airport provides.

    _____
    _____
    _____

36. What is the support model that your airport uses for common use systems?
    - ☐ Self-support
    - ☐ Vendor support
    - ☐ Third party
    - ☐ Other: _____

37. Does your airport have a common use baggage makeup system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

38. Does your airport have a common bag-drop solution/system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

39. Does your airport use a baggage reconciliation system?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

40. What benefits have you noticed with the implementation of common use models? Please describe.
    _____
    _____
    _____

41. Please identify any upgrades/enhancements you are considering to your installed common use system.
    - ☐ Accessibility for the disabled
    - ☐ Network
    - ☐ Platform upgrades
    - ☐ Hardware
    - ☐ Other: _____

42. Is your airport planning to implement common use in the future?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

43. What problem does your airport envision a common use installation will facilitate or solve?
    _____
    _____
    _____

44. What is the main driver for your common use initiative?
    - ☐ Customer service
    - ☐ Defer capital expenditures
    - ☐ Passenger flow
    - ☐ Cost reduction
    - ☐ Overall facilities usage
    - ☐ Inability to expand
    - ☐ Attract new tenants
    - ☐ Maximize use of gates for multiple carriers
    - ☐ Other: _____

45. Did or will your airport apply for Airport Improvement Program (AIP) funding to help pay for common use systems (U.S.-based airports only)?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

46. Please describe the elements of these systems that have been identified as public use for the AIP funding application.
    _____
    _____
    _____

47. Did your airport apply Passenger Facility Charges (PFCs) to offset the costs of the common use systems?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

48. If your airport is a non-U.S. airport, please describe any funding that was used to pay for common use systems, such as airport usage fees, taxes, etc.

    _____
    _____
    _____

49. What does your airport view as the greatest inhibitor to acceptance of common use models from airlines? Please rank 1–7, where 1 is the greatest inhibitor and 7 is the least inhibitor.

    a. Common Use Terminal Emulation (CUTE):
        - ___ Costs too much
        - ___ Difficult to deploy
        - ___ Difficult to certify
        - ___ Loss of branding ability
        - ___ Lack of control
        - ___ Maintenance/support
        - ___ Airlines prefer dedicated systems

    b. Common Use Self-Service (CUSS)
        - ___ Costs too much
        - ___ Difficult to deploy
        - ___ Difficult to certify
        - ___ Loss of branding ability
        - ___ Lack of control
        - ___ Maintenance/support
        - ___ Airlines prefer dedicated systems

50. If we have any clarifying questions or require additional information, may we contact you?
    - ☐ Yes
    - ☐ No
    - ☐ Not sure

51. If your airport has no intentions of implementing common use systems, what is the major reason for this decision?

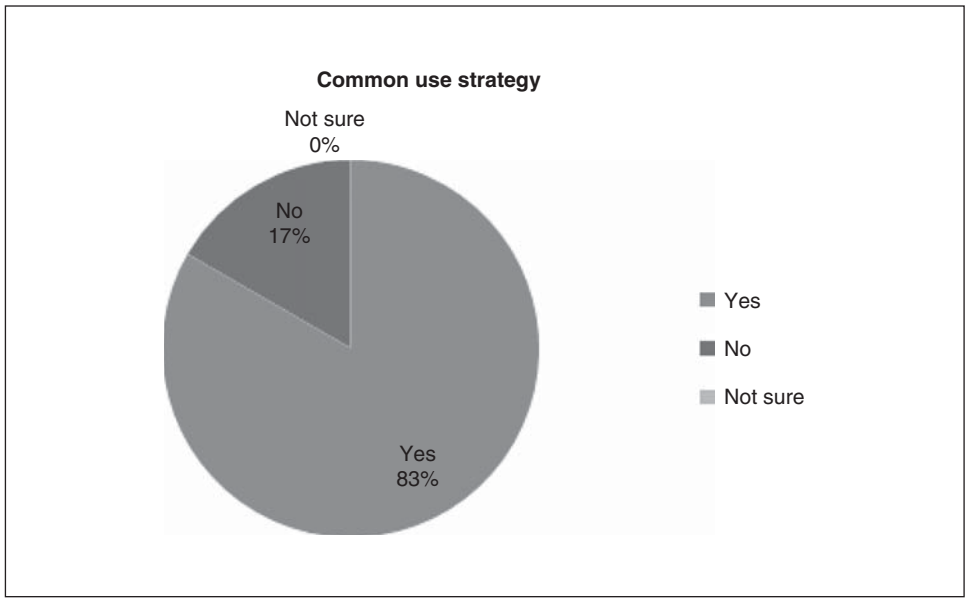
    _____
    _____
    _____

APPENDIX D

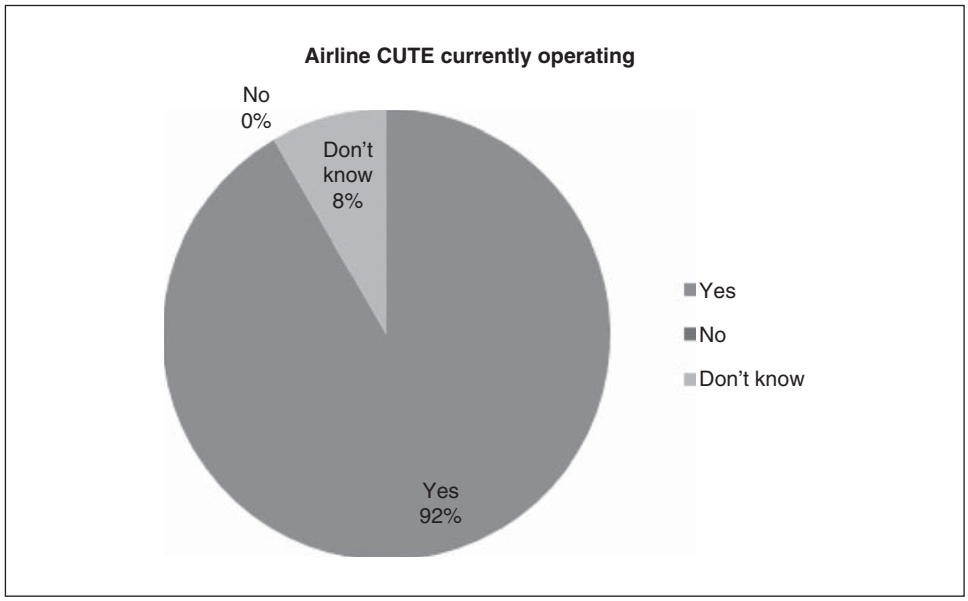
Compiled Survey Results

AIRLINES

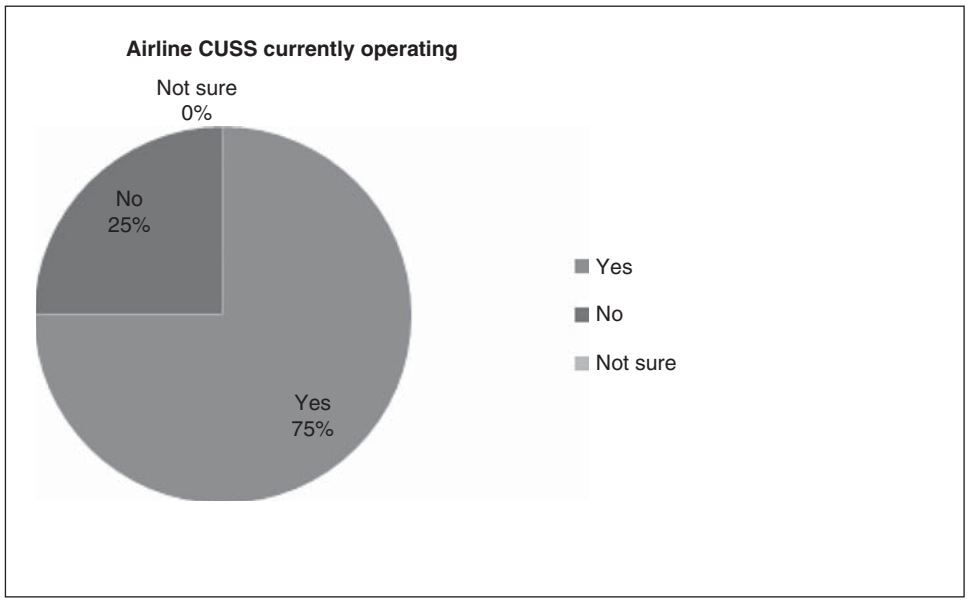
1. Does your airline have a common use strategy?



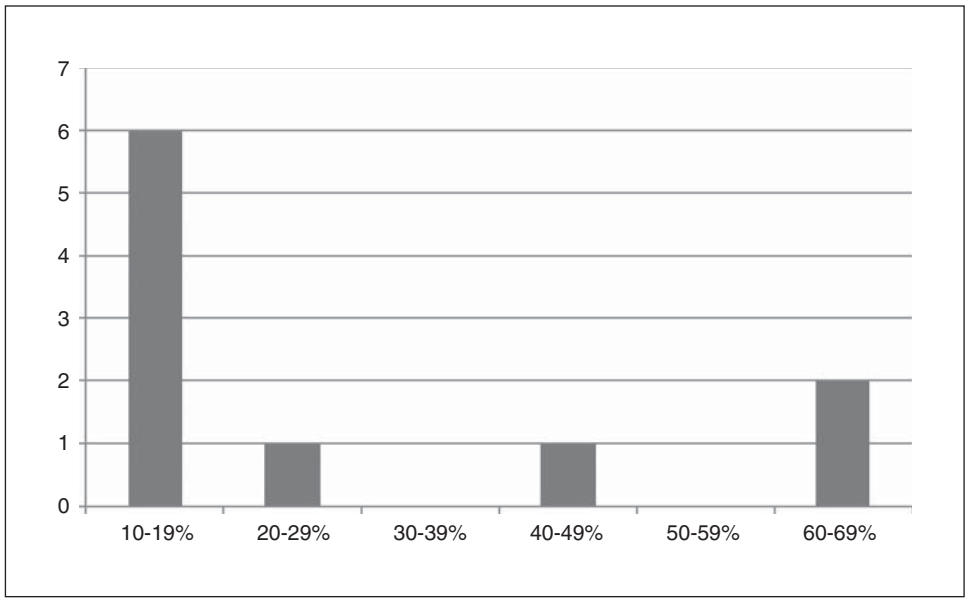
2. Is your airline operating in a Common Use Terminal Equipment (CUTE) environment at any of the airports which you service?



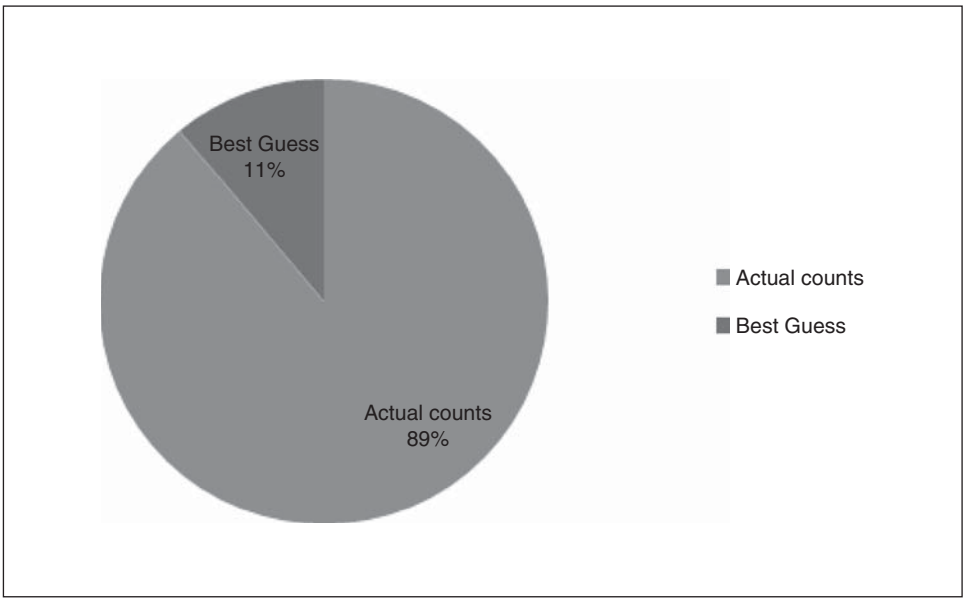
3. Is your airline operating in a Common Use Self-Service (CUSS) environment at any of the airports which you service?



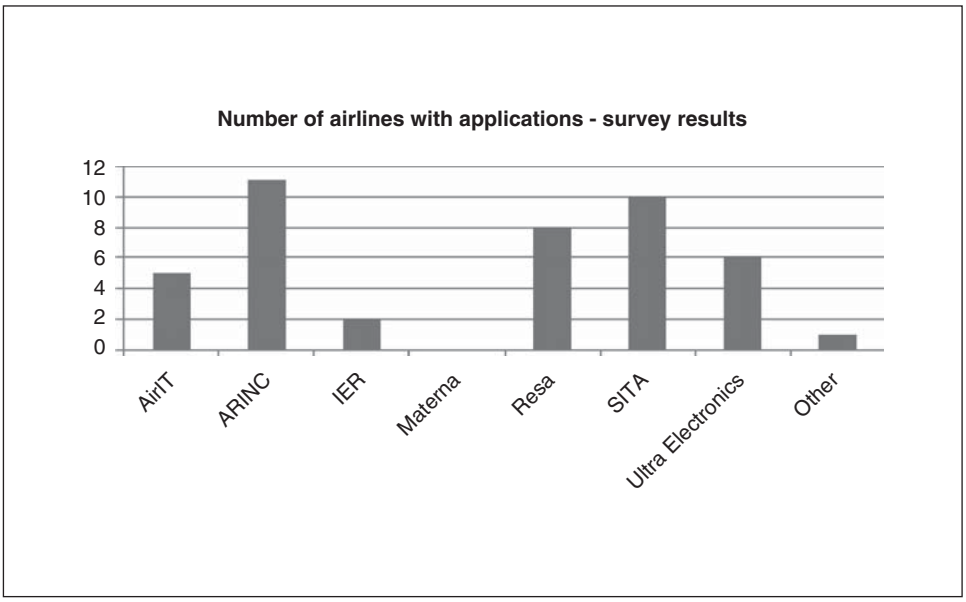
4. Approximately what percent of your passengers check in on the Internet prior to arrival at an airport?



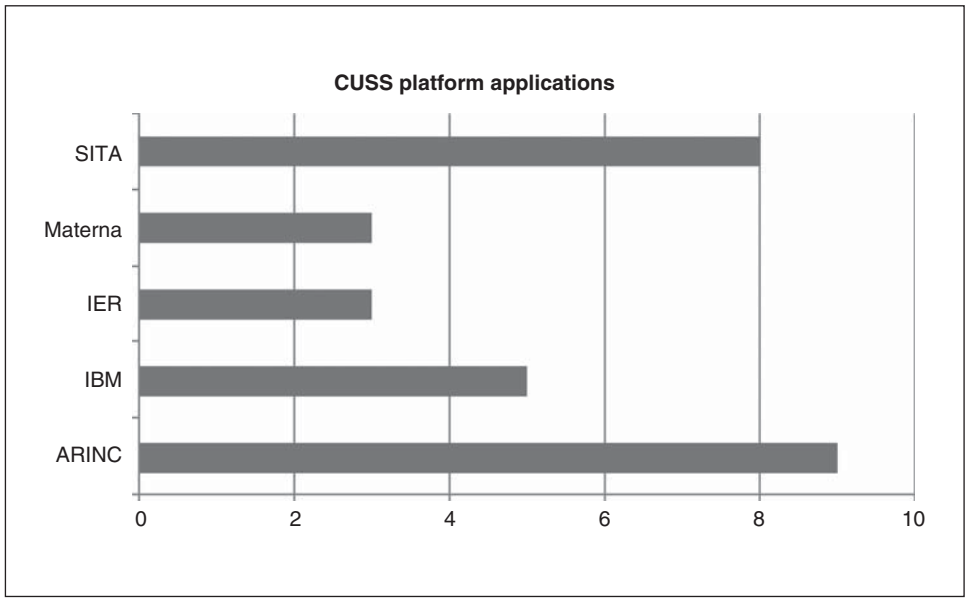
5. How did your airline arrive at this number?



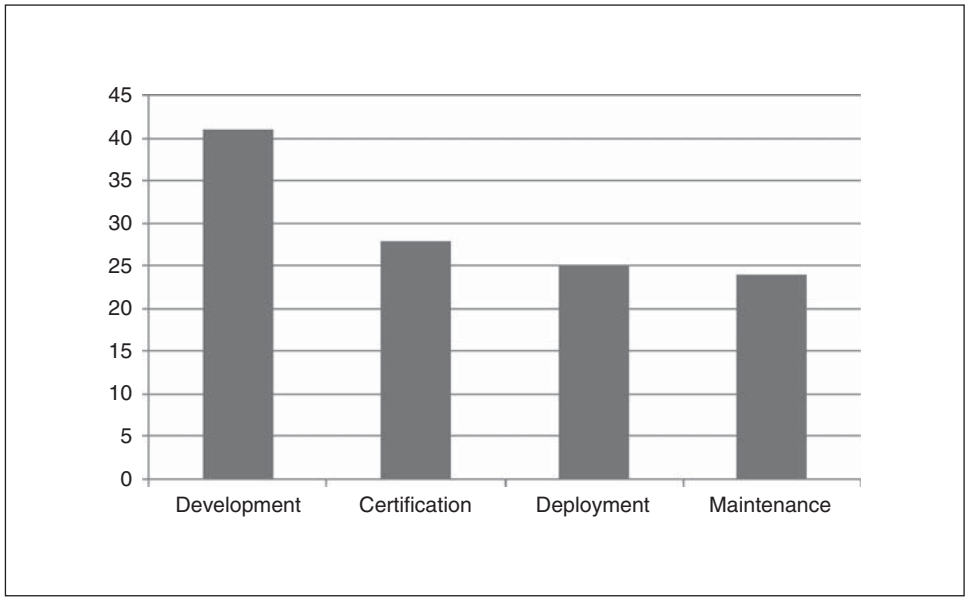
6. For which of the following vendor's platforms do you have a CUTE application? Please mark all that apply.



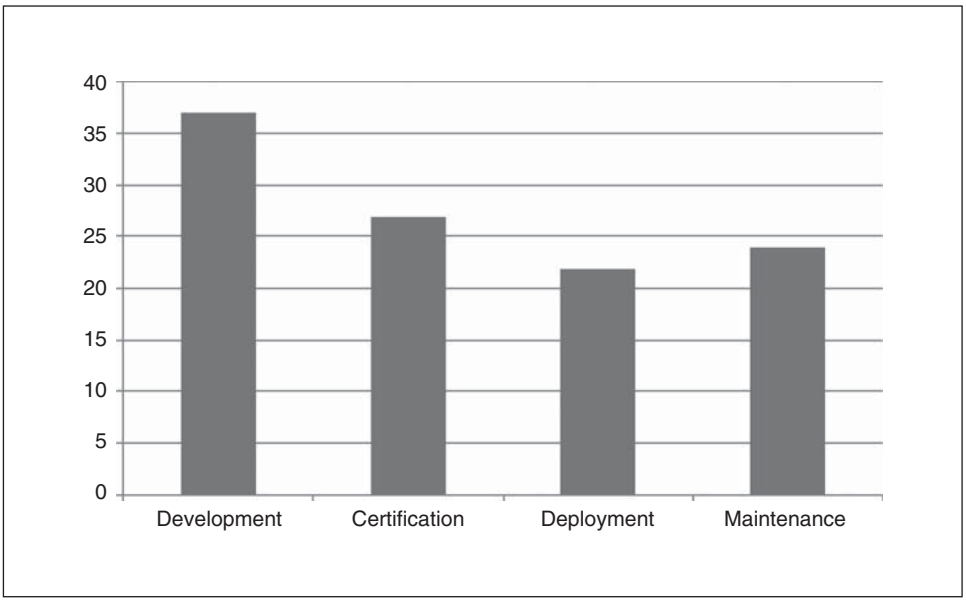
7. For which of the following vendors do you have a CUSS compliant application? (check box)



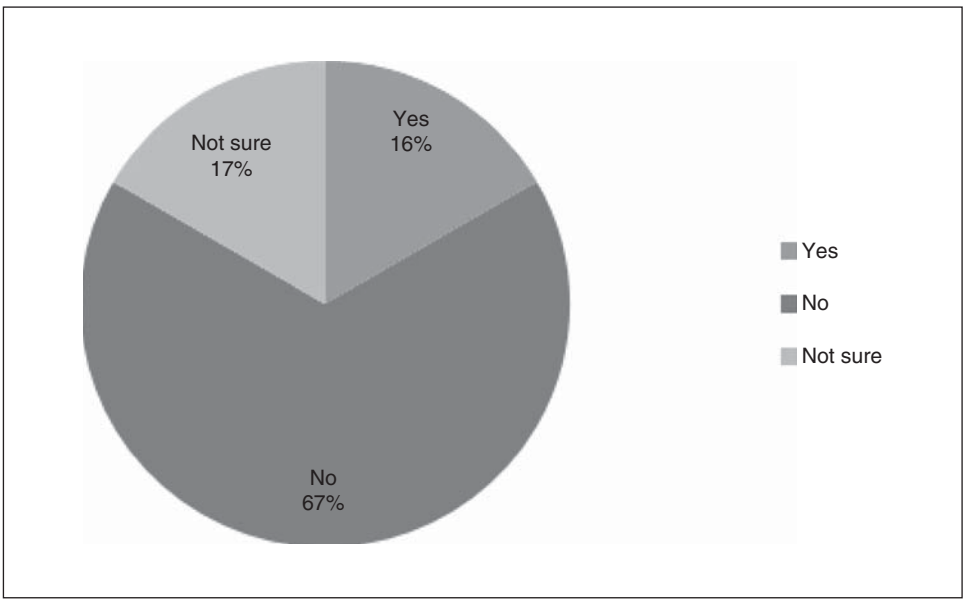
8. We are identifying 4 divisions to the common use development process. Please rank these in order of most expensive, in your view. For the purposes of this question, 1 equals most expensive, 4 equals least expensive.
   a. Common Use Terminal Emulation (CUTE):



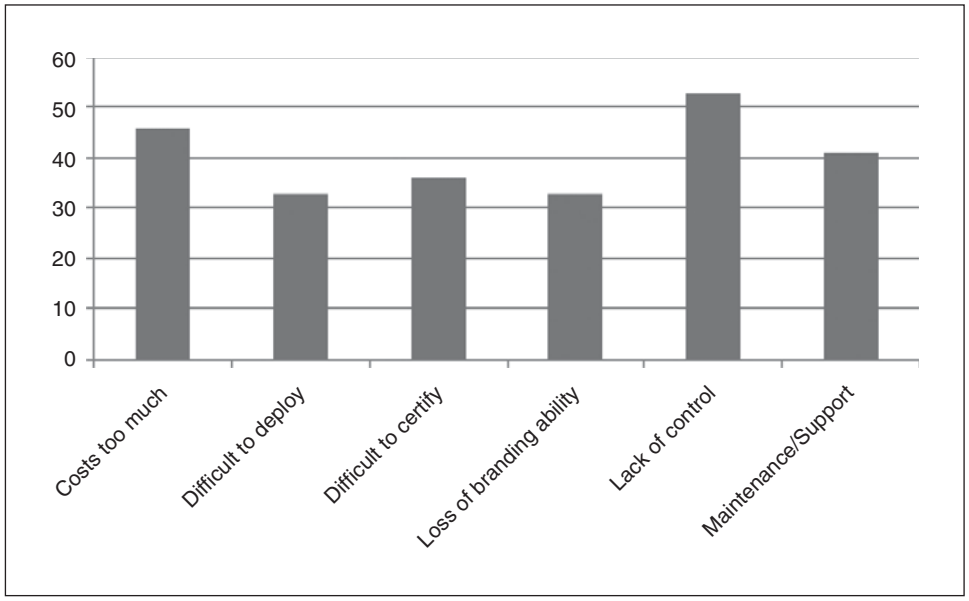
b. Common Use Self-Service (CUSS)



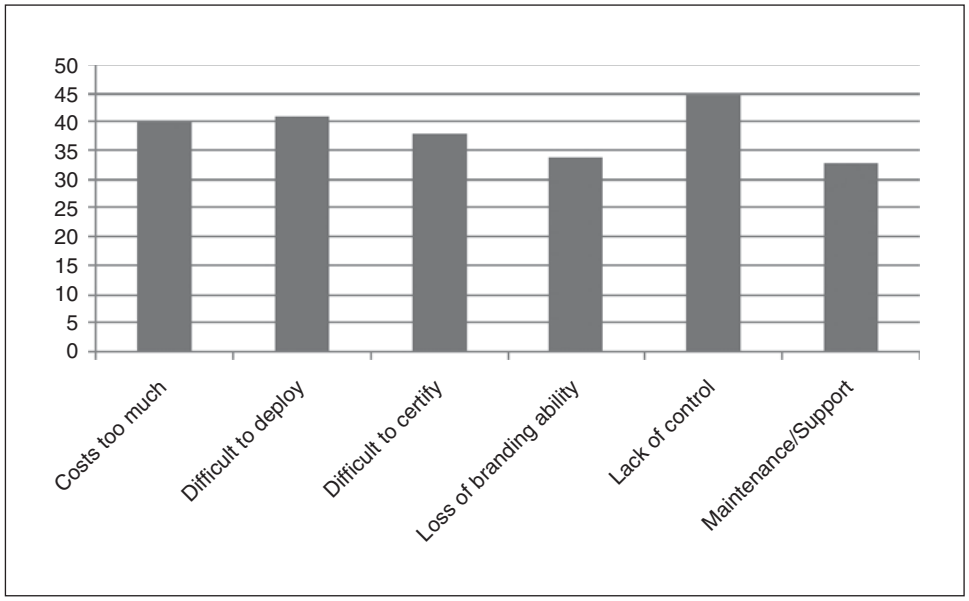
9. Does your airline have a service level agreement with the common use provider (CUTE and CUSS) to provide timely application distributions and updates?



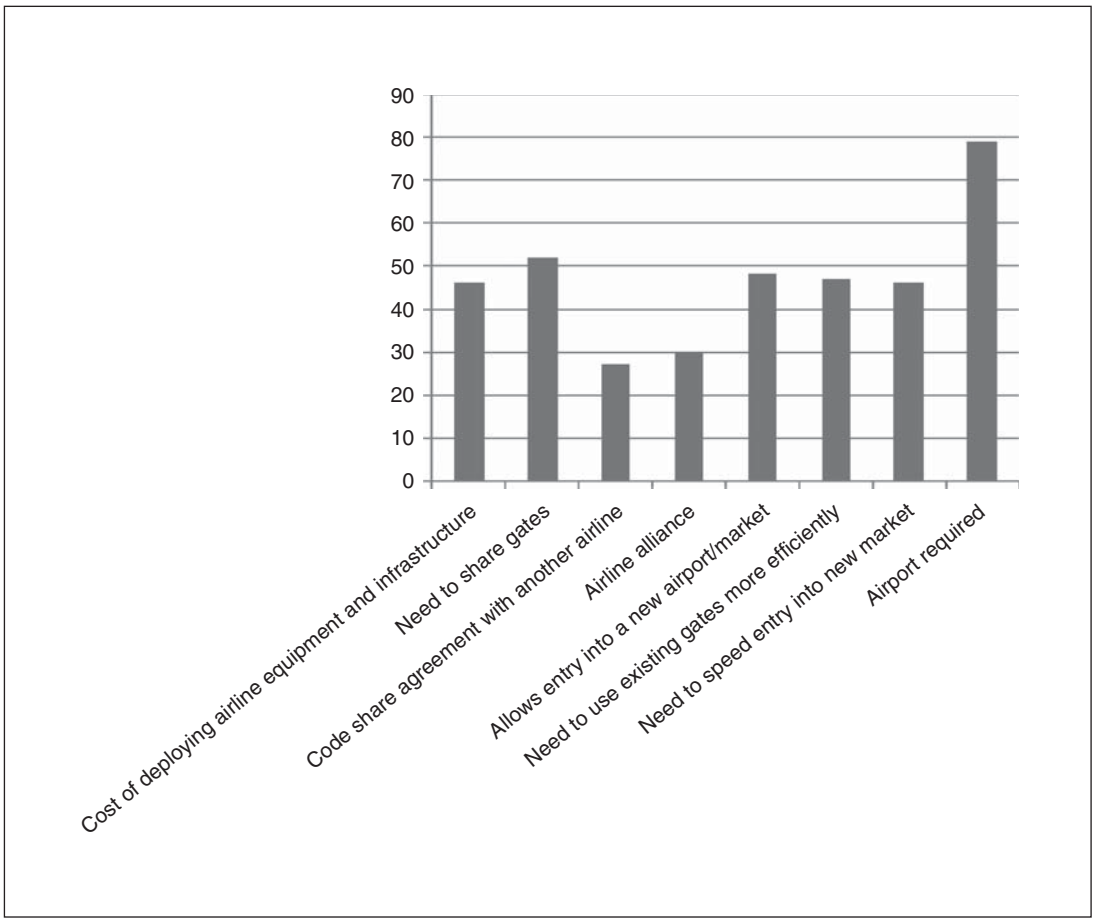
10. Please rank the following common use inhibitors from most (1) to least (6).
    a. Common Use Terminal Emulation (CUTE):



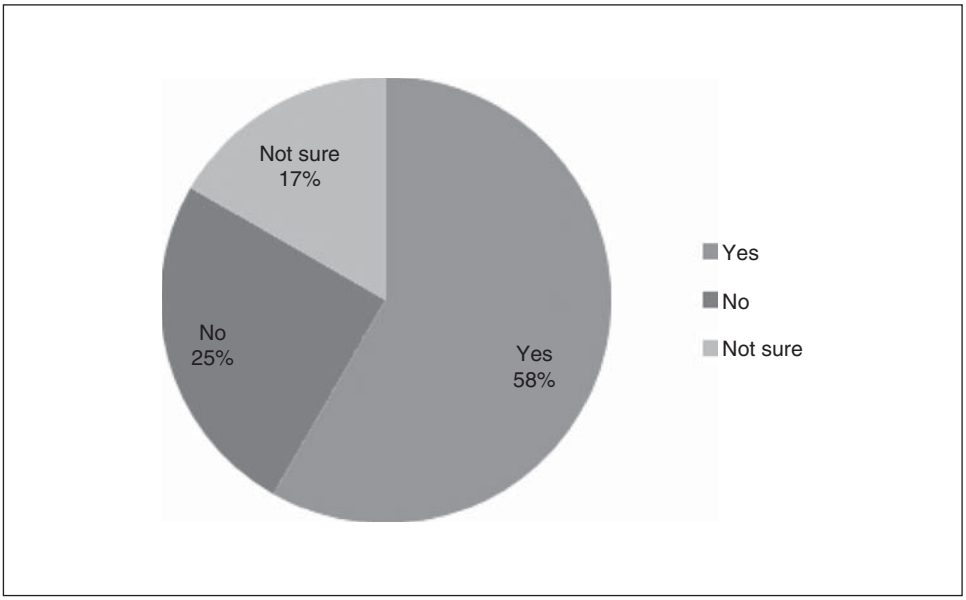
    b. Common Use Self-Service (CUSS)



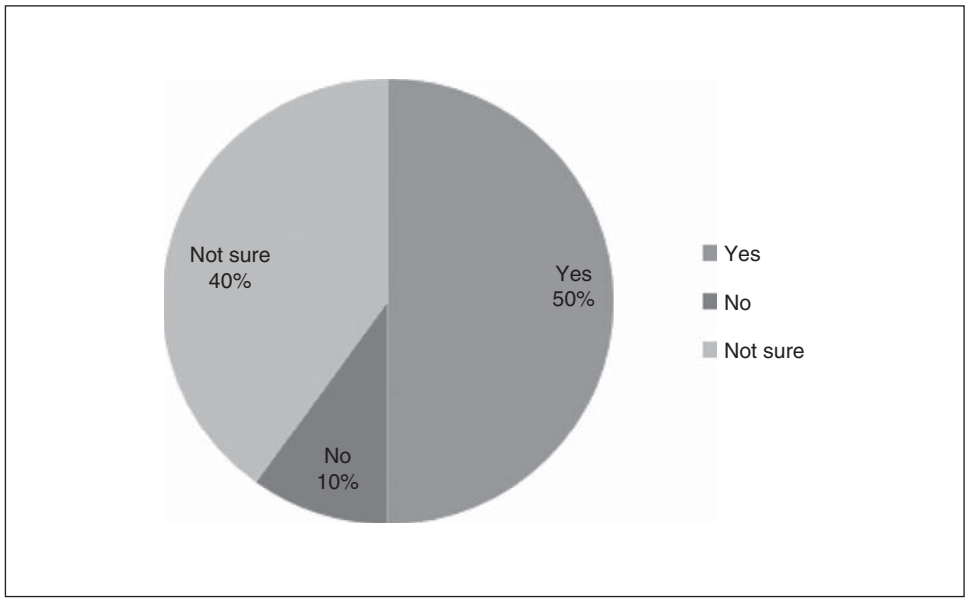
11. Please rank the following reasons why your airline would choose to use a CUTE system at a particular airport from most important (1) to least important (8):



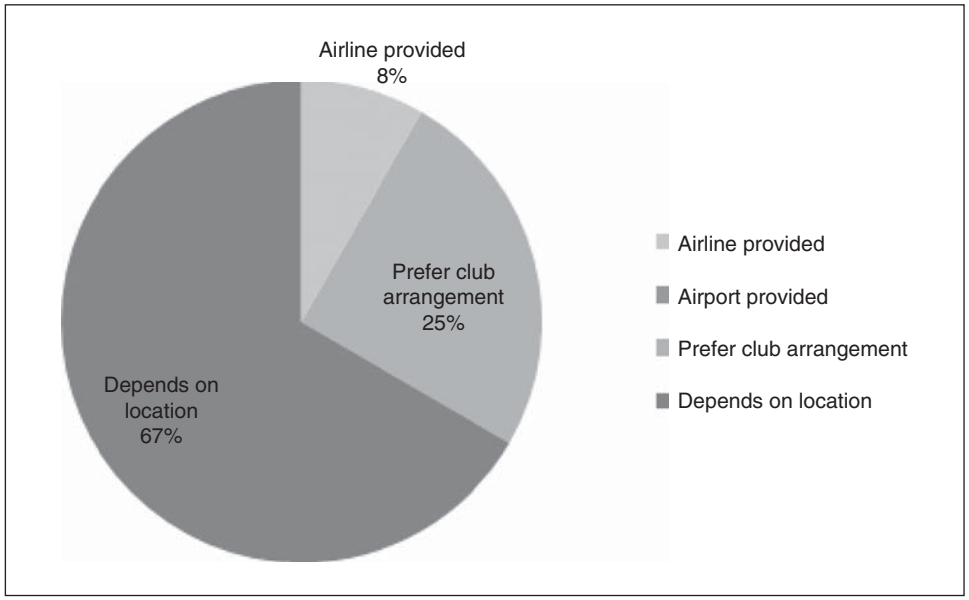
12. Does your airline have an official policy or statement with respect to common use?



13. If yes, can you provide this official policy or statement to the surveyor?



14. Does your airline prefer to provide the common use equipment, provide a CLUB arrangement, or does your airline prefer the airport to provide?



15. In your airline's view, what are airports doing well in the deployment of common use?
    - Some airports are working closely with us to understand our needs and then attempting their best to apply those needs in the common use environment.
    - That more and more airports are opting for a common use platform at their airport.
    - CUTE is working really well within Europe and more and more airports are adopting CUTE. This is great news for our business model—the more CUTE the better. In Europe (especially the UK) airports are doing NOTHING well with regard to CUSS.
    - Not making common use a profit center.
    - Most CUTE/CUSS airports are providing good/timely service for hardware problems, restocking, troubleshooting issues, and just being responsive and working with our technical staff to determine root cause of problems when they occur and not just pointing fingers.
    - Airports that have an open book policy toward common use and do not see it as another revenue stream/profit target are likely to succeed in convincing airlines to participate.
    - N/A
    - CUTE directs—A few airports are including the end users group in the discussion leading up to which vendor they will choose operational requirements and/or basically using the airlines experience to help them through the process. CLUB sites—The airport is allowing the end user to manage the platform. This results in a much more user friendly environment allowing the airlines a voice in the size and scope of CUTE products, installations, path of existing CUTE products, and timely retirement of obsolete technologies.
    - Done well if airlines are involved in selection process and decisions for cost-effective hardware fit-up that meets with business strategy & StB objectives. The cost recovery model must be designed in such a way that ANY/ALL airlines operating at the site contribute, including any charter operation or one-time/seasonal operators since the facilities are available to them by virtue of common use. Not charging ALL results in scheduled carriers subsidizing others!
    - Candidly, not much! Varies by airport. As I struggle to stay away from my negative list, they typically install enough computer terminals and they spell our name correctly on the invoices.

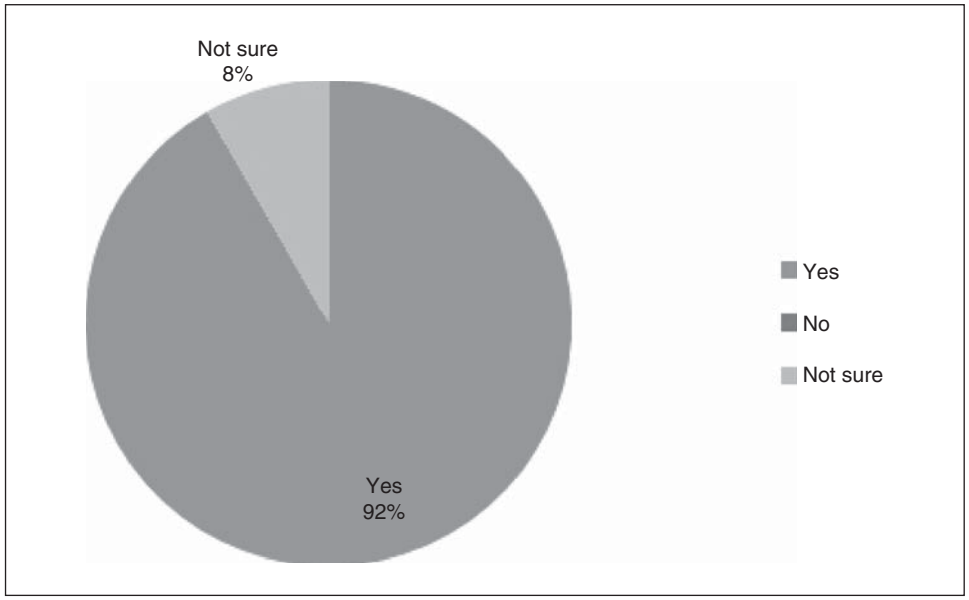
16. What are airports not doing well in the deployment of common use?
    - Not listening. Not responding at the speed I need them to. Not presenting costs up front. Poor phasing.
    - Not involving airlines during the planning stages of a new common use IT platform (ask airlines what they need, listen to their requirements).
    - CUSS is destined to fail because airports are hesitant to move into CUSS in the correct manner—having said that, CUSS standards make it nigh on impossible for us as an airline to consider expanding our existing operation going forward. In Europe (especially the UK) airports cannot get themselves organised to adopt the CUSS systems and make terminals that are ready for "self-service." A prime example is [deleted airport identifier], which in CUSS terms is nothing short of a bad joke! In the U.S. you look at [deleted airport identifier] and they have made the process work for airlines and themselves. The CUSS standard MUST be standardised for this to succeed—CUSS 2 should be amalgamated into CUPPS development so that all parties, airlines, airports, and providers can work from one common standard. With regards to CUTE, the biggest issue with airports is where they interfere with the day-to-day operation of the airlines using the systems—this does vary dramatically depending on the CLUB arrangements, etc. There are some airports that have no idea what they are entering into with regard to moving to CUTE—this is a frightening prospect for an airline such as us!
    - Inadequate hardware selection. Restricting the timely application releases. Increased complexity in making the product work and troubleshooting other single airport issues. Some airports use CUTE/CUSS as a profit center.
    - Some providers require too much time to get new software changes tested and ready to distribute. Could be they don't have adequate staff and facilities to support their sales/installed base.
    - Not engaging airlines, or not engaging early enough. Inflexible, illogical, pricing. Not prepared to stick with tried and trusted vendors. Not considering airline IT security issues.
    - Working with carriers on unique requirements.
    - Many airports are failing to utilize and listen to airline experiences with vendor and CUTE products. Very often the airports will go with the cheapest price. They are not comparing apples to apples resulting in a less than adequate system that costs more and does meet the airlines needs. Many airports are slow to evolve to new technologies.
    - Unilaterally making decision based on vendor's sales presentations with no practical experience/understanding of the business needs or platform reliability.
    - No vendor/airline SLA with enforcement, used for airport revenue generation, maintenance/support painful, costs not clearly defined, forced to use poor business process, minimum configuration vs. maximum, our hardware tools not allowed (even though certified), updates take too long, vendor not always able to use their existing standards, insufficient skilled support, unable to innovate, unable to market our product or services, lack of differentiation, airport wants to micro manage our customer, if the customer is "abused" the airline takes the hit ...

17. What facility changes would your airline anticipate in the implementation of common use (e.g., better dynamic signage to support branding needs, new ticket counter positions with embedded kiosks, etc.)?
    - Better passenger flow management with the use of this technology.
    - None.
    - Process, process, process... Plonking CUSS kiosks in random areas in an airport will not work (again this has been proven at [deleted airport identifier])! Waste of time, money, effort. They have to be built into an operational process that customers can work with and easily understand: Clearly marked out passenger direction, kiosks, bag drop, security. . . At all costs the perception of queuing many times MUST be eliminated. The biggest issue facing us now is the ability to drop bags quickly. Kiosks and Internet check-in are great concepts when travelling with hand luggage only, but can be pointless without a quick effective fast bag drop process.
      Many UK airports are suffering from bag capacity, so the introduction of remote bag drop needs to be considered fully and introduced where it is feasible. Introduction/integration of data systems in an airport and usage of 2D technology could also speed the

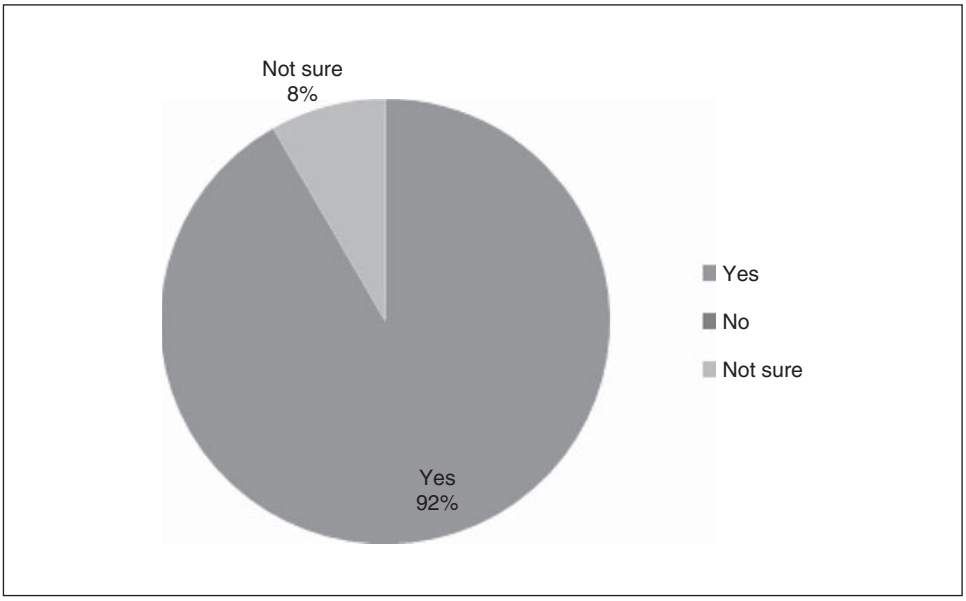
processing of passengers—although I see sharing data between airlines and airport operators being a culture shift that will be hard to overcome for some airlines.
- Have every airport implement share systems in the same way. Dynamic signage that supports unique airline products.
- Could be all of the above depending on airport. [deleted airline identifier] prefers embedded kiosks to save the customers making multiple stops.
- Support of current 2 step process. Semi-permanent branding in priority use areas.
- Embedded, in-line kiosk screens in the ticket counter.
- Better Internet access.
- Redesign of the layout to optimize self-serve passenger flows. Leverage free-standing (not embedded) CUSS kiosks and a baggage drop-off designed to support kiosk or web check-in/mobile check-in flows. Limited "traditional desks" to handle the exceptions only.
- To allow the airlines to use their standard business processes and allow for continuous improvement of that process. To allow consistency of product and service between airports within our route structure ...

18. How would these changes affect the usage of existing facilities?
Why do you feel that way?
- Require movement of existing equipment.
- Airports are getting busier year on year. Airports are NOT getting bigger (physically) year on year. As such, we have to look at the infrastructure of the airport and put in place systems (CUTE, CUSS, Fast Bag Drop, Remote Bag Drop, etc.) that can make an airport become more efficient in managing larger volumes of passengers without longer queues and delayed flights. I am certain that an average airport can process 30%–40% more passengers by building process and technology into its operation. This will cost airports, but it will probably be less cost than building a new terminal.
- Beneficial to airlines and their customers.
- Embedded kiosks for [deleted airline identifier] would increase use. [Deleted airline identifier] at international airports is subject to much tighter rules/regulations than other airlines that are not U.S. flag ship carriers. Airports don't really get this... or why it's a problem.
- The ability to use a universal business process and present a common customer experience across all airports would be an enabler to commit to common use facilities.
- Lessen the queue line confusion and offer more throughput or capacity at the ticket counter. The [deleted airport identifier] solution is a poor design.
- Decrease dependency on airport vendors and allow carriers more flexibility.
- More fluidity on passenger movements, open spaces, increased throughput, better unit costs. Separating check-in and bag drop allows for better/quicker access to kiosks while enabling unhindered access to bag drops for all self-serve channels (kiosks, web, mobile, off-site check-in, etc . . .).
- It would change today's "Un-Common use" to "Common Use" and allow passengers and agents to use the same business process at all locations. Simplify our support model and training programs.

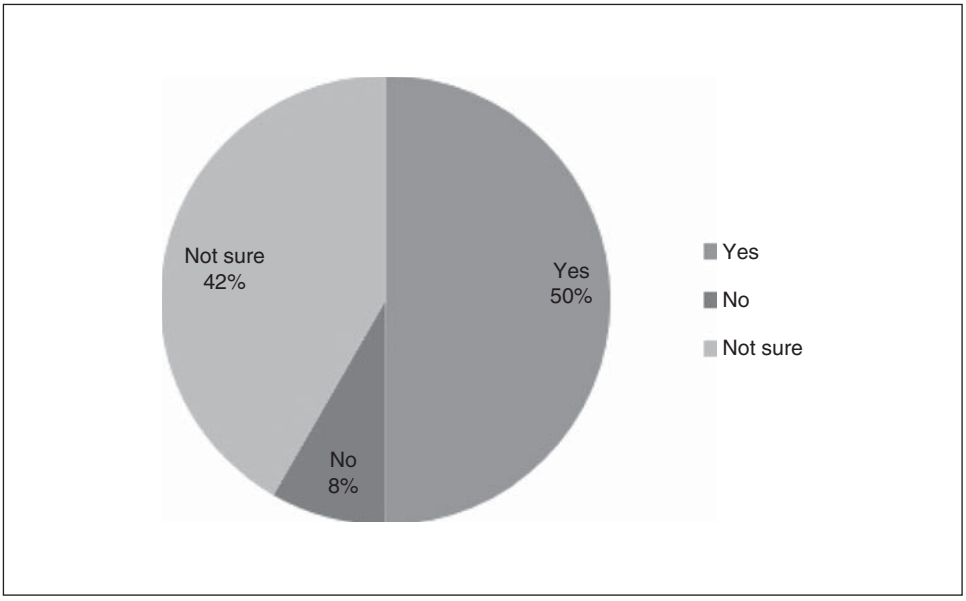
19. Is your airline aware of the IATA focus initiatives, such as e-ticketing, Bar Code Boarding Passes (BCBP), and CUSS?



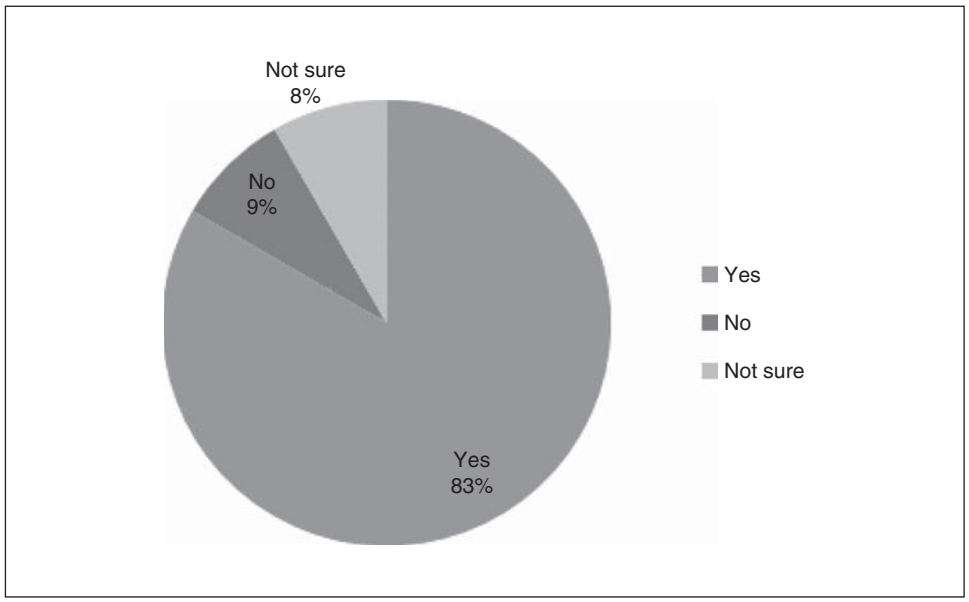
20. Does your airline use/support or have plans to support 2D barcode?



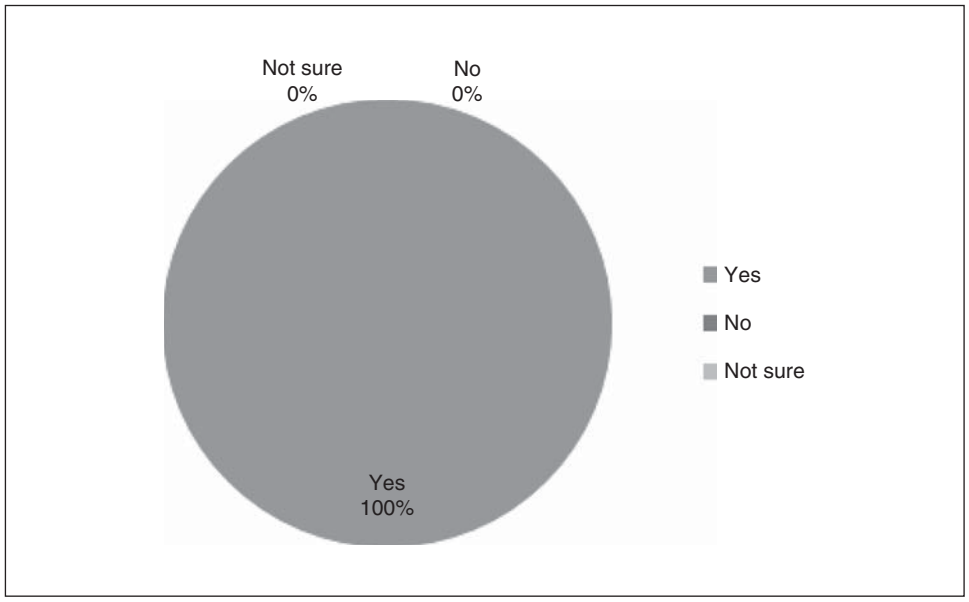
21. Is your airline planning on providing 2D barcode check-in via cell phone?



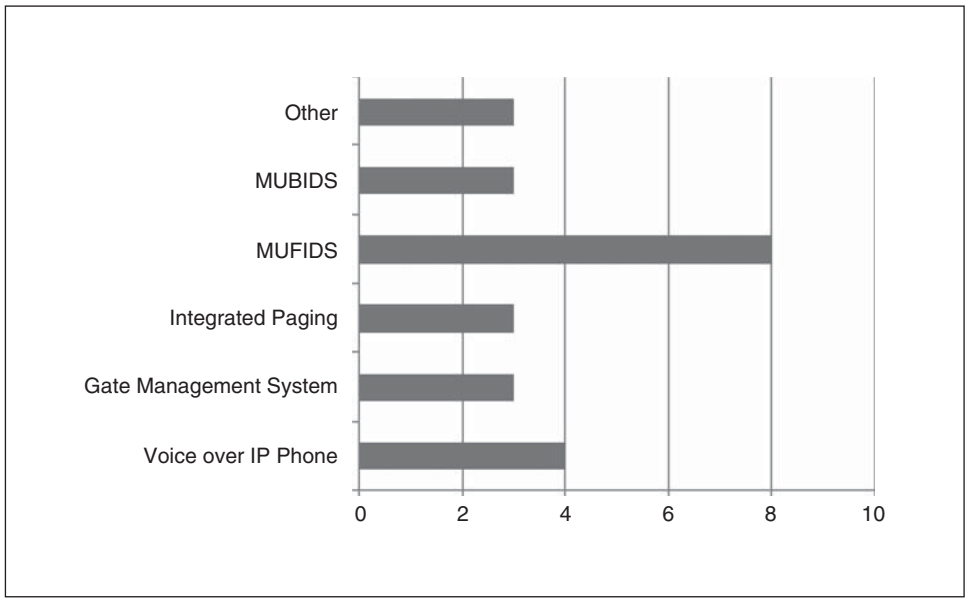
22. Does your airline use/support or have plans to support e-ticketing?



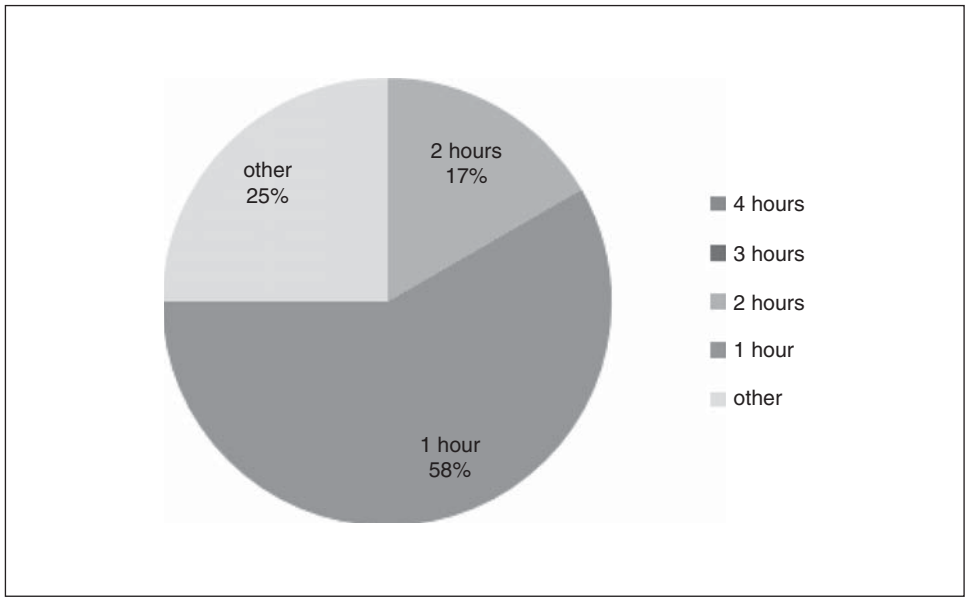
23. Does your airline use/support or have plans to support CUSS?



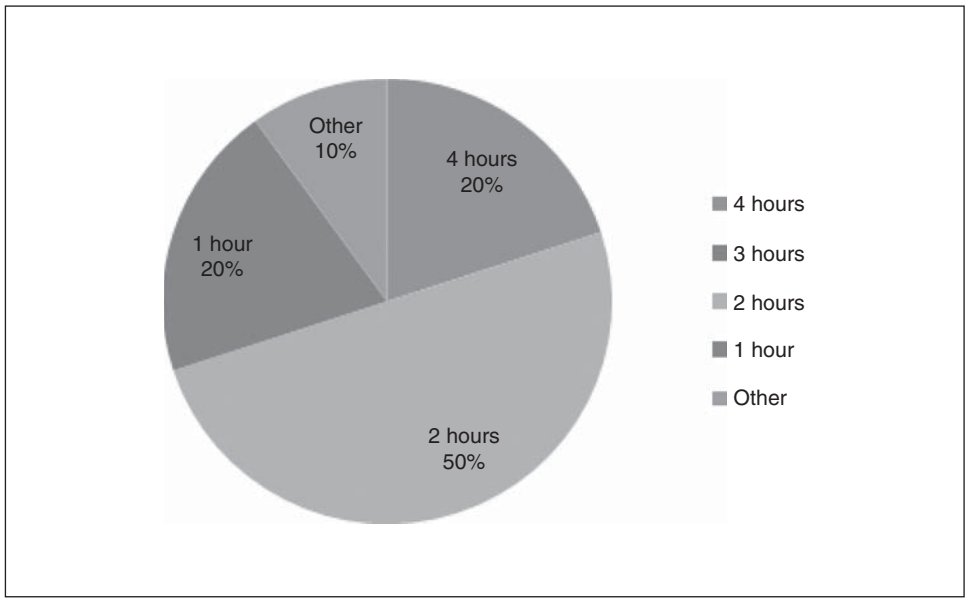
24. What supporting technologies have helped to improve the implementation and use of a common use model?



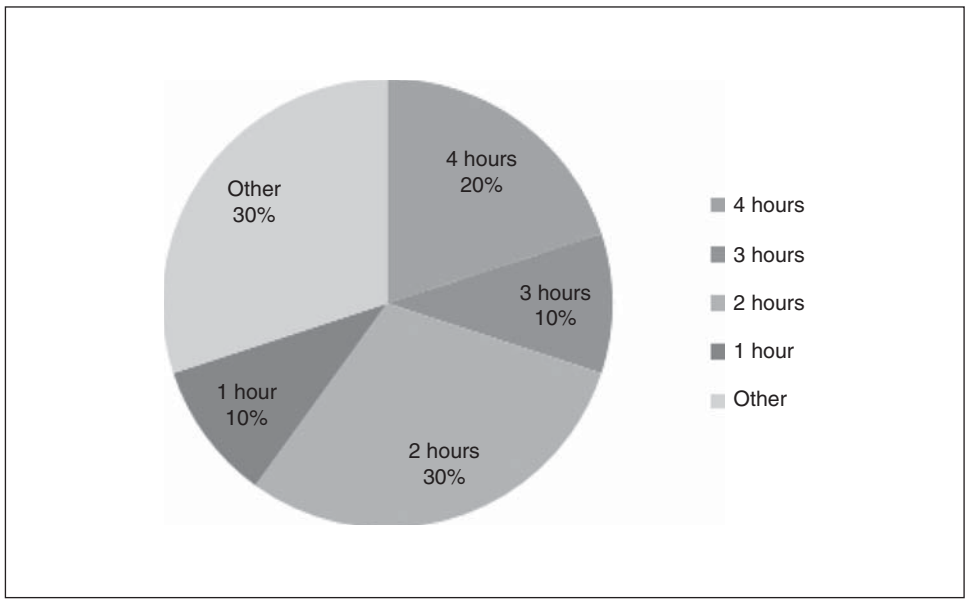
25. What is the maximum response time your airline expects for support on common use technology systems for major failures?



26. What is the maximum response time your airline expects for support on common use technology systems for minor failures?

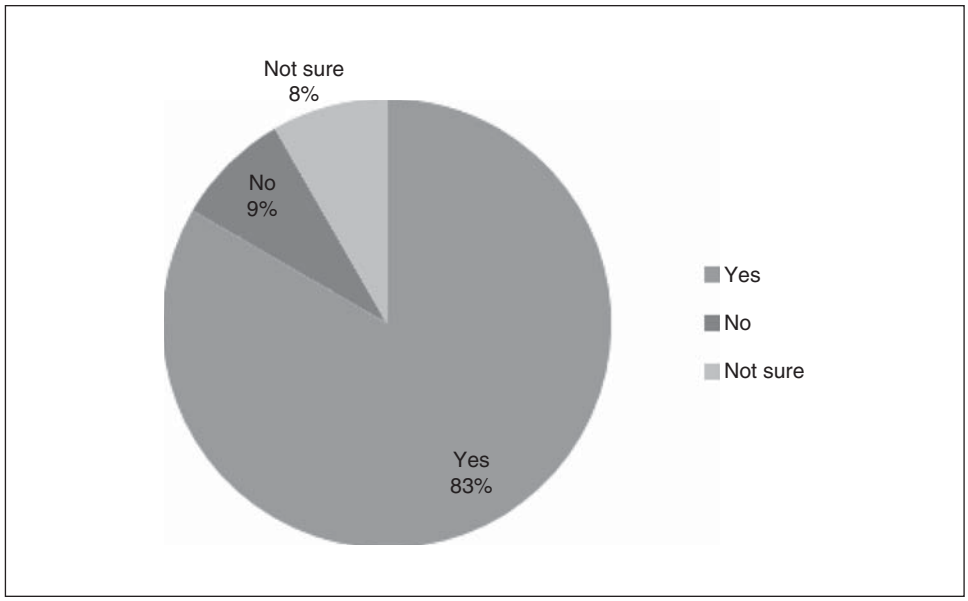


27. What is the maximum response time your airline expects for support on common use facilities (e.g., hold rooms, ticketing counters, and club spaces)?

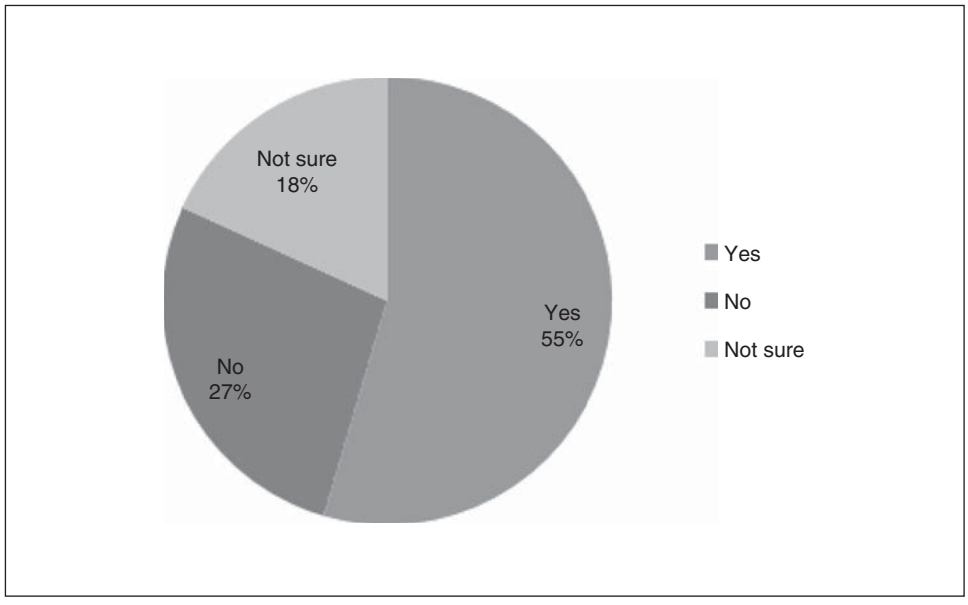


28. Are there any areas of an airport that your airline would not be in favor of having common use activities?
    - In my preferred flyer club room.
    - Back office (greatly depends on the size of the operation at a given airport).
    - No—let's make it as easy as we can for the passengers and try to avoid all passengers having to converge in one common standard check-in space.
    - Yes. Check-in desks, gates, gate information displays, self-service, and back office.
    - In most airports we prefer our own equipment. Where common use exists we have no choice. We will always install our own equipment if we have the choice.
    - Sales desks.
    - Generally, we are not in favor of common use unless there are agreed upon standards.
    - Back office, operations, underwing.
    - Probably not our club space in terms of design and branding. Equipment inside could still be CUTE for consistency. Other areas would be candidates for common use, assuming the targeted areas all have the necessary functionalities and can support the business needs at a competitive cost.
    - Depends on city . . . Although, based on current experiences, I would say gates and ticket counters.

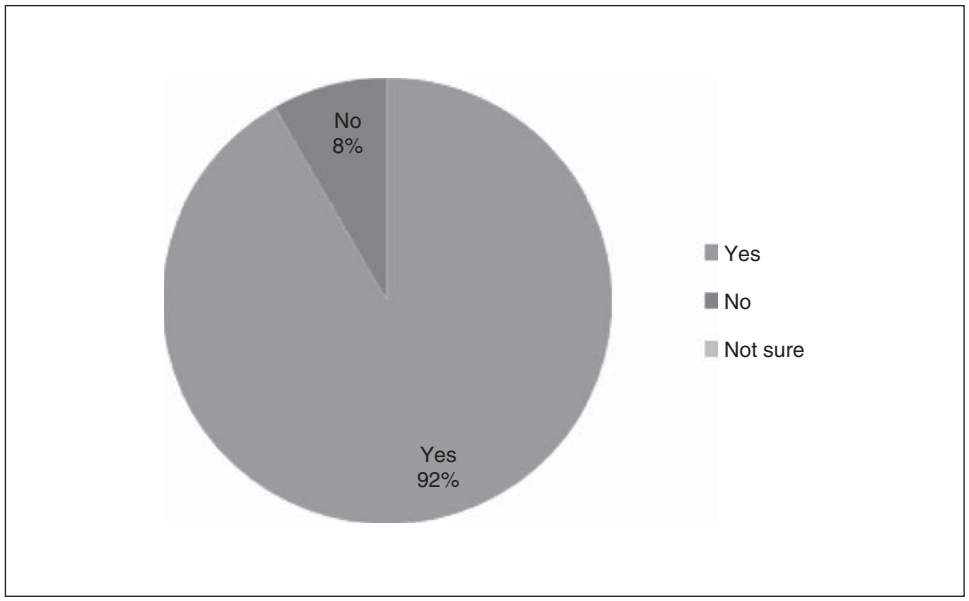
29. Does your airline utilize common use space at any airports you service (club space, baggage handling, check-in agents/multi-airline check-in, other . . .)?



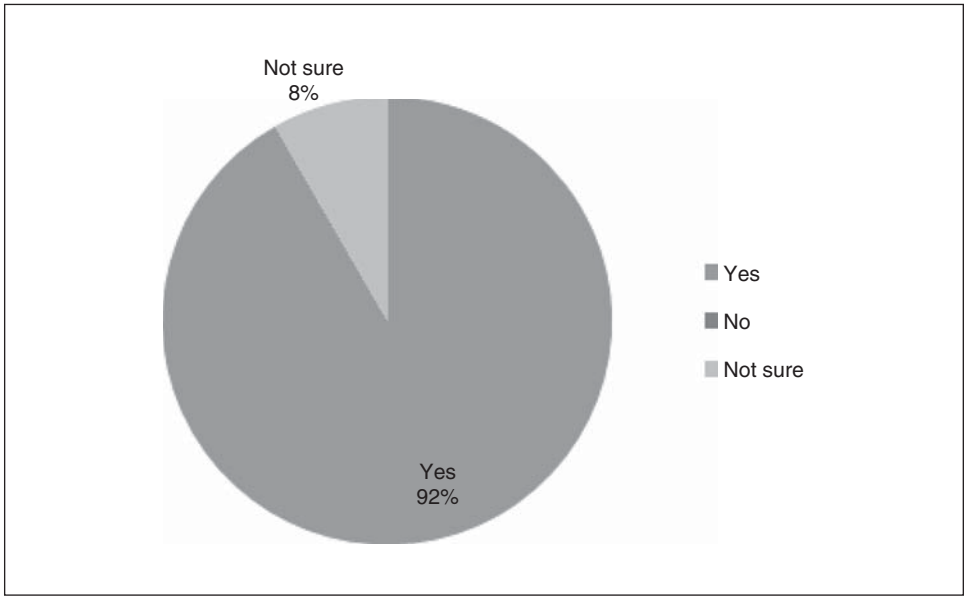
30. Does your airline utilize any common use office space (back office, baggage service office, or other)?



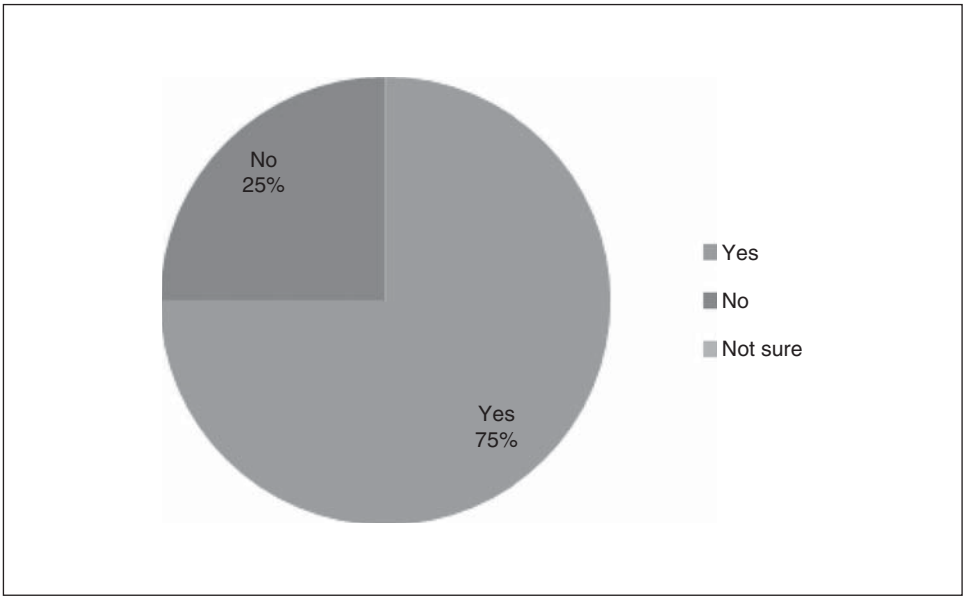
31. Is your airline aware of the Common Use Passenger Processing Systems (CUPPS) project (RP 1797) currently being undertaken by IATA?



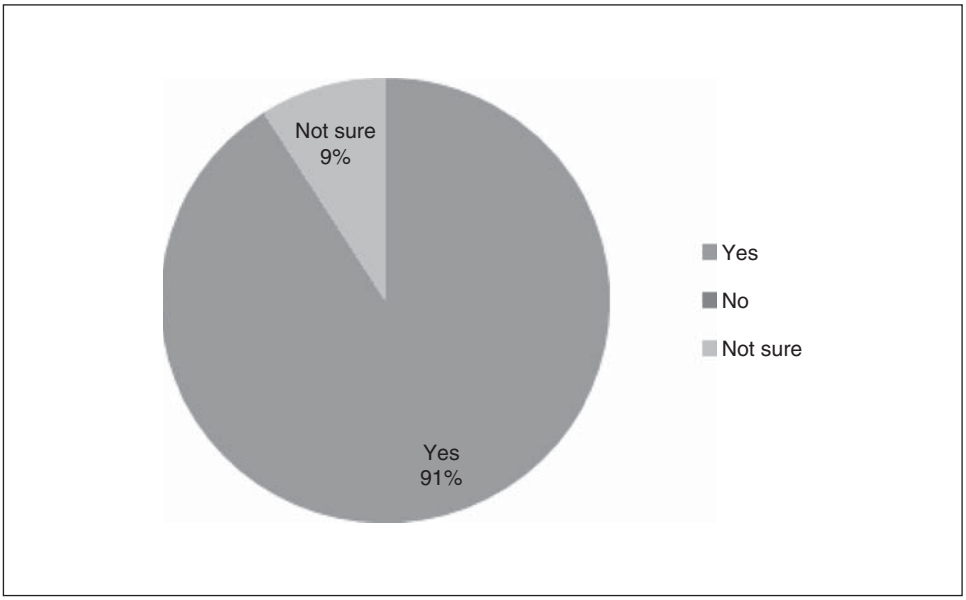
32. Is your airline in favor of the CUPPS initiative?



33. Does your airline have an official position on CUPPS?

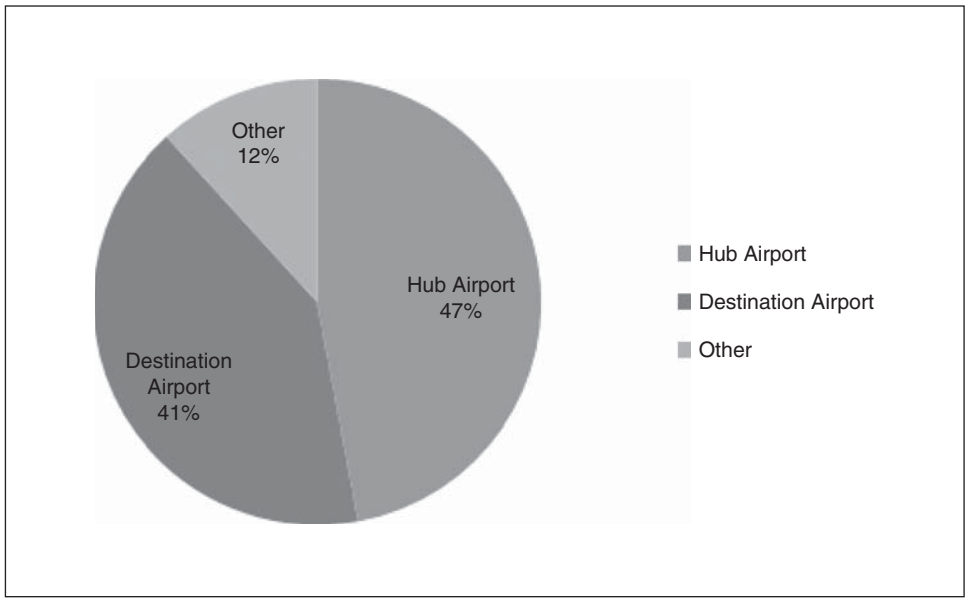


34. If we have any clarifying questions or require additional information may we contact you?



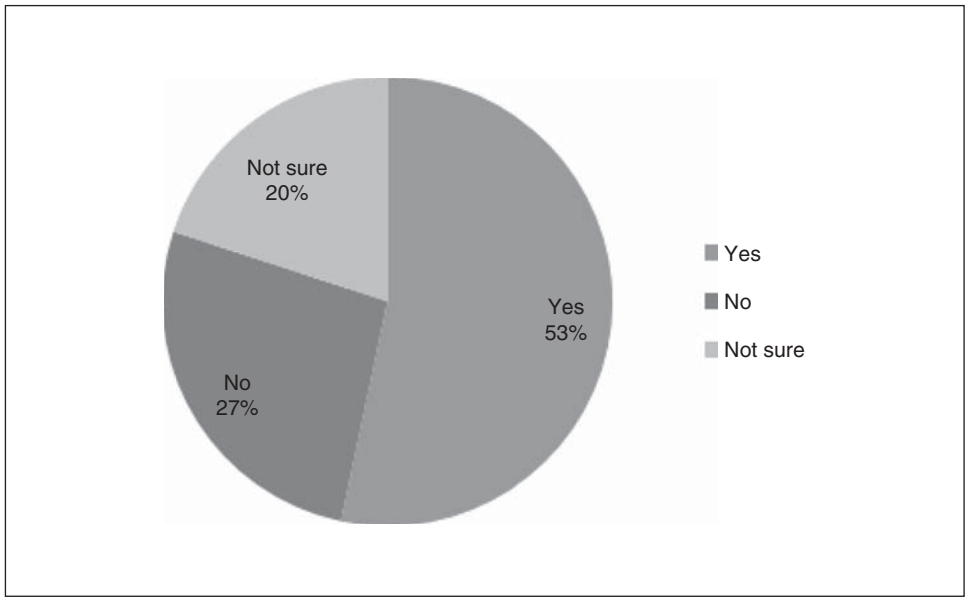
Airports

1. Is your airport a hub airport or a destination airport?

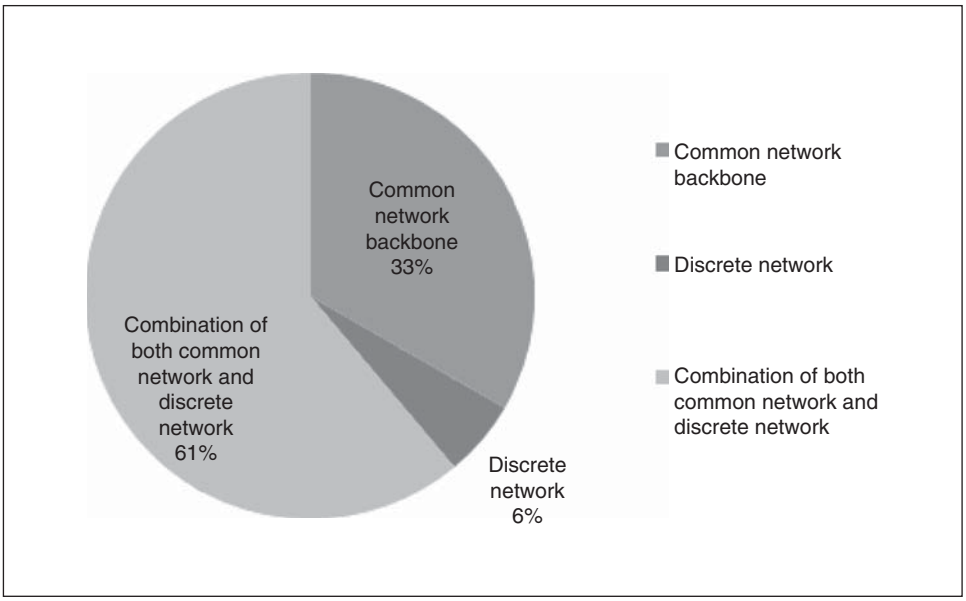


Other responses:
- Common user terminal facility.
- Mostly destination, but also significant connections.

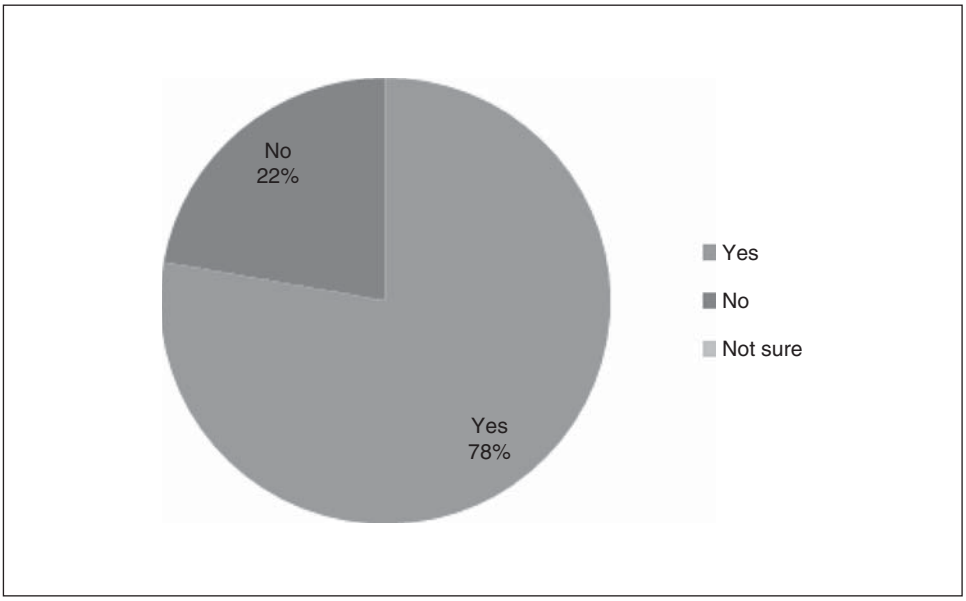
2. Is your airport required to create a competition plan (U.S. airport only)?



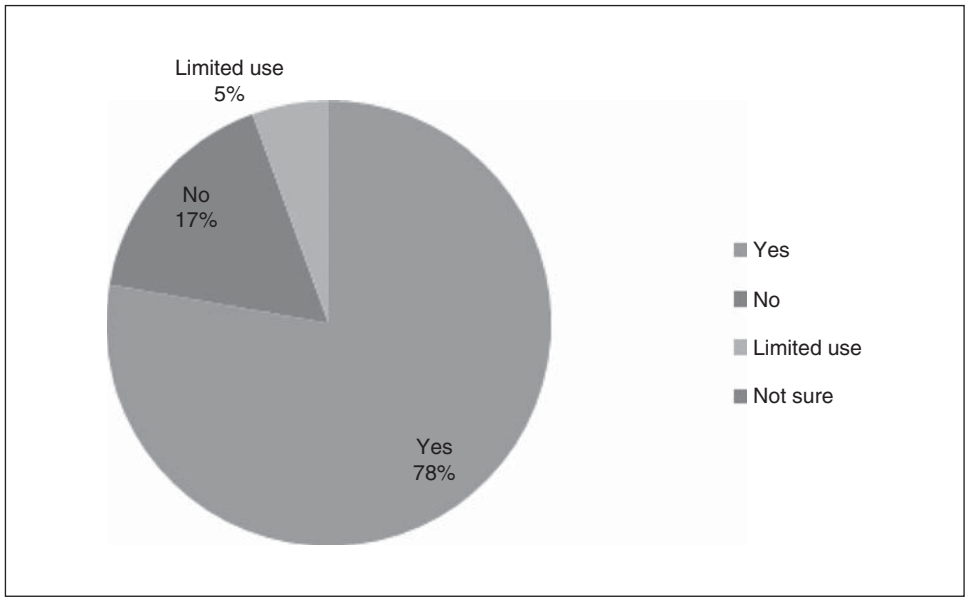
3. Do you provide a common network backbone for all systems or do you have discrete networks for each system?



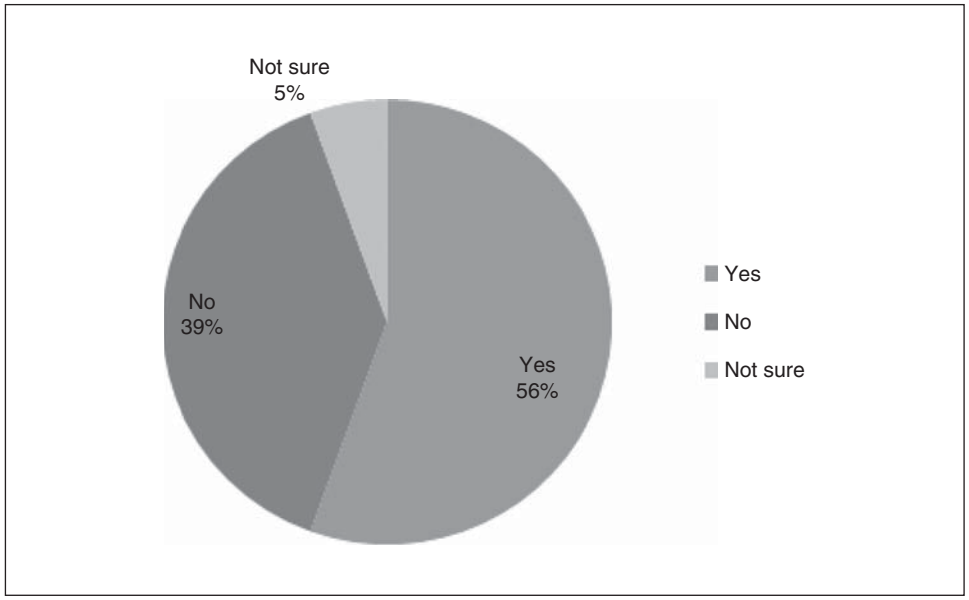
4. Does your airport provide common baggage make-up area?



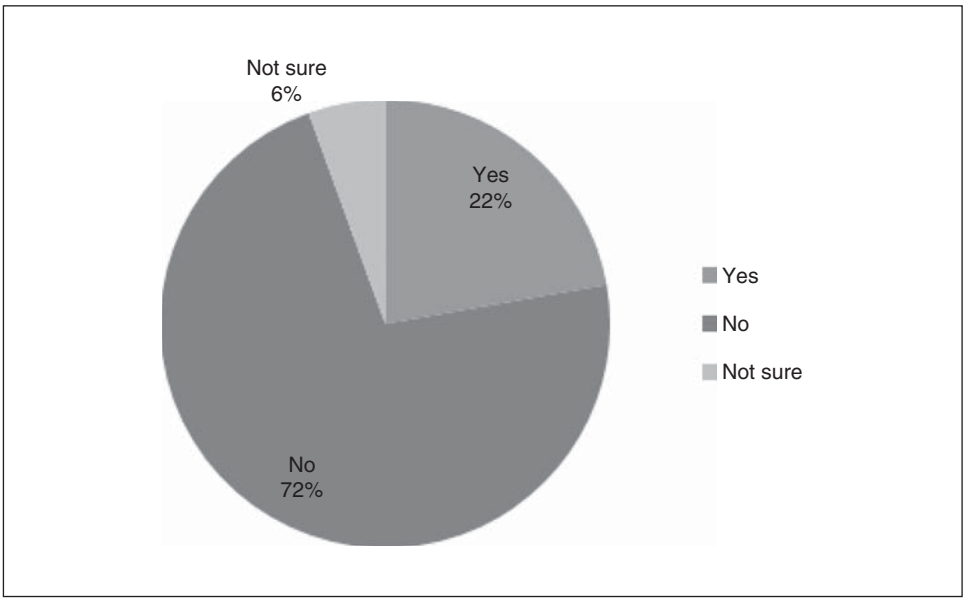
5. Does your airport provide gate management services?



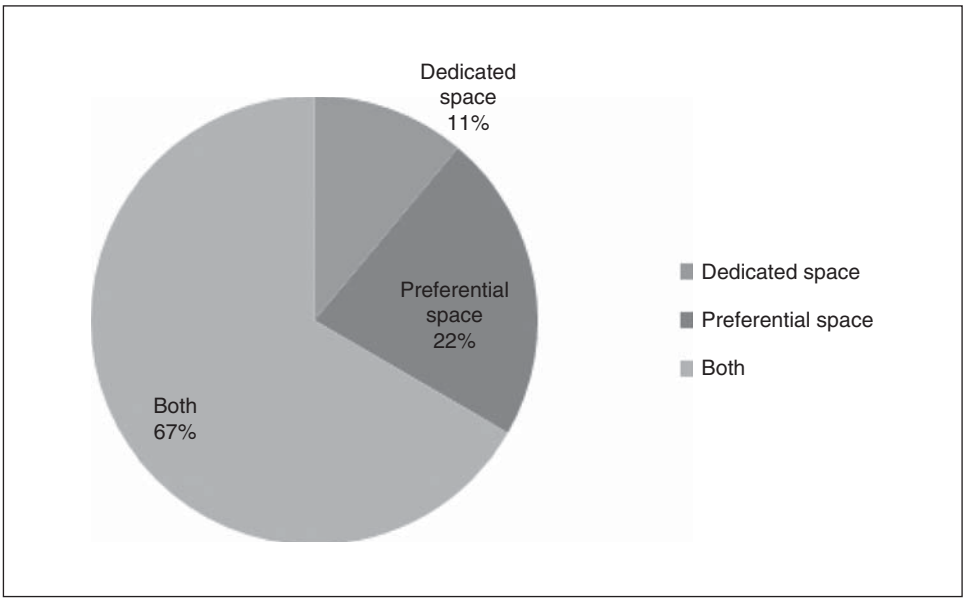
6. Does you airport provide a local departure control system?



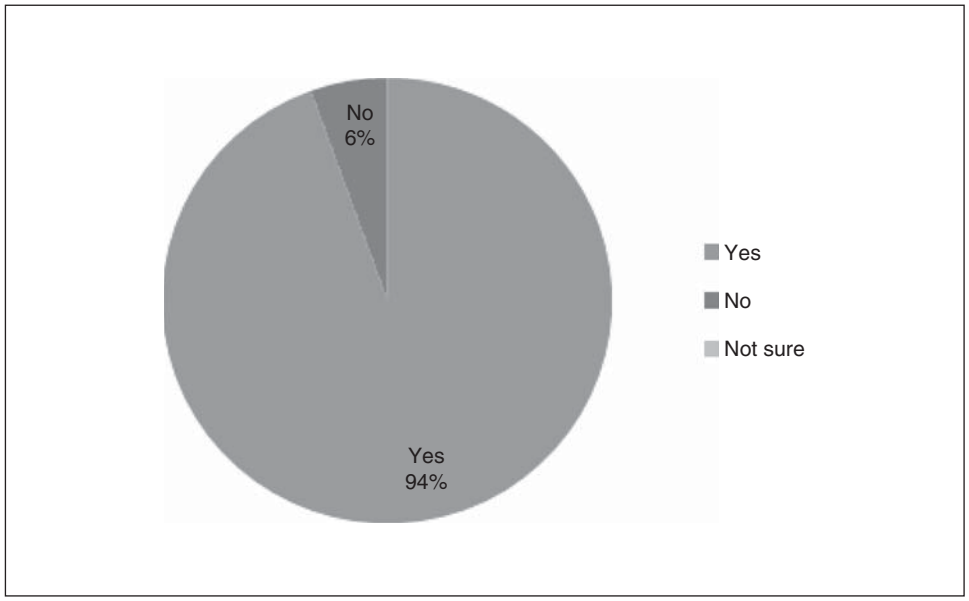
7. Does your airport provide common baggage drop-off at a single location for all airlines? This excludes off-site bag drop.



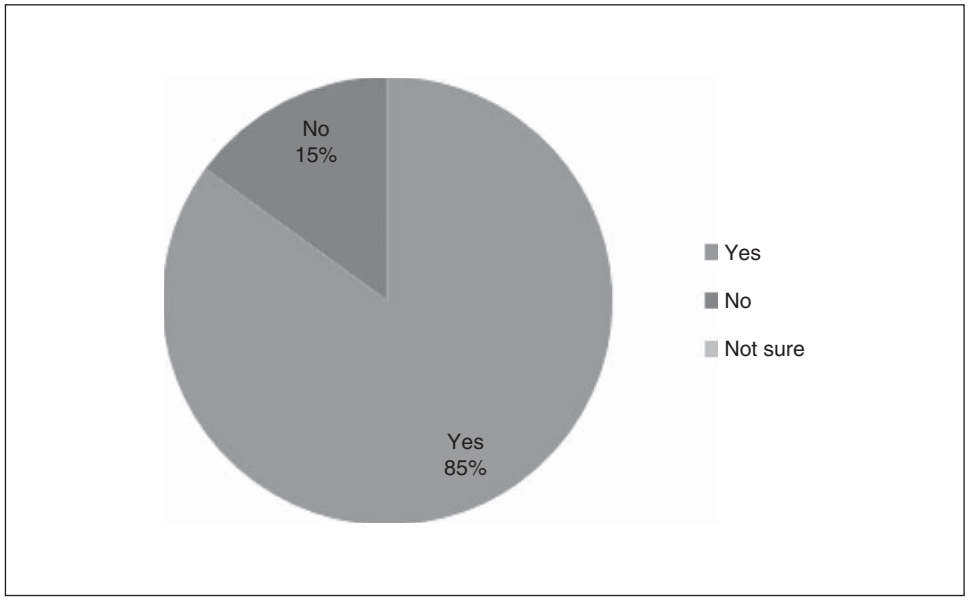
8. Do you provide dedicated space, preferential space, or other?



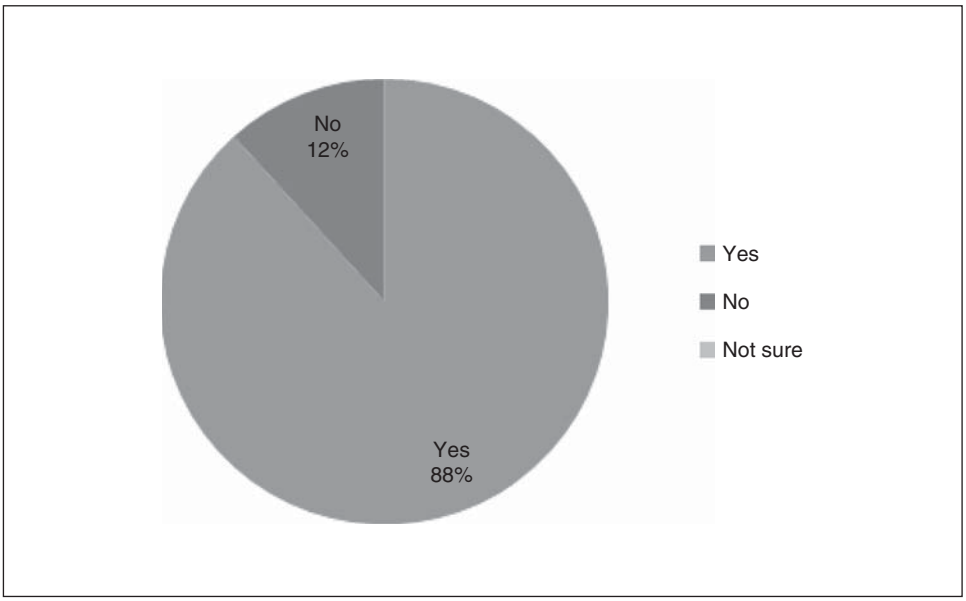
9. Is your airport aware of the Common Use Passenger Processing Systems (CUPPS) project (RP 1797) currently being undertaken by IATA, ATA, and ACI?



10. Has your airport implemented any common use models? By common use models we mean any systems or areas of your airport that are identified as common use by all operating airlines in that terminal, concourse, etc.



11. Do you have common use in international gates/check-in counters?

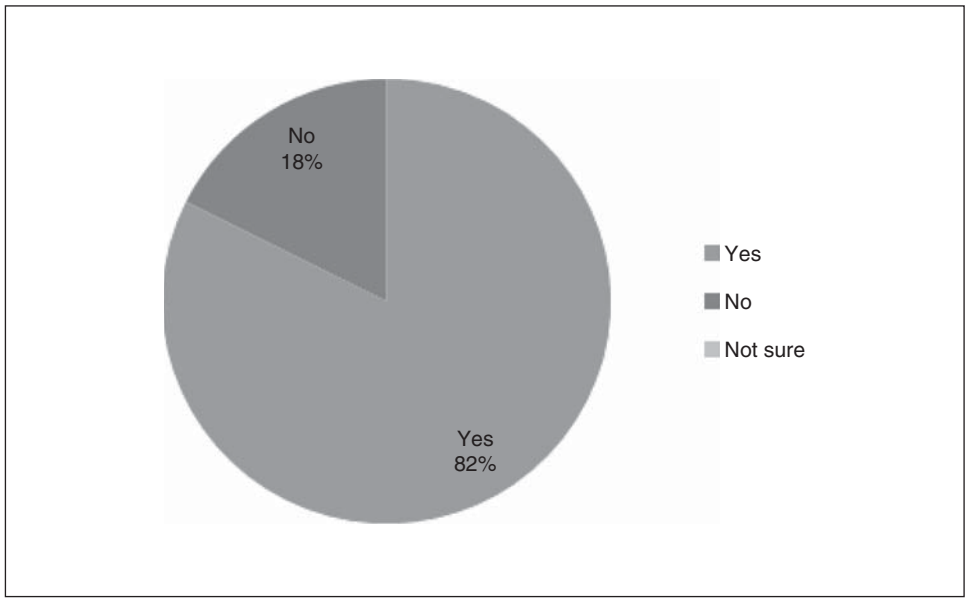


12. How many international gates (of the total available) are common use (example answer: 20 of 27)?
    - 37/37 16 ct gates, 20 hardstand, 1 bus gate
    - 21 of 21
    - 16 of 16
    - 9 of 127
    - All
    - 15 of 15
    - 36 of 36
    - 10 of 28
    - Don't know
    - All are common use
    - 83 of 83

13. How many international ticketing counters (of the total available) are common use (example answer: 15 of 19)?
    - 184 of 184
    - 168 of 168
    - 83 of 83
    - 43 of 43
    - 196
    - 65 of 65
    - 150 of 150
    - 60 of 98
    - 24 of 32
    - All are common use
    - 92 of 160

14. Do you have other common use systems in your international gates (please list)?
    - CUSS
    - Network infrastructure, WiFi system, FIDS, BIDS, dynamic signage, baggage system (including RFID), and gate/check-in counter assignment system. Coming soon to this facility: common-use kiosks.
    - Baggage reconciliation, FIDS, baggage system
    - All PBBs and accessories (water, air, 400 hz), BRS, wi-fi (ramp level)
    - BTRS
    - FIDS
    - MUFIDS BIDS gate management
    - Flight information systems, baggage system, baggage rec. phone, security system, paging
    - Common use self-service, common use baggage reconciliation
    - LBA, FIDS, RMS, LDCS, MuseLink
    - Don't know
    - SITA CUTE

15. Do you have common use in domestic gates/check-in counters?

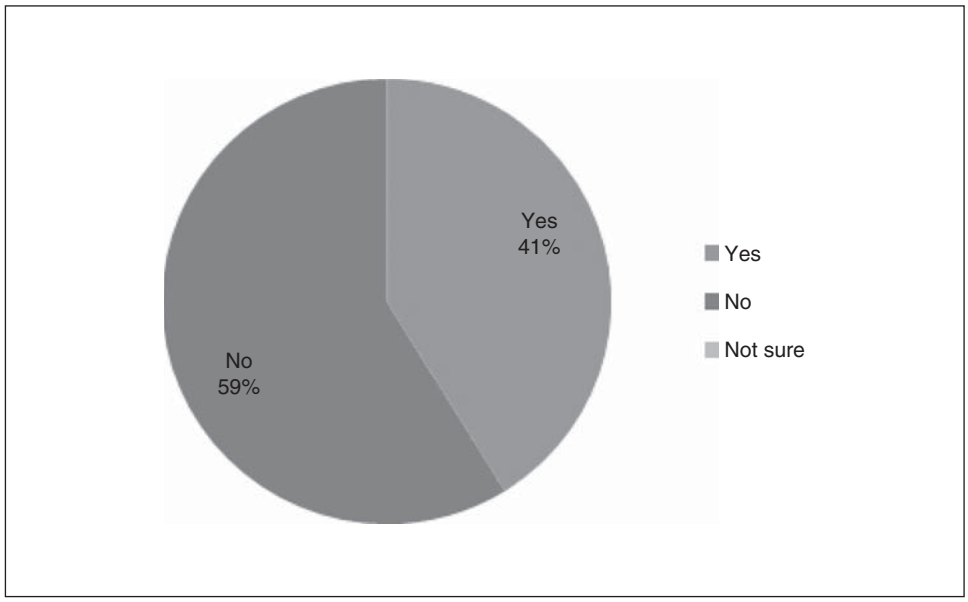


16. How many domestic gates (of the total available) are common use (example answer: 15 of 17)?
    - 37 of 37
    - 32 of 80
    - 10 of 127
    - ALL—16 gates, 23 hard stands
    - 4 of 6
    - 27 of 27
    - 14 of 25
    - All common use; a few are preferential
    - 22 of 45

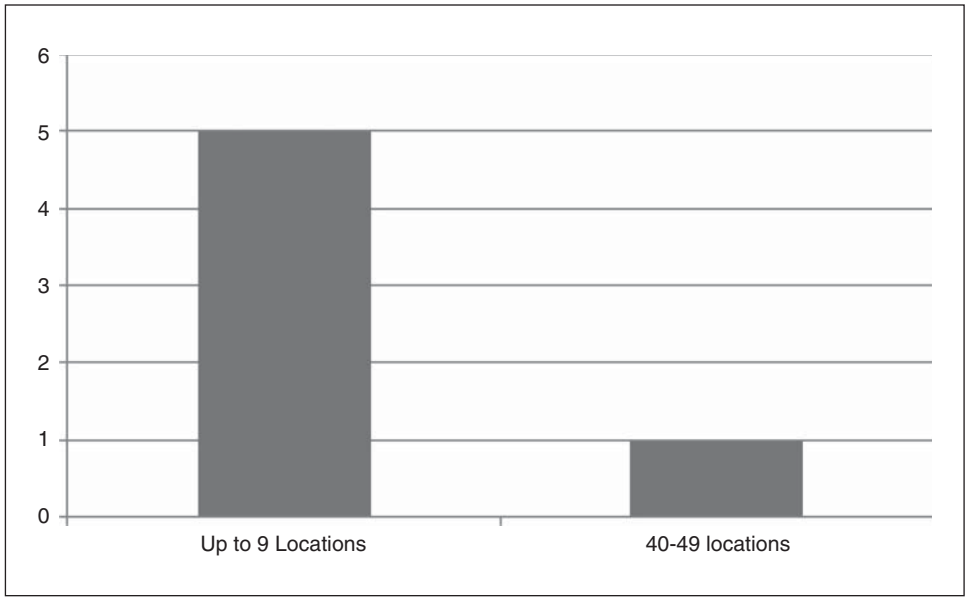
17. How many domestic ticketing counters (of the total available) are common use (example answer: 15 of 17)?
    - 184 of 184 (same as international counters)
    - 96 of 240
    - 43 of 43
    - 196
    - 4 of 6
    - 65 of 65
    - 42 of 89
    - All are common use
    - 119 of 261

18. Do you have other common use systems in use in your domestic gates (please list)?
    - CUSS
    - Network infrastructure, WiFi system, FIDS, BIDS, dynamic signage, baggage system (including RFID), common-use kiosks, gate/check-in counter assignment system.
    - Baggage reconciliation, FIDS, baggage system
    - BTRS
    - FIDS
    - MUFIDS BIDS gate management
    - Flight information systems, baggage system, baggage rec, phone, security system, paging.
    - No.
    - Public address
    - Common use self-service, common use baggage reconciliation
    - LDCS, CUTE, RMS, LBA, FIDS

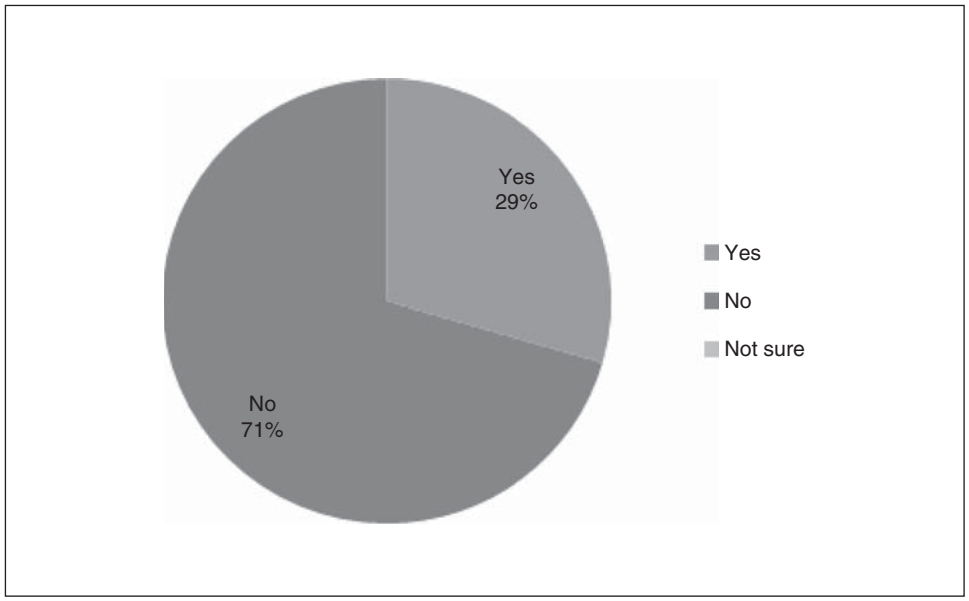
19. Do you have common use at off-site locations?



20. How many different locations?

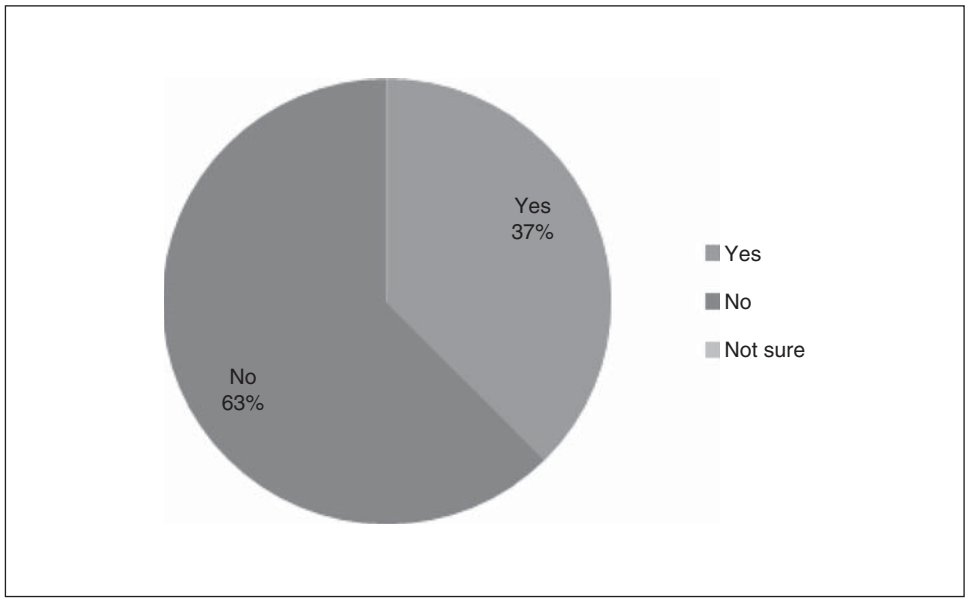


21. Do you have common use at curbside check-in locations?

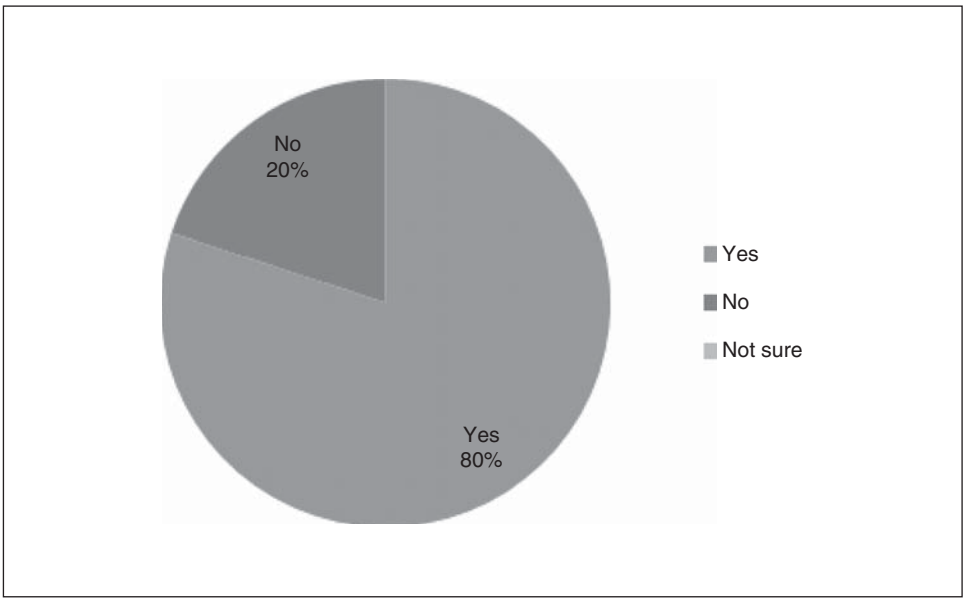


22. How many curbside locations (of the total available) are common use (example answer: 37 of 37)?
    - 19 of?
    - 2 of 2

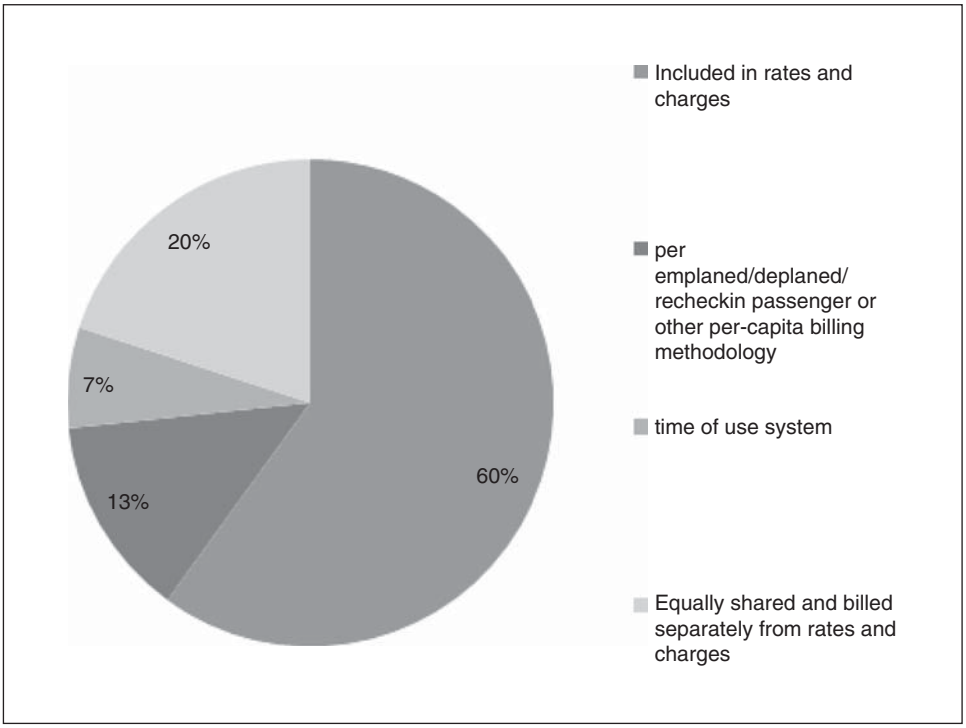
23. Does your airport have mobile common use terminals?



24. Does your airport have CUSS check-in locations?



25. How are airlines charged for the use of the installed common use systems?



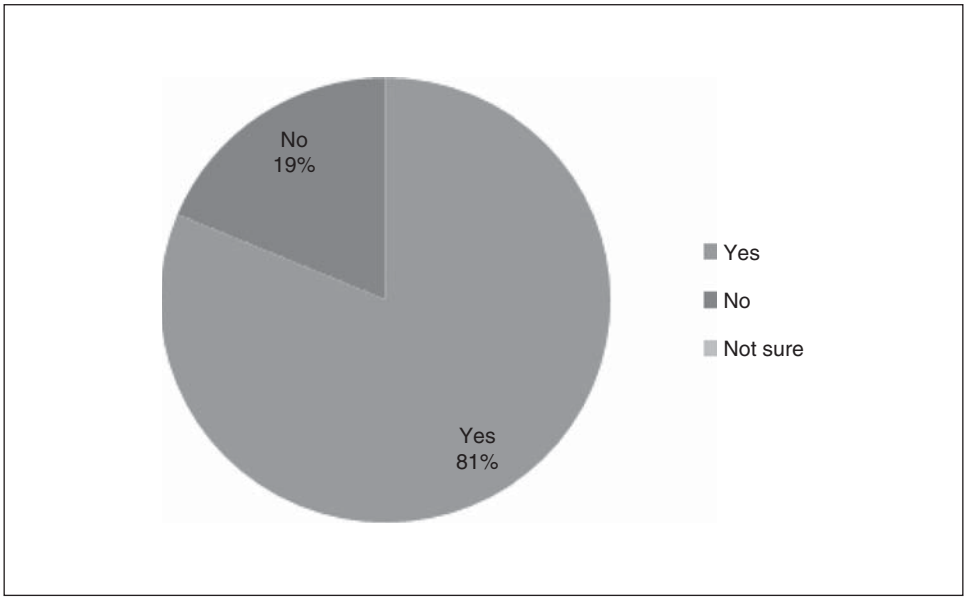
Other responses:

- Enplanement fees, counter charges, bag
- combined equally shared and per capita
- Signatory—Cost recovery
- Per operation by aircraft type

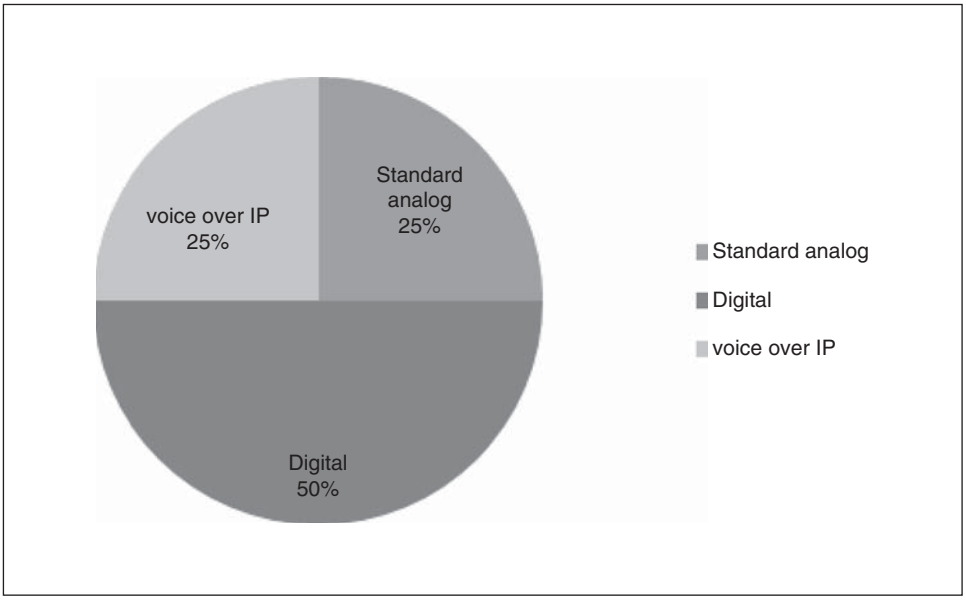
26. What is/was the most expensive portion of your common use system?
    - Vendor costs for the ridiculously high CUSS kiosks
    - Support (comprised mostly of staffing costs)
    - Enplanement fees
    - Baggage system
    - Flight information system
    - Annual support for Operation and Maintenance
    - Common use passenger processing—ticket counters, gates
    - CUTE and infrastructure
    - Capital upfront costs
    - Hardware infrastructure
    - Hardware (magnetic printers and BGRs) check-in kiosks
    - Long-term on-site support
    - Don't know

27. What is/was the most difficult portion of your common use system to support?
    - The baggage system is most difficult to support. All of the data flow necessary to keep that system actively sorting accurately and the various airline systems involved makes it very challenging.
    - There are multiple issues that are difficult to support/manage, and depending on whom you are speaking with would rate the most difficult. Fare policy regarding gate/hardstand assignments for arrivals/departures, Fare policy regarding check-in counter assignments and airline branding needs. IT support for systems that interface with airline specific services (terminal emulators with airline host with CUTE).
    - Integrated IT systems are the most complex. 25 plus or minus airlines whose hosts often don't integrate completely, or easily, with the CUTE system.
    - Accuracy of flight information data feed(s) to system.
    - Support for airline application upgrades.
    - Printers
    - CUSS kiosks
    - Individual airline connectivity to CUTE. Airline emulation.
    - Education
    - Integration of CUTE FIDS and PHONES
    - Integrated with airline hosts
    - It requires a level of cooperation between the airlines, the airport, and the service providers that none of them is accustomed to providing.
    - Don't know.

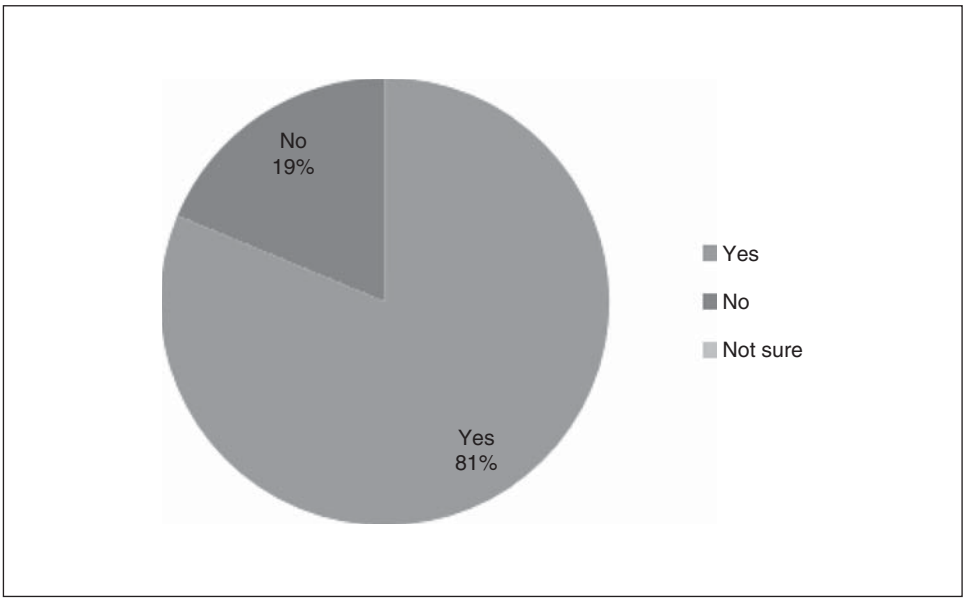
28. Do you provide phone service as a part of your common use system?



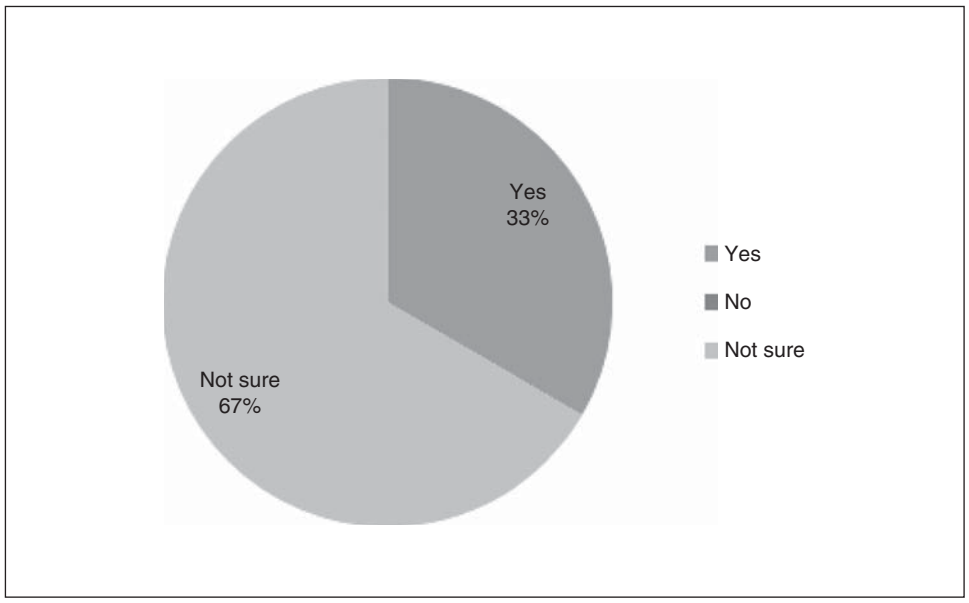
29. What type of phone service do you provide?



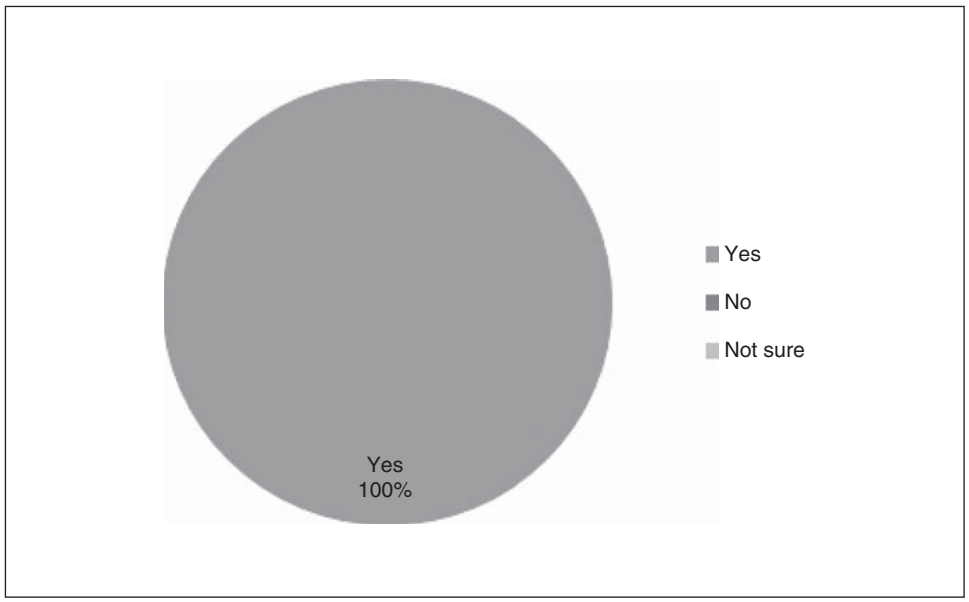
30. Do you provide WiFi for operational use, either in-building or exterior to the building, as a part of your common use system?



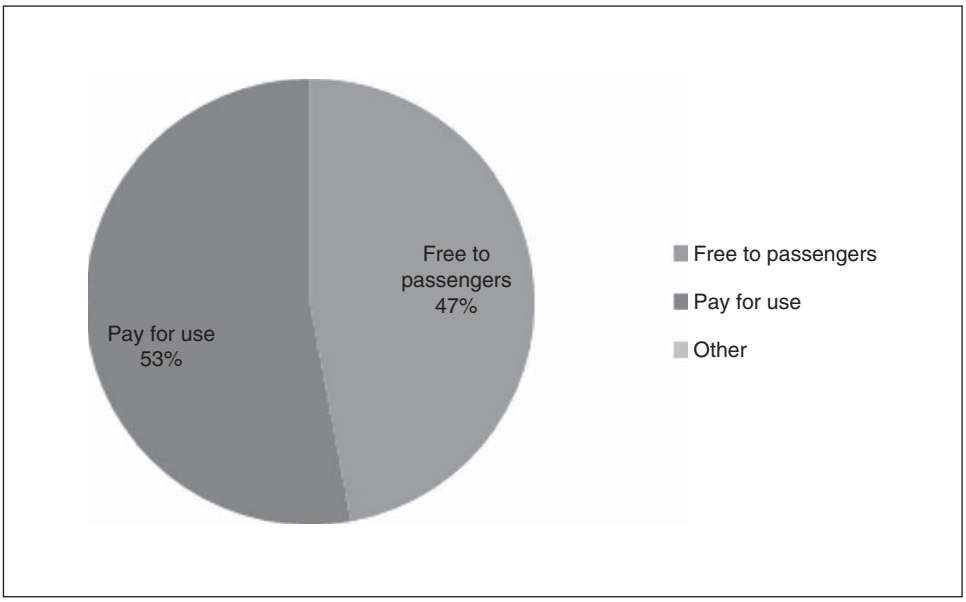
31. Are you planning on offering WiFi for operational use, either in-building or exterior to the building, as part of your common use system?



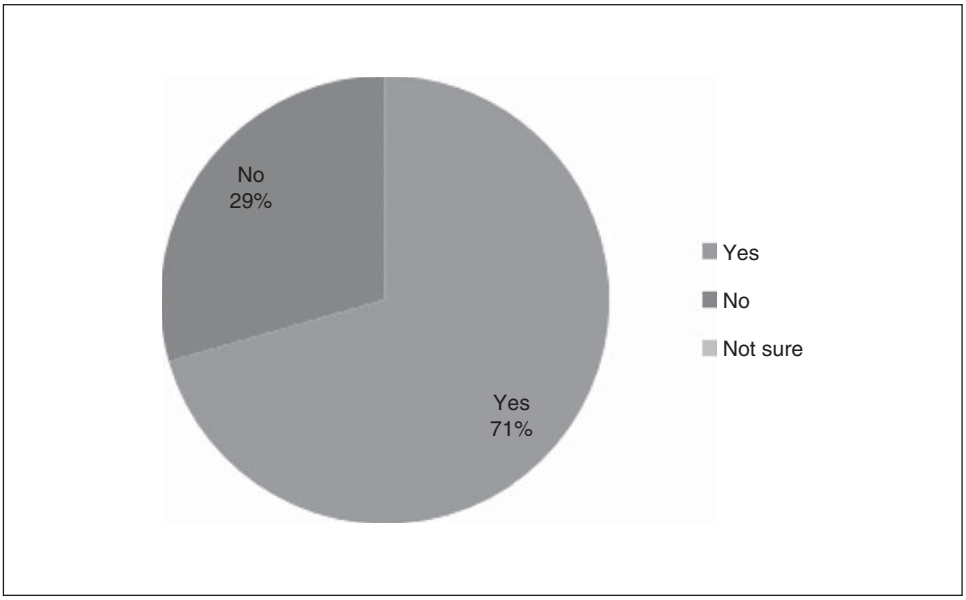
32. Do you provide WiFi for Internet access within public concourses for use by the public?



33. What business model do you use for your WiFi access for passenger use?

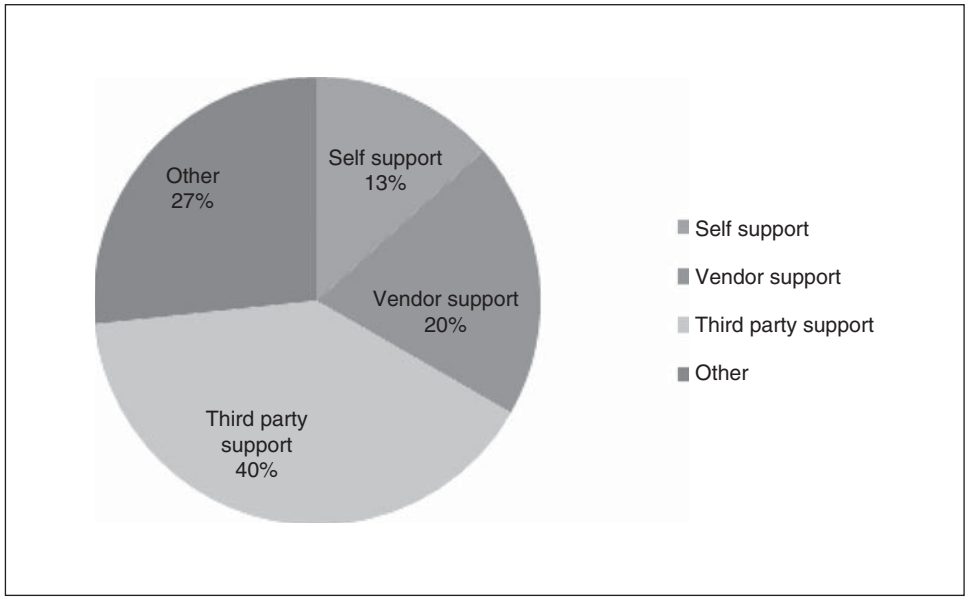


34. Does your airport provide other shared/common services (baggage handling, check-in agents/multi-airline check-in, other)?



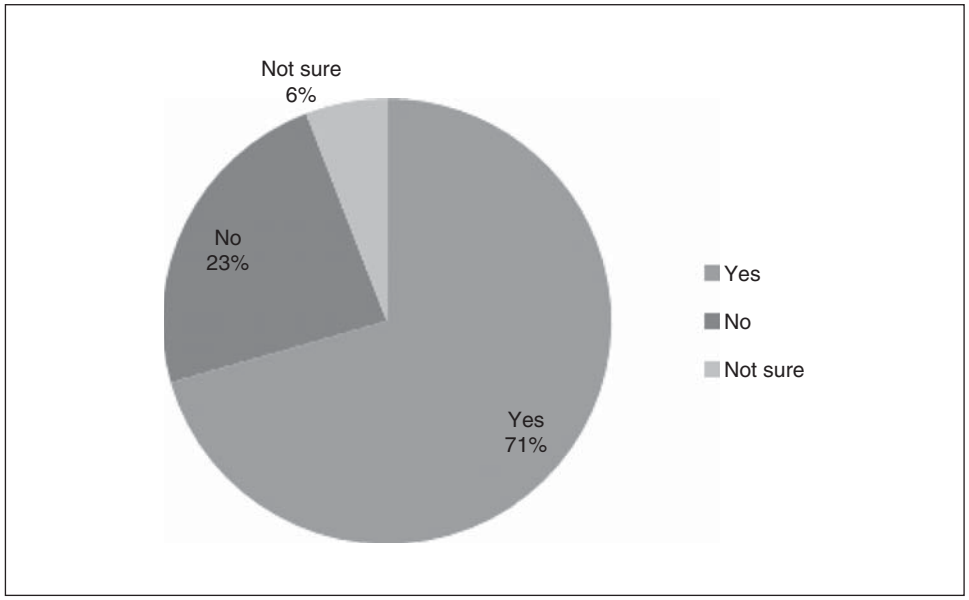
35. Please list any shared/common services that your airport provides.
- CUTE, CUSS, VoIP
- Support for all of the systems provided
- Ground handlers, passenger service (check-in), baggage inductors
- In-line baggage handling
- Baggage handling
- Ground handler contracted to airport provides charter check-in. Airport provides LDCS.
- Baggage induction, security pre-screening
- BHS, visual messaging, public address, CCTV, MATV, access control
- Baggage handling (part) CUSSCI CUTE
- Bag tag activation points

36. What is the support model that your airport uses for common use systems?

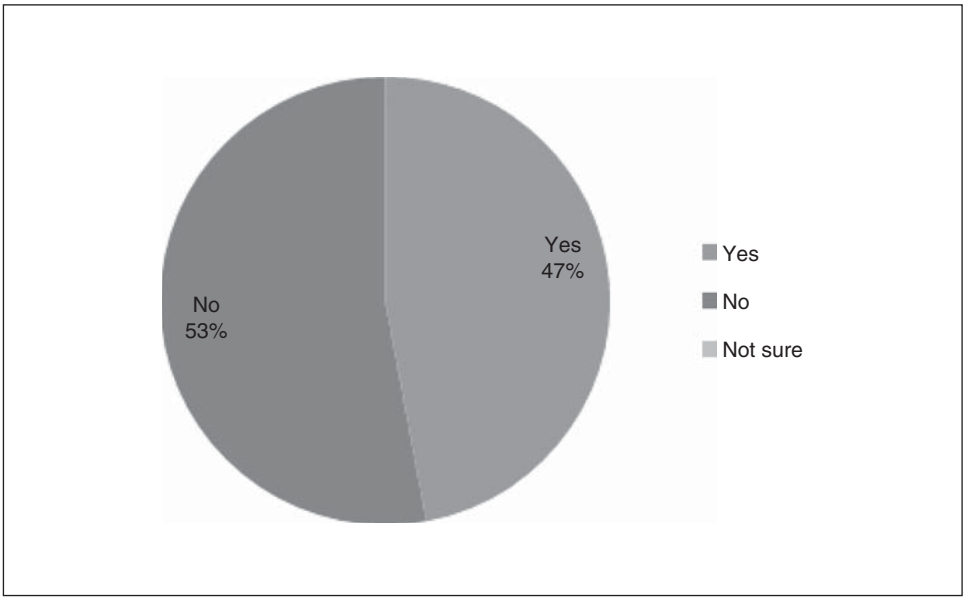


Other responses:
- All apply
- CUTE—vendor, all others—3rd party
- Combination of above depending on service
- Combination of self and vendor supported

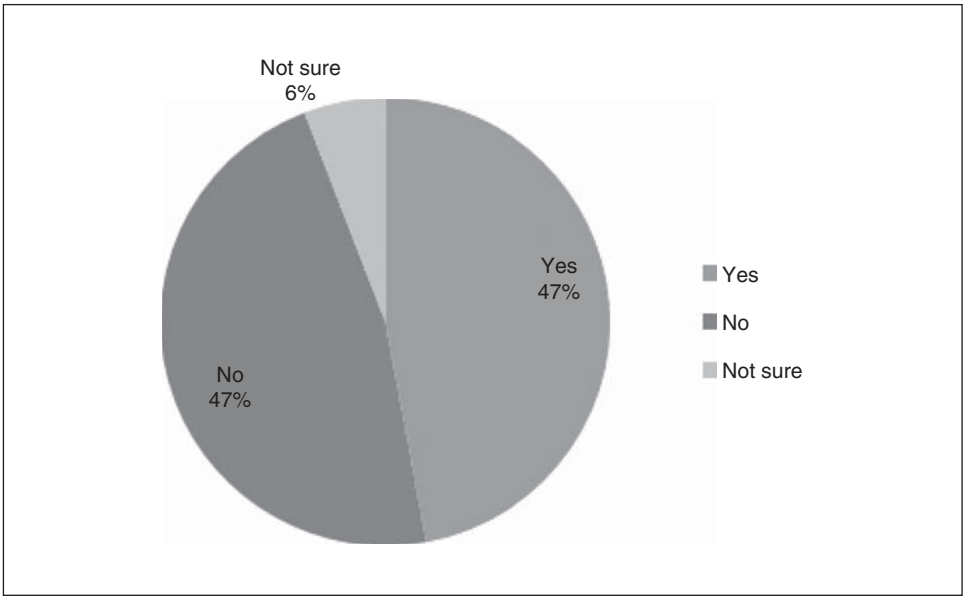
37. Does your airport have a common use baggage makeup system?



38. Does your airport have a common bag-drop solution/system?

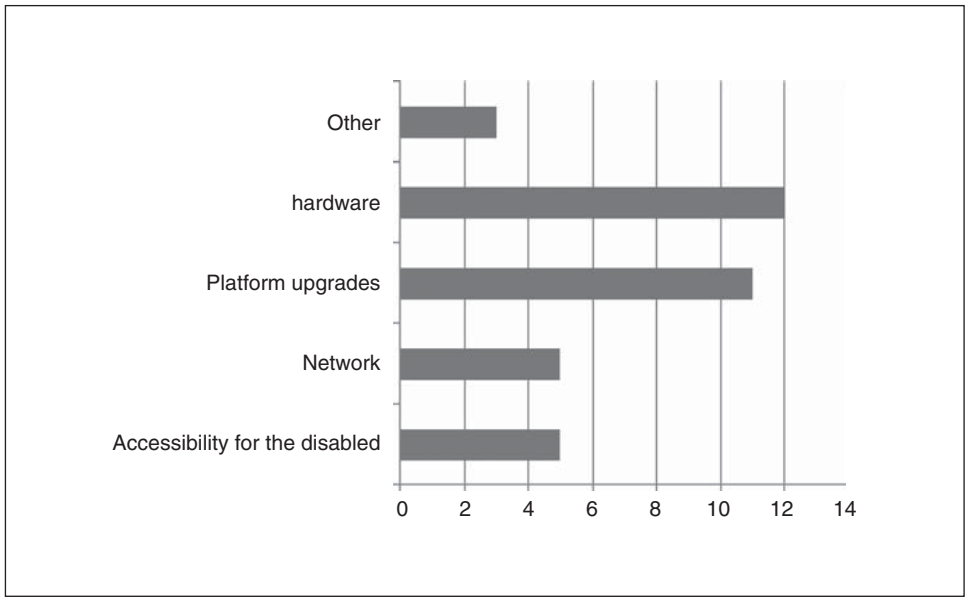


39. Does your airport use a baggage reconciliation system?



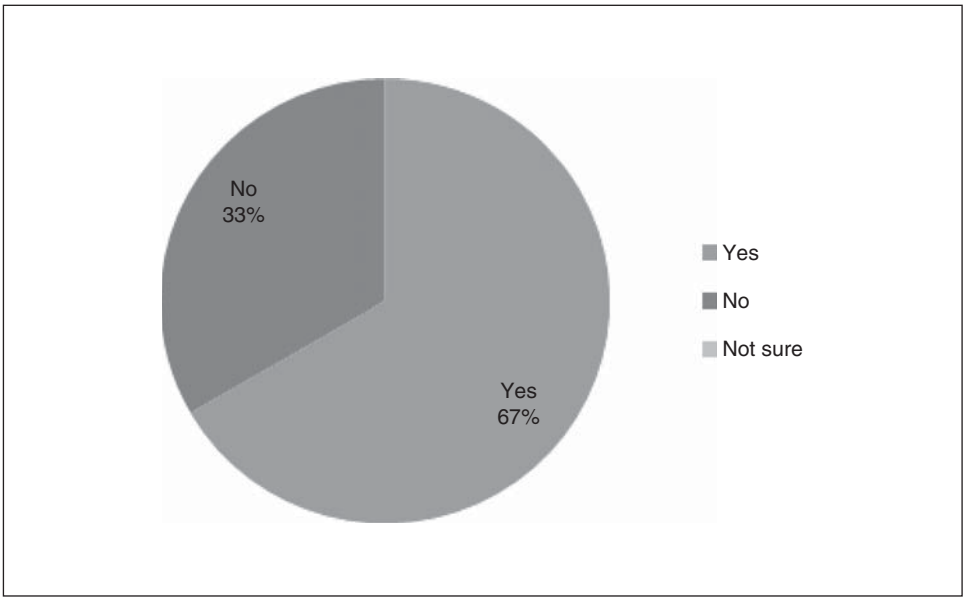
40. What benefits have you noticed with the implementation of common use models? Please describe.
    - More vendors to work with
    - Common use has been the single item that has allowed us to efficiently use the terminal space, despite significant growth.
    - Increased optimization of resources (gates, hardstands, check-in) allowing for increased capacity/growth within the facility.
    - Cost savings (less capital for facilities), more options to attract new airlines or expansion by existing, more control over use of resources.
    - Efficiencies in facilities utilization; maintenance of baggage sortation systems.
    - Flexibility with airline exit/entry, airline allocation for check-in/gates/baggage laterals/baggage arrival carousels.
    - Better utilization of critical resources, ease of airline relocation.
    - Accommodate new carriers quickly. Better service to charter airlines via LDCS. Ability to manage gates. Resources.
    - Increased resource utilization to effect positive change in capacity.
    - Flexibility—one model for all carriers.
    - Improved availability of gate and check-in positions. Better control management of technical infrastructure in the terminal building.
    - Increased passenger processing capacity, faster passenger processing, more efficient use of space, deferred capital expenses for construction of new terminals.
    - The primary benefit realized at [airport identifier removed] with the implementation of common use systems is the flexibility to move, add, or change resources assigned to an airline or flight. Secondarily, the increase in operational awareness gives us an ability to be more effective in managing the airport resources. Finally, it has begun to change the role of the airport from landlord to service provider.
    - Capacity—Being able to handle growth of passengers without expanding check-in desks.
    - Efficiency, service level, lower cost.

41. Please identify any upgrades/enhancements you are considering to your installed common use system.



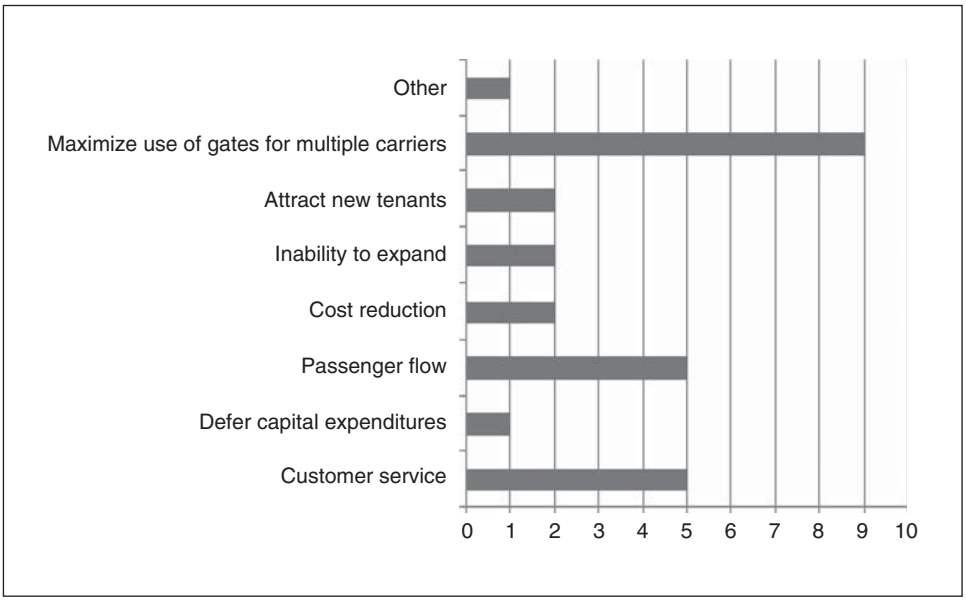
Other responses:
- In the midst of replacing common use software.
- 2D barcode readers at kiosks. Baggage self tagging.

42. Is your airport planning to implement common use in the future?



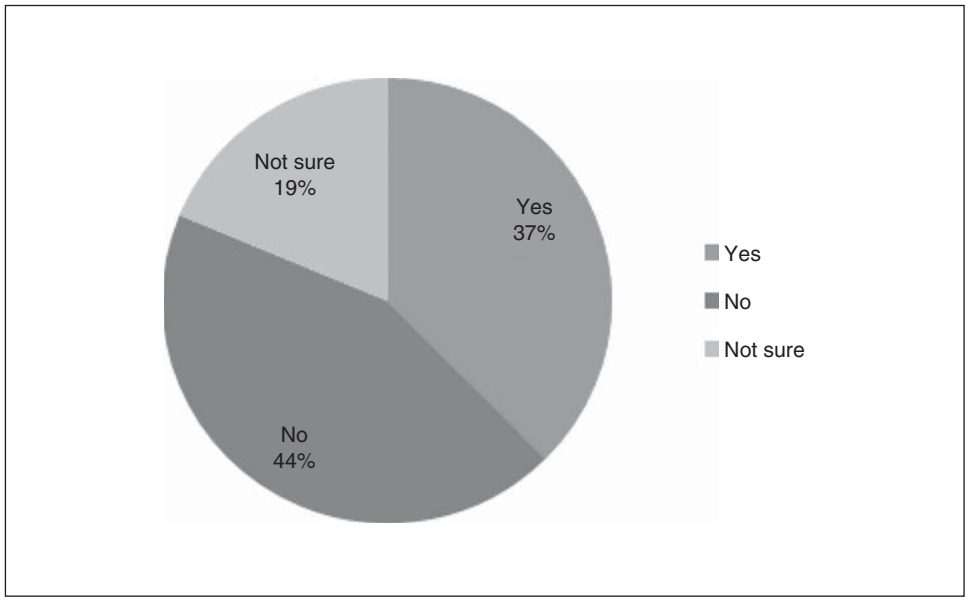
43. What problem does your airport envision a common use installation will facilitate, or solve?
   - Reduce passenger congestion
   - It will facilitate facilities usage, on a cost-effective basis.
   - Immediate: Better utilization of FIS related gates, long term: better utilization of domestic gates.

44. What is the main driver for your common use initiative?



Other responses:
   - Maximize airport capacity
   - Change of business model

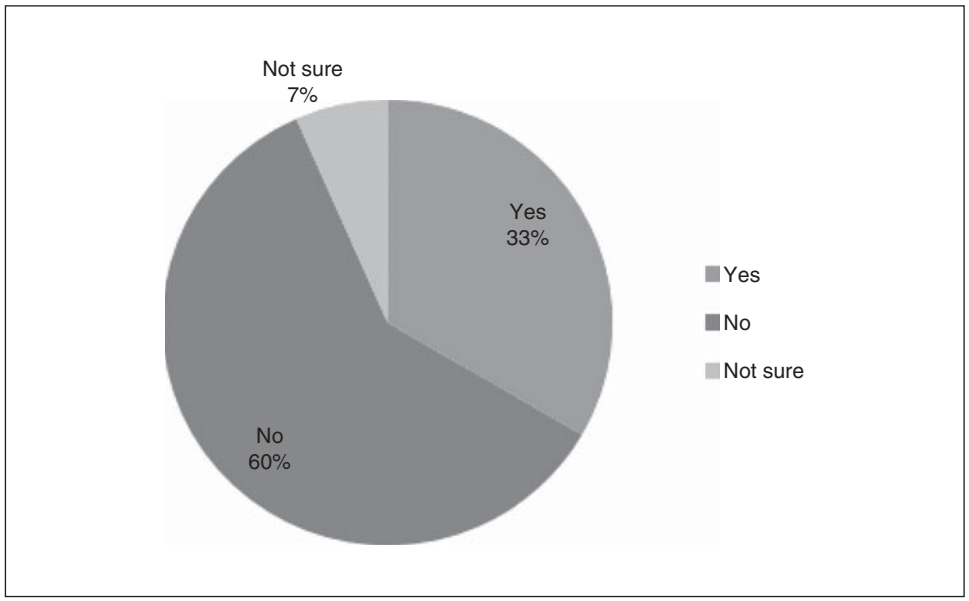
45. Did or will your airport apply for Airport Improvement Program (AIP) funding to help pay for common use systems (U.S. based airports only)?



Comments:
- Private company without access to AIP.
- Have used AIP to complete aprons and fuel systems for common use gates.
- AIP money has not yet been applied for.

46. Please describe the elements of these systems that have been identified as public use for the AIP funding application.
- N/A
- We actually used PFC funds. Use of AIP funds was negligible.
- Have used AIP to complete aprons and fuel systems for common use gates.
- None as we are a private entity.
- Not applicable.

47. Did your airport apply Passenger Facility Charges (PFCs) to offset the costs of the common use systems?

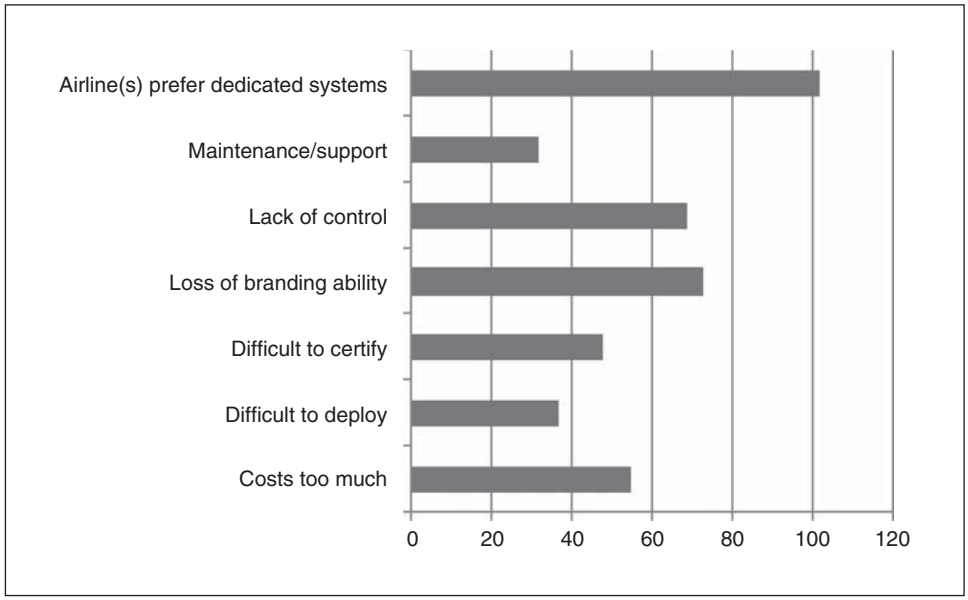


Other responses:
- Private company without access to AIP
- BHS to date; CUPPS in future
- PFC funding for a pilot common use installation

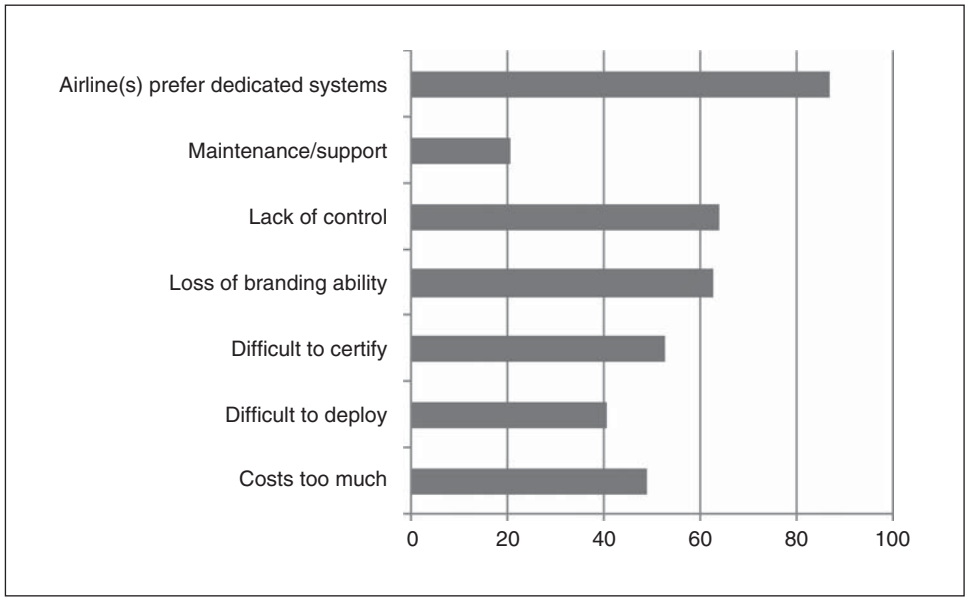
48. If your airport is a non-U.S. airport, please describe any funding that was used to pay for common use systems, such as airport usage fees, taxes, etc.
- N/A
- Airport improvement fees, airline departing seat fees
- Airport improvement fee for every enplaned passenger, similar to the U.S. PFC
- All included as part of the rates and charges

49. What does your airport view as the greatest inhibitor to acceptance of common use models from airlines? Please rank 1–7, where 1 is the greatest inhibitor and 7 is the least inhibitor.

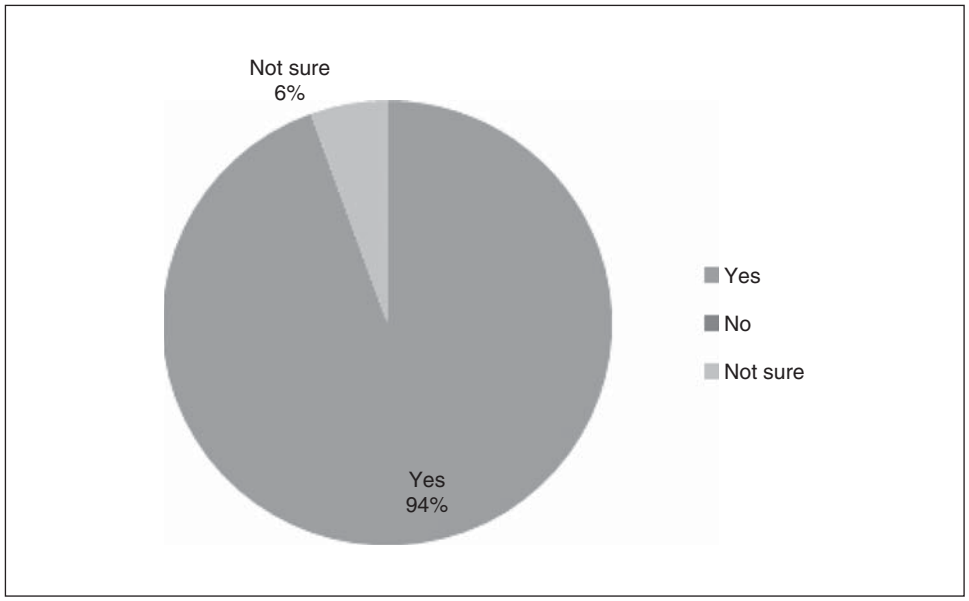
a. Common Use Terminal Emulation (CUTE):



b. Common Use Self-Service (CUSS)



50. If we have any clarifying questions or require additional information, may we contact you?



51. If your airport has no intentions of implementing common use systems, what is the major reason for this decision?
    – We are a hub for [airline identifier removed] and 80% of our operation is [airline identifier removed]. Management has decided they do not want to go with common use. However, we are in the design phase of new terminal and concourse building and the concept could be revisited through the design.

APPENDIX E
FAA Initiative Summaries

OPERATION EVOLUTION PARTNERSHIP

The Operational Evolution Partnership (OEP) is the FAA's plan for implementing the Next Generation Air Transportation System. The program is being developed by the Joint Planning and Development Office (JPDO). The FAA expects to publish its first version in the next year.

The OEP was created to harmonize existing FAA plans and concepts, and provide a real and tangible foundation against which the FAA and our partners can chart the future. In the past the OEP focused solely on increasing capacity and increasing efficiency at the 35 OEP airports. In its new form, the OEP broadens its scope to ensur the implementation of the operational improvements outlined in the NextGen concept of operations. It will include key modernization programs that provide enablers for operational change, such as ERAM, SWIM, and ADS-B. The expanded OEP will grow to include strategic dates beyond the current OEP's 10-year time frame, detailing the activities the agency must complete to achieve the NextGen vision.

Who Is Developing OEP Version 1?

OEP is a FAA-wide plan. It is validated by the OEP Review Board, which examines new programs for inclusion in the plan and for resource prioritization. The OEP Review Board makes recommendations to the OEP Associates Team, which includes the agency's top executives and which ultimately oversees the OEP. These bodies include representatives from many FAA lines of business, including Airports; Aviation Safety; the Air Traffic Organization; Aviation Policy, Planning, and Environment; Financial Services; Information Services; and the JPDO. The OEP Planning Staff produces the document, manages internal coordination, and facilitates FAA-industry collaboration.

How Will FAA Use the OEP?

To Prioritize Resources

OEP will provide a single entry point for new NextGen initiatives to enter the FAA capital budget portfolio. It will provide an integrated view of the programs, systems, and procedures that are being developed across all lines of business and are critical to transforming the system. It will reveal the interdependencies of these activities, so we'll understand how changes in resource allocation to one program would impact the broader plan.

To Focus Future Development

To support NextGen needs, the FAA Research & Development (R&D) program must be flexible, balanced, and dynamic to respond simultaneously to the critical near-term needs of the current system while providing for future needs. The R&D program is helping the FAA achieve NextGen by identifying challenges, understanding barriers, and developing solutions across the parameters of safety, environment, air traffic management, human factors, systems integration, and self-separation. Through OEP, the FAA will assess NextGen research and development requirements and prioritize new R&D initiatives before they are included in FAA's budget planning.

To Partner with Industry

OEP is also FAA's tool for collaborating with the aviation community on NextGen implementation. Through OEP we are seeking stakeholder input, evaluating available technologies, defining and prioritizing research and development requirements, establishing milestones and commitments, and providing status, context, and guidance for initiatives related to NextGen. Industry collaboration is imperative for ensuring that aircraft are properly equipped for NextGen. RTCA functions as a federal advisory committee and serves as industry's voice to the OEP.

What Will Version 1 Contain?

OEP Version 1 describes the framework for the implementation plan. The plan is divided into three domains:

- **Airport Development**, focused on capacity enhancements and delay reduction for the airport surface.
- **Aircraft and Operator Requirements**, focused on developing standards for an avionics equipage package that provides the new capabilities required by NextGen.
- **Air Traffic Operations**, focused on producing transformative air traffic control capabilities.

OEP will contain both commitments, which are fully funded implementation activities, and strategic initiatives, which are being validated for implementation. The first version will show how currently funded programs support the NextGen vision, and is being used to guide FY09 budget formulation.

What Is OEP's Relationship to the JPDO?

Because the JPDO is not an implementing or executing agency, the FAA and the other JPDO partner agencies must each develop an implementation schedule for their NextGen activities. The FAA is using the OEP to guide its transformation. JPDO representatives will participate along with the FAA in OEP development and execution.

How Does the OEP Relate to Other Planning Documents?

NextGen Concept of Operations

The Concept of Operations is a document that provides a basic operational description of how the NextGen will function in 2025. The version released for comment in March 2007 describes all segments of a flight, from the time an aircraft departs until it arrives at its destination, as well as operations that take place before and after a flight, such as flight planning and security screenings. OEP, in turn,

defines the major operational changes the FAA will enact through technologies and procedures that will transform today's National Airspace System (NAS) into the NextGen system.

FAA Flight Plan

The Flight Plan is FAA's five-year strategic plan. It focused on a select group of high-priority, measurable goals and initiatives for achieving increased aviation safety, greater airspace capacity, international leadership, and organizational excellence. Further, each FAA office links portions of its respective annual business plan to the Flight Plan. In comparison, the OEP's time frame stretches through 2025 and includes a broader range of transformation activities related to the first three Flight Plan focus areas.

Enterprise Architectures

The NAS and NextGen Enterprise Architectures are extremely detailed system engineering plans that define timelines and milestones for key infrastructure programs. They are the backbone of the OEP. OEP describes the operational changes that these infrastructure programs, in coordination with new procedures, avionics . . . will ultimately provide. Furthermore, a team of top agency executives met regularly to assess the progress of OEP activities, and the planning office conducts frequent outreach meetings with aviation community organizations.

National Aviation Research Plan

Research and development is critical to ensuring the FAA meets NextGen goals. The annual National Aviation Research Plan (NARP) is an integrated, performance-based plan that describes the FAA R&D programs that support both the day-to-day operations of the NAS and the vision for NextGen. The OEP relates R&D activities to the plan's transformative capabilities, to show explicitly how research is moving NextGen forward.

NEXTGEN CONCEPT OF OPERATIONS—JOINT PLANNING AND DEVELOPMENT OFFICE (JPDO)

NextGen is a wide ranging transformation of the entire national air transportation system—not just certain pieces of it—to meet future demands and avoid gridlock in the sky and in the airports. It moves away from ground-based surveillance and navigation to new and more dynamic satellite-based systems. Technologies and activities that support this transformation are currently part of the FAA's investment portfolio and represent a step beyond our legacy modernization programs. These new capabilities and the highly interdependent technologies that support them will change the way the system operates, reduce congestion, and improve the passenger experience. This multi-agency initiative is led by the JPDO.

The Concept of Operations (ConOps), developed by JPDO, is a document that provides a basic operational description of how the air transportation system will function in 2025. The version released for comment in March 2007 describes all segments of a flight, from the time an aircraft departs until it arrives at its destination, as well as operations that take place before and after a flight, such as flight planning and security screenings. OEP, in turn, defines the major operational changes FAA will make through technologies and procedures that will transform today's NAS into the NextGen system.

The ConOps forms a baseline that can be used to initiate a dialogue with the aviation stakeholder community to develop the policy agenda and encourage the research needed to achieve our national and global goals for air transportation.

The goals for NextGen focus on significantly increasing the safety, security, and capacity of air transportation operations and thereby improving the overall economic well-being of the country. These benefits are achieved through a combination of new procedures and advances in the technology deployed to manage passenger, air cargo, general aviation (GA), and air traffic operations. The NGATS Vision Briefing (2005) identifies eight key capabilities needed to achieve these goals:

- Network-Enabled Information Access
- Performance-Based Services (now Performance-Based Operations and Services)
- Weather Assimilated into Decision-Making
- Layered, Adaptive Security
- Broad-Area Precision Navigation [now Positioning, Navigation, and Timing (PNT) Services]
- Aircraft Trajectory-Based Operations (TBO)
- Equivalent Visual Operations (EVO) (the characteristics of which are described throughout this concept)
- Super-Density Arrival/Departure Operations.

Airports are the nexus of many of the NextGen transformation elements, including air traffic management (ATM), security, and environmental goals. Accordingly, the sustainability and advancement of the airport system is critical to the growth of the nation's air transportation system. Airports form a diverse system that serves many aviation operators and communities with different needs. Airport operators include a mix of private and local government/public entities that are responsible for aligning their activities with NextGen goals. New technology and procedures will improve access to airports, enabling better utilization of existing infrastructure and currently underutilized airports. The sustainability of existing airports will be enhanced with a preservation program to increase community support and protect against encroachment of incompatible land uses and impacts to airport protection surfaces. Finally, new airport infrastructure will be developed using a comprehensive planning architecture that integrates facility planning, finance, regional system planning, and environmental activities to enable a more efficient, flexible, and responsive system that is balanced with NextGen goals.

At the heart of the NextGen concept is the information-sharing component known as net-centric infrastructure services or net-centricity. Its features allow NextGen to adapt to growth in operations as well as shifts in demand, making NextGen a scalable system. Net-centricity also provides the foundation for robust, efficient, secure, and timely transport of information to and from a broad community of users and individual subscribers. This results in a system that minimizes duplication, achieves integration, and facilitates the concepts of distributed decision making by ensuring that all decision elements have exactly the same information upon which to base a decision, independent of when or where the decision is made. The net-centricity component binds NextGen operational and enterprise services together, thereby creating a cohesive link. Enterprise services provide users with a common picture of operational information necessary to perform required functions. The suite of enterprise services includes shared situational awareness (SSA), security, environment, and safety.

SSA services offer a suite of tools and information designed to provide NextGen participants with real-time aeronautical and geospatial information that is communicated and interpreted

between machines without the need for human intervention. A reliable, common weather picture provides data and automatic updates to a wide range of users, aiding optimal air transportation decision making. PNT services reduce dependence on costly ground-based navigation aids (NAVAIDs) by providing users with current location and any corrections, such as course, orientation, and speed, necessary to achieve the desired destination. Real-time air situational awareness is provided by integrating cooperative and noncooperative surveillance data from all air vehicles.

Security services are provided by a risk-informed security system that depends on multiple technologies, policies, and procedures adaptively scaled and arranged to defeat a given threat.

New technologies and procedures aid in passenger screening and checkpoint responsibilities. Baggage screening improvements include integrated chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) detection and sensor fusion systems in a range of sizes for increased portability and remote screening.

Environmental interests are proactively addressed through the development and implementation of an integrated environmental management system (EMS). Technologies are incorporated before and during operations to enable optimized route selection, landing, and take-off procedures based on a range of data feeds including noise, air emission, fuel burn, cost, and route efficiency. At airports, a flexible, systematic approach is developed to identify and manage environmental resources that are critical to sustainable growth. Environmental considerations continue to be incorporated into aircraft design to proactively address issues including noise reduction and aircraft engine emissions.

Because of the profound impact adverse weather has on transportation, NextGen is focusing on a major new direction in aviation weather information capabilities to help stakeholders at all levels make better decisions during weather situations. For NextGen, weather information has a core function—identify where and when aircraft can or cannot safely fly. These safe and efficient NextGen operations will be dependent on enhanced aviation weather capabilities based on three major tenets:

- A common picture of the weather for all air transportation decision makers and aviation system users.
- Weather directly integrated into sophisticated decision support capabilities to assist decision makers.
- Utilization of Internet-like information dissemination capabilities to realize flexible and cost-efficient access to all necessary weather information.

Aviation safety is steadily improved to accommodate the anticipated growth in air traffic while the number of accidents is decreased through an integrated safety management system (SMS). A national safety aviation policy is established that formalizes safety requirements for all NextGen participants. The safety improvement culture is encouraged by management and utilizes nonreprisal reporting systems. Safety assurance focuses on a holistic view of operators' processes and procedures rather than the individual pieces of the system. Modeling, simulation data analysis, and data sharing are utilized in prognostic assessments to improve safety risk management.

Data from the above services are used to provide real-time system-level risk assessments and operational impact reviews to evaluate the performance, system safety, and security of NextGen via the performance management service. Real-time, onboard data are monitored and shared to evaluate and manage individual aircraft risk. Safety compliance is monitored through network-enabled data gathering, which collects interaircraft and pilot-to-pilot performance data.

This enhanced monitoring of operational characteristics facilitates the integration of "instantaneous" system performance metrics into system management decisions.

NextGen is a complex system with many public and private sector stakeholders that must smoothly, promptly, and capably integrate with the changes in the global air transportation system. National defense, homeland security, ATM, commercial and GA operators, and airports work together to support passenger, cargo, recreational, and military flights. Through a net-centric infrastructure, enterprise services provide users with a common picture of operational information necessary to perform required functions. These integrated capabilities of NextGen will provide the capacity required to meet the nation's need for air travel in the most effective, efficient, safe, and secure manner possible.

FAA FACT 2 STUDY

FACT 2 is an assessment of the future capacity of the nation's airports and metropolitan areas. Its goal is to determine which airports and metropolitan areas have the greatest need for additional capacity. Traffic in the NAS was modeled using projections of future enplanements and operations from two different sources: the FAA's Terminal Area Forecast (TAF) and the Center for Advanced Aviation Systems Development's experimental model of origin and destination traffic. TAF assesses traffic on an airport-by-airport basis based on the economic and demographic characteristics of the airport metropolitan area. The following is a summary of some of the important findings.

Summary

Many existing airports will need to be expanded to meet future demand. The metropolitan areas that have traditionally driven aviation demand will continue to do so.

Metropolitan areas on both coasts have critical capacity problems that are becoming more chronic. In the last 40 years, two new major commercial service airports have opened in the United States, Dallas–Fort Worth and Denver International. We may need to add as many as four more in the next 20 or 30 years. Atlanta, Chicago, Las Vegas, and San Diego are among the likely candidates.

In addition to building new runways and airports, we need to expand regional planning in key areas of our country and examine the role of congestion management measures in the few locations where expanding airport capacity is unlikely. Eighteen of our biggest airports are back to pre-9/11 levels. It is likely that four more—Baltimore, Detroit, Newark, and Phoenix—will achieve those levels in the next couple of years.

FACT 2 examined potential benefits of some emerging concepts of the NextGen air traffic system that might help alleviate congestion at the busiest 35 airports, and the news was very encouraging. Every single one of them experienced a projected drop in delays. The anticipated benefits of NextGen are critically important as efficiency enhancements for airports with planned runway improvements and even more so for airports in the NAS where geographic and other constraints prevent physical expansion of the airfield. In addition, NextGen is critical to handling traffic volume and ensuring smooth, high-capacity aircraft flows between airports. It also enhances our

ability to meet our capacity requirements in ways that cause less harm to the environment and less disturbance to our neighbors—so the expansion of the airspace is beneficial to everyone.

Planned Improvements

The FACT 2 analysis includes planned improvements affecting runway capacity for two future planning periods, 2015 and 2025:

- New or Extended Runways.
- New or Revised ATC Procedures.
- Airspace Redesign.
- Other Assumptions (existing environmental restrictions).

This updated study shows that some airports have higher capacities than originally presumed and thus less need for additional capacity.

Input from Affected Airports

A few important issues were raised by a number of the airport sponsors:

- An airport's runways are not necessarily the limiting capacity factor. Often, taxiways and terminal gates can limit the annual number of operations more than runway capacity by itself. However, the present analysis did not consider potential limitations imposed by the taxiway or terminal infrastructure.
- Airspace limitations also impact capacity. The ability of the airspace around many of the airports to accommodate more arrivals and departures may be limited, especially where there are several major airports in the same area (Southern California, Northern California, Chicago, New York, Philadelphia, and Southern Florida). Enroute airspace congestion may also impose departure delays. In other cases, operational flexibility may be affected by nearby military airspace or environmentally sensitive areas.

Some Findings of the FACT 2 Study

The FACT 2 analysis found the total number of airports and metropolitan areas needing additional capacity beyond what is currently planned was lower than reported in FACT 1. The FACT 2 analysis also identified a greater number of large hub airports that will need additional capacity beyond what is currently planned.

New runways typically provide the greatest capacity enhancement in the airport environment, and more will be needed to manage delays throughout the NAS. Some communities, however, are constrained from building runways or implementing other airfield projects to enhance capacity. In such cases, NextGen, which includes various technology advancements planned to transform how we move people and goods, will be required to provide solutions for additional capacity.

FAA FLIGHT PLAN

The Flight Plan is a 5-year strategic plan outlining the FAA's goals and objectives. The Plan is updated every year and focuses on four goals:

- **Increased Safety**
- **Greater Capacity**
- **International Leadership—**Aviation safety is a vital national export. We will enhance America's leadership role by sharing our expertise and new technologies with our international partners.
- **Organizational Excellence—**To fulfill our mission, the FAA must be a world-class organization. This requires greater fiscal responsibility, stronger leadership, more cooperation, and performance-based management.

FAA NAS Architecture 6

The National Airspace System Architecture 6 (NAS 6) is an update to NAS Architecture 5. NAS 6 represents a continuation of FAA's multiyear framework to measure progress in modernizing the NAS. NAS 6 incorporates many of the different agency plans and programs as well as reflects changes in the FAA's budget and FAA Joint Resources Council decisions. Updates in NAS 6 also reflect changes in the Joint FAA/Industry concept of operations, and FAA Administrator goals and strategies that appear in the FAA Flight Plan.

Specifically, the NAS Architecture overall represents the proposed execution of several key modernization plans: the FAA's Flight Plan; the NAS Operational Evolution Plan, which has been expanded into the NAS Operational Evolution Partnership; the NAS Capital Investment Plan; and the National Aviation Research Plan. NAS 6 is a comprehensive, multiyear plan for improving the NAS and ultimately reflecting the plans for the Next Generation Air Transportation System, or the NextGen, to be fully operational in the year 2025. The JPDO is coordinating the NextGen, and NAS 6 will be aligned with NextGen planning.

NAS 6 includes a series of Operational Improvements, or OIs, to assist users and manufacturers in planning their operations and investments. The OIs in NAS 6 will be updated in line with the plans for development of the NextGen.

NATIONAL AVIATION RESEARCH PLAN

The annual National Aviation Research Plan (NARP) is an integrated, performance-based plan that describes the FAA R&D programs that support both the day-to-day operations of the National Airspace System and the vision for NextGen. The OEP links R&D activities to the plan's transformative capabilities, to show explicitly how research is moving FAA toward NextGen.

The NARP uses ten R&D milestones to bridge the near-term goals of the Flight Plan with the long-term goals of the NextGen Integrated Plan.

1. **Fast, flexible, and efficient—**a system that safely and quickly moves anyone and anything, anywhere, anytime on schedules that meet customer needs.

   The approach includes developing and demonstrating NextGen according to the FAA responsibilities in the JPDO plan and continuing ongoing efforts related to increasing airport capacity and reducing costs. Validation of the 2015 milestone will include a combination of modeling, analysis, full-scale testing, and initial standards. The capacity evaluation under the system knowledge goal supports the interim assessment of progress and the validation of this milestone.
2. **Clean and quiet—**a significant reduction of aerospace environmental impact in absolute terms.

   The approach has four parts: measure current levels in the system; determine the target levels of noise and emissions;

build models to assess and predict the impact of change; and develop reduction techniques and assess their cost-benefit. Validation of the 2015 milestone will include modeling, physical demonstrations, prototypes, full-scale tests, and software beta tests. The environmental evaluation under the system knowledge goal supports the interim assessment of progress and validation of this milestone.

3. **High quality teams and individuals—**the best qualified and trained workforce in the world.

   The approach includes continued pursuit of efficiency gains in en route and pursuit of new knowledge and results that produce efficiency gains in terminal and tower. The baseline for all demonstrations will be 2004 traffic levels. Validation of the interim and 2015 milestones rely on simulation and prototyping. Validation will involve field trials only to the extent that resources and funding are available. This goal contributes to the integrated demonstration under the human-centered design goal.

4. **Human-centered design—**aerospace systems that adapt to, compensate for, and augment the performance of the human.

   The approach includes identifying roles and responsibilities, defining human and system performance requirements, applying error management strategies, and conducting an integrated demonstration across multiple goal areas. Validation of the 2015 milestone will include simulations and demonstrations to confirm the requirements and methodologies for human performance and error management. The final demonstration will integrate weather-in-the-cockpit technologies, self-separation procedures, air traffic controller productivity tools, and network-enabled collaborative decision making to increase capacity, reduce delays, and promote safety.

5. **Human protection—**no fatalities, injuries, or adverse health impacts owing to aerospace operations.

   The approach includes preventing injuries during regular operations and protecting people in the event of a crash. Validation of the supporting milestones will include demonstrations, modeling, simulations, full-scale testing, and initial standards. Validation of the 2015 milestone will include analysis of U.S. accident data. In 2010, progress will be measured based on accident data from 2003 to 2008; in 2012 based on data from 2003 to 2010; and in 2015 based on data from 2003 to 2012. Results from the safe aerospace vehicle goal will contribute to the interim and final measurements of the reduction. The safety evaluation under the system knowledge goal will support the interim assessment of progress and validation of the 2015 milestone. The 2015 demonstration will show that the R&D is complete, and it is possible to meet the targeted operational improvement by 2025.

6. **Safe aerospace vehicles—**no accidents and incidents owing to aerospace vehicle design, structure, and subsystems.

   The approach includes preventing accidents resulting from engine failures, structural failures, and system failures; developing a fireproof cabin; integrating unmanned aircraft into the system; and addressing safety problems specific to general aviation. Validation of the 2015 milestone will include modeling, flight simulation, physical demonstration, prototypes, and initial standards. The results from this goal will contribute to the 2015 milestone to demonstrate a two-thirds reduction in fatalities and significant injuries under the human protection goal.

7. **Self-separation—**no accidents and incidents owing to aerospace vehicle operations in the air and on the ground.

   The approach includes conducting R&D to support the standards, procedures, training, and policy required to implement the NextGen operational improvements leading to self-separation.

   This goal does not develop technology, but it works with the designated technology developer to prepare for the operational use of the technology according to the JPDO schedule identified below. Validation of the 2015 milestone will include demonstrating that the research and development is sufficient for the initial policy and standards that are required to certify technology, procedures, and training needed to implement the JPDO plan for self-separation

8. **Situational awareness—**common, accurate, and real-time information on aerospace operations, events, crises, obstacles, and weather.

   The approach includes supporting development of standards and procedures for weather-in-the-cockpit to provide the flight crew awareness of weather conditions and forecasts; demonstrating wake turbulence technologies to support self-separation; and improving situational awareness at airports. Validation of the 2015 milestone will include pilot-in-the-loop simulations, modeling, tests, physical demonstrations, and initial standards and procedures.

9. **System knowledge—**a thorough understanding of how the aerospace system operates, the impact of change on system performance and risk, and how the system impacts the nation.

   The approach includes developing the information analysis and sharing system to support the FAA and NextGen safety initiatives; generating guidelines to help stakeholders develop their own safety management systems; and modeling activities to help measure progress toward achieving safety, capacity, and environmental goals. Validation of the 2015 milestone will include analysis, modeling, prototypes, and demonstrations. The evaluation efforts under this goal support the interim assessment of progress and validation of the 2015 milestones under the human protection, clean and quiet, and fast, flexible, and efficient goals.

10. **World leadership—**a globally recognized leader in aerospace technology, systems, and operations.

    The approach includes managing research collaborations to increase value and leveraging research under the existing R&D program to increase value. This goal applies to the R&D program only. Validation of the 2015 milestone will include developing agreements and conducting analysis. The research results listed under activity 2 are generated by the other nine goals in this plan. The purpose of this goal is to help plan the use of these products in international partnering activities to produce the highest value. The method of validation for the individual research results is provided under the respective goal for each result.

APPENDIX F

Survey Respondents

The following airports responded to the survey:

- JFK International Terminal (Terminal 4)
- Clark County Department of Aviation, Las Vegas McCarran International Airport
- San Francisco International Airport
- Tampa International Airport
- Greater Toronto Airports Authority
- Greater Orlando Airport Authority
- Metropolitan Airports Commission (Minneapolis–St. Paul International Airport)
- San Diego County Regional Airport Authority
- Salt Lake City International Airport, Salt Lake City Department of Airports
- Williams Gateway Airport
- Halifax International Airport Authority
- Vancouver International Airport Authority
- Dallas–Fort Worth International Airport
- Amsterdam Airport Schiphol
- Aéroports de Montréal
- Miami–Dade Aviation Department
- Four anonymous responses.

The following airlines responded to the survey:

- Lufthansa AG
- EasyJet Airline
- American Airlines
- United Airlines
- Qantas Airlines
- Southwest Airlines
- Skybus Airlines
- Delta Airlines
- Air Canada
- Alaska Airlines
- British Airways
- Two anonymous responses.

Abbreviations used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation