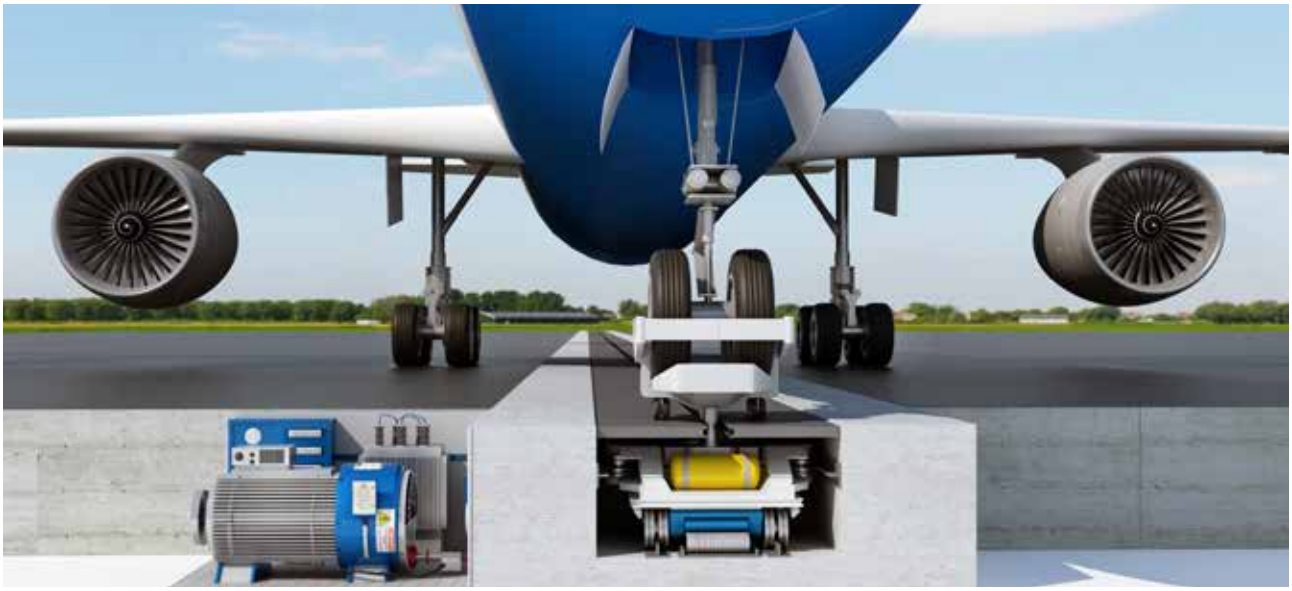
June 2016

General System Description

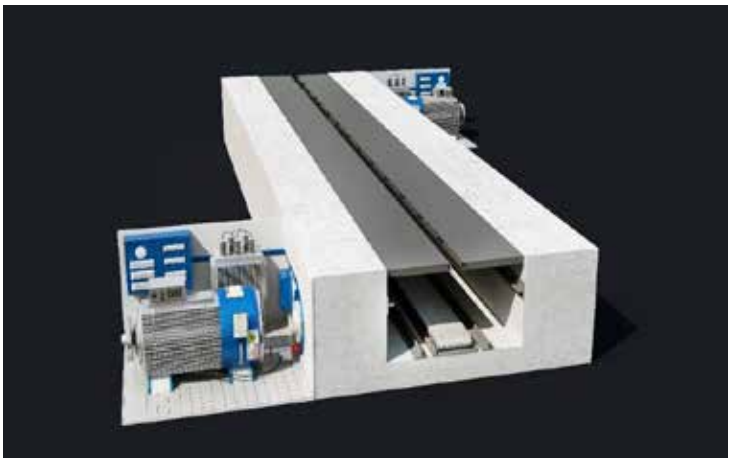
The Airplane Transporting Systems (ATS) is an innovative system designed to transport aircraft from the runway via the taxiway to the airport gates and back to the runway. Upon landing, the pilot taxis the aircraft to the taxiway where ATS system is installed ready for use. Next, the aircraft nose wheel is driven into the ATS pull car, then secured, and finally the aircraft engines are shut down saving fuel and emissions. The ATS system uses special channels with a rail system built beneath the taxiway and powered by electrical motors in the channels to transport aircraft. The pull car moves each aircraft along the channel to the appropriate gate. At time for gate departure, the ATS pull car pushes the aircraft away from the gate and pulls it along the taxiway and to the runway. Lastly, the pilot starts the engines, drives off the pull car, and positions the aircraft for takeoff. The entire ATS system is fully automatic, integrated into the ground control system, and ran by the ground control tower personnel. ATS maximizes safety by optimizing airport taxiway traffic, reducing personnel and equipment in and around flight operations, and controlling all aircraft movements during taxi and gate operations.



ATS is comprised of three sub-systems, the taxiway channel, pull cars and software.

Taxiway Channel

The taxiway channel consists of 15-17 meter (16-19 yards) length modules built into the airport taxiway approximately 80 cm (2,6ft) deep and 120 cm (4 ft) wide. Each module is powered by two electrical engines, installed at approximately 40 meter (44 yards) channel increments. The main engine operates the taxi channel and the second engine is there in case of emergency or main engine failure. Stainless steel doors cover the channel utilizing a brush system to close the gap between the doors, leaving only 10 cm (4 in) gap exposed, which reduces potential Foreign Object Damage (FOD). Channels are designed with a drainage and heating system to keep the system operating during unfavorable weather conditions, such as rain, snow and ice.



Pull Car

The pull car transports an aircraft from the runway to an airport gate and back to the runway. The pull car rides in the taxi channel securely moving the aircraft. The pull car system, including the connection between the aircraft nose wheel and the pull car, is fully automatic. After driving an aircraft into a pull car, no additional actions are required by the pilot, but at all times, the pilot can disconnect from a pull car in case of emergency.

Software

ATS has a fully integrated software system that eliminates most human touch points and errors. The system software completely orchestrates all aircraft movements from the taxiway to the airport gate and back to the runway. The ATS software suite is planned to integrate with the existing airport traffic control system software and is envisioned to be operated by the ground control personnel.

Safety

Each year there are several hundred aircraft collisions during taxiing. Fortunately, most accidents do not endanger passengers' lives, but still have a negative impact on the daily operations of the airport and airlines. These collisions cause huge financial losses ($50B US annually) and disrupt airport operations impacting passengers.

ATS significantly improves safety by eliminating aircraft collisions with other aircraft and ground equipment!

Multiple, yet independent, aircraft movements occur simultaneously between the runway, aprons and gates. Each arriving and departing aircraft has an assigned taxi pathway leading its assigned gate or runway. The ATS system optimizes traffic on taxi-lanes and stacks aircraft closer together since the engines are shut off during ATS aircraft movement.
The ATS system also eliminates collisions with baggage and towing vehicles. Each ATS pull car is equipped with a radar that monitors all possible collision areas. In case of emergency, the pulled aircraft will be stopped immediately, and the traffic control, pilot and other taxiing aircrafts will immediately receive information about the incident. The system automatically reacts to such a situation and adjusts the movements of other aircrafts accordingly.

ATS systems eliminates most collisions at airports!

System Benefits

ATS maximizes safety by optimizing airport taxiway traffic, reducing personnel and equipment in and around flight operations, and controls all aircraft movements during taxi and gate operations. ATS significantly improves safety of airports and eliminates most aircraft collisions. This system dramatically reduces fuel emissions since the engines are powered off while taxiing and gate docking, which also eliminates harmful exhaust emissions emitted in the atmosphere. Airports can potentially sell their fuel emission tax credits and reduce airport ground crew manpower to offset the initial and sustainment costs of the ATS system. Airline fuel consumption will decrease as a result of airports implementing ATS, which decreases operating costs of airlines.

Reduced Manpower and Ground Equipment

Because ATS is a fully automated system, an airport can significantly reduce ground equipment and personnel decreasing overhead costs. For example, Frankfurt Airport can reduce the number of employees by an estimated 400 people. Some ground equipment, such as tug vehicles, are no longer required since aircraft are moved by ATS pull cars.

Current airport operations requires 4 people and 1 tug for every aircraft!

Increase in Airport Capacity

ATS reduces transport time of aircraft between runway and airport gates approximately 30%. ATS increases capacity of airports through quicker movements and increases capability to stack aircraft closer together since the engines are not operating. ATS enables an airport to service more aircraft concurrently.

Faster Aircraft Movements

Attaching and detaching an aircraft from a pull car occurs within a matter of moments. Currently, pushback (an airport procedure during which an aircraft is pushed backwards away from an airport gate by external power or aircraft engine power) is accomplished in an average of 4 minutes. ATS eliminates these 4 minutes because the aircraft remains attached to the pull car while stationary at the gate. During pushback, the ATS system immediately begins moving the aircraft along the channel and does not require stopping until the aircraft is at the runway. This also decreases the chances for collisions with ground vehicles.
The number of flight operations around the world increases every year. Increased flight operations equate to increased airport ground movements at airports. Airport aircraft movements average approximately 800,000 aircraft movements/year. The more aircraft movements, the more time saved creating increased capacity. See chart below:

Rank	Airport	Location	Code (IATA/ICAO)	Total Movements	Rank Change	Change
1.	Hartsfield-Jackson Atlanta International Airport	Atlanta, Georgia, United States	ATL/KATL	882,497	▲1	▼1.6%
2.	O'Hare International Airport	Chicago, Illinois, United States	ORD/KORD	875,136	▼1	▼0.8%
3.	Dallas/Fort Worth International Airport	Coppell, Euless, Grapevine, and Irving, Texas, United States	DFW/KDFW	681,244	–	▲0.2%
4.	Los Angeles International Airport	Los Angeles, California, United States	LAX/KLAX	655,564	–	▲3.0%
5.	Beijing Capital International Airport	Chaoyang-Shunyi, Beijing, China	PEK/ZBAA	590,169	–	▲1.4%
6.	Denver International Airport	Denver, Colorado, United States	DEN/KDEN	541,213	–	▼4.3%
7.	Charlotte Douglas International Airport	Charlotte, North Carolina, United States	CLT/KCLT	540,944	–	▼0.8%
8.	McCarran International Airport	Las Vegas, Nevada, United States	LAS/KLAS	522,399	–	▲0.3%
9.	George Bush Intercontinental Airport	Houston, Texas, United States	IAH/KIAH	502,844	–	▼1.2%
10.	Charles de Gaulle Airport	Paris, France	CDG/LFPG	475,776	▲1	▲0.9%

Gate Optimization

Integration of the ATS ground control system to the flight control tower allows for greater optimization of airport gates and quicker departure times. Planes will not move until their allotted time and slot in the ATS system. ATS greatly reduces negative consequences of human induced errors by optimizing taxi times, gate pushback, and eliminating congestion on taxiways. There is no more waiting on a gate for a gate crew to dock and marshal an aircraft. ATS improves operations during adverse weather conditions such as rain and snow.

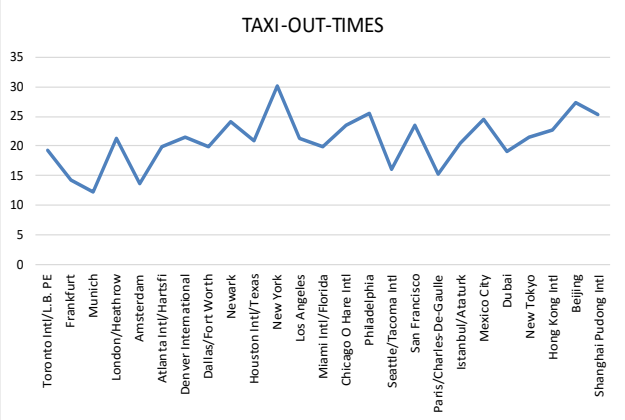
Sources of savings:

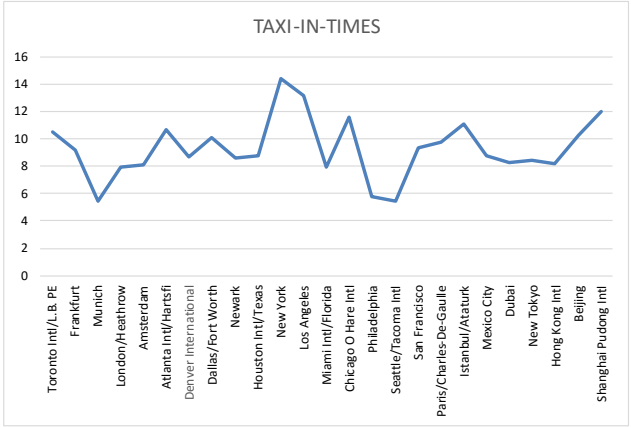
- **Reduced manpower**
- **Elimination of tug vehicles, „follow me" cars and other equipment**
- **Quicker aircraft movements**
- **Move efficient gate operations**
- **Increased airport capacity**

Taxi Time

Taxi time greatly influences fuel consumption of an aircraft. Approximately 25% of all commercial aircraft are wide-body aircrafts, which consume an average of 70 liters (19 gallons) of fuel/minute during taxiing. The remaining 75% of large commercial aircraft are mid-size aircraft, which burns an average of 22 liters (6 gallons) of fuel/min during taxiing. The overall average of passenger aircraft burns about 35 liters (9 gallons) of fuel/minute. Calculations indicate that fuel required to taxi is 3-4% of the entire fuel consumed for flight operations (take-off, flight, and landing). In addition, fuel used during taxiing results in large amounts of harmful emissions released into the atmosphere. The table below shows taxi times for the busiest US airports:

Origin Airport Taxi-Out Times	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4
Hartsfield-Jackson Atlanta International	19.0	19.1	19.7	17.8	18.0	18.8	18.6	17.4
Chicago O'Hare International	16.6	16.2	16.5	16.2	17.1	16.8	16.7	16.0
Dallas/Fort Worth International	14.0	14.1	14.9	14.6	14.2	14.6	14.5	14.8
Detroit Metro Wayne County	19.0	18.5	17.8	18.4	21.3	21.4	19.5	17.9
Los Angeles International	15.1	15.3	16.2	15.8	15.0	15.6	16.2	14.9
Miami International	16.1	16.8	17.0	16.0	16.6	17.4	16.5	15.7
John F. Kennedy International	23.3	26.3	27.5	23.5	23.8	28.5	28.0	23.0
Newark Liberty International	19.6	22.4	22.5	19.2	19.1	21.2	21.7	19.5
San Francisco International	15.9	17.9	17.7	16.9	15.1	17.4	16.3	16.0
Washington Dulles International	15.9	16.7	17.2	15.7	16.6	18.5	17.3	16.0





Fuel Savings

The ATS system is designed to transport aircraft between runway and gate without aircraft engine power. Depending on the type and size of aircraft, fuel usage for 1 minute of taxiing is 20-70 liters (5-18 gallons) per minute. Average fuel usage for passenger aircraft is 35 liters (9 gallons) per minute while taxiing.

Fuel Price	$1,70 USD/gal	€0.40/Liter
Fuel Consumption	9 gal/min	35 L/min

For example, an aircraft taxiing 16 minutes will save approximately €224 or $244
35 L/min x 16 min = 560 liters x €0.40 = €224
9 gal/min x 16 min = 144 gallons x $1.7 = $244 USD

Design, Installation and Training

Design

ATS World Wide will collaborate with each airport to design an optimal layout for the ATS system to maximize airport capacity and optimize aircraft movement flow.

Installation

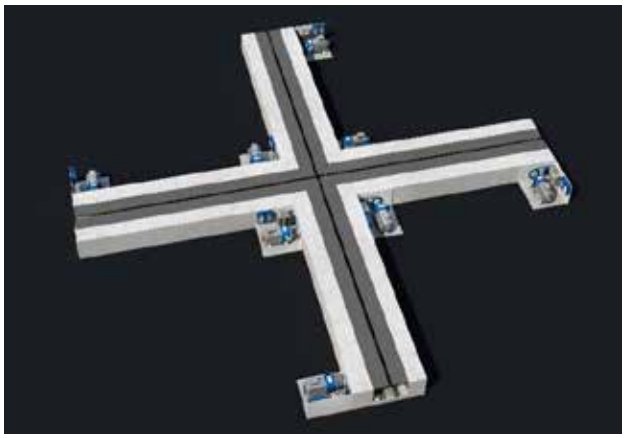
ATS system installation is accomplished using a modular installation strategy, which minimizes airport downtime. Taxiway channels are designed to be constructed in 8-hour increments allowing taxiway and/or gates to return to normal operations in between increments. Disruptions to airport operations are further minimized by installing the taxi channels at night. In most European countries, flights are prohibited during the hours of operation 2300 – 0500. This timeframe varies at United States airports. During this downtime, installation is optimal. During an 8-hour break in airport operations, ATS World Wide can install up to 250 meters (273 yards) of taxi channel.

Channel Installation

Channel modules are built off-site prior to installation in close proximity to the airport. First, a modified 'concrete cutting vehicle' cuts the channel into the taxiway, second, the foundation is constructed and finally the channel module put in place and secured. After each section is complete, the taxiway can be used for normal airport operations until the entire ATS system installation is complete and operational.

Pull Car Installation

Pull cars are built off-site at a permanent manufacturing facility and delivered to the airport as the channel modules are installed. Pull cars are installed into the channel as required.



Software Integration

ATS World Wide will partner with the airport to determine the optimal taxiway layout of the ATS system then customize and upload the ATS software suite for ground traffic controllers to operate the entire system. The software integration is planned late in the installation project schedule in order to minimize disruptions to airport operations.

System Training

ATS World Wide offers an array of training options for airport personnel, to include a customized simulated system, onsite ATS expertise and classroom training.

Installation Cost Estimate

Implementation of ATS system by airports will require an initial investment costs and operating costs for system maintenance.

Installation Estimates	USD	Euro
1 m (1.1 yd) ATS system cost	$3,121	€2,800
1 ATS pull car cost	$78,026	€70,000
Project cost (% of total system cost)	5%	5%
Annual Mx cost (% of total system)	4%	4%

One option to recuperate an airport's investment in ATS is to charge usage fees to airlines. Estimated fees are less than the cost of fuel burned during traditional ground taxing creating economic benefits to both the airlines and airport system. For this option, airline ATS usage fees are estimated to cost approximately 60% of saved fuel during taxi.

ATS Operations and Maintenance

The ATS system is fully automatic and operated by airport personnel through the airport traffic control system software using lasers on the pull cars to help transport aircraft. Approximately 10 employees are required to operate the entire ATS system at a large airport. An additional 10 employees are estimated to maintain the ATS system for an average size airport. These personnel maintain the system in air traffic control tower, monitor software and hardware functionality, maintain the channel and pull cars, and detach aircraft from pull cars if necessary to transport aircraft by traditional means. The ATS channel and pull cars will require periodic inspections and maintenance. Prior to installation, ATS World Wide will determine recommended spare parts, tooling and support equipment required to operate and maintain the system.

Detaching from ATS System During Transport

At any time during ATS operations, the pilot or ground controller can detach the aircraft from ATS system in approximately 45 seconds or less. The pilot has the ability to disengage the ATS system at his or her discretion. After the aircraft detaches from the pull car it can move under its own power or be towed by traditional means. This event has no impact to other aircraft operating under the ATS system. All other aircraft in the system receive an alert regarding the detaching event and the system will continue to operate.

Required Aircraft Modification

In order to disconnect from a pull car, an aircraft may require minor modification to its software; however, detachment can also occur via ground controllers. No other aircraft modifications are anticipated.

Environmental Protection

Significant reduction in aircraft fuel consumption, due to not operating engines during taxi under ATS, dramatically reduces harmful emissions emitted into the atmosphere. They are as follows:

- **Carbon Monoxide**
- **Carbon Dioxide**
- **Hydrocarbon**
- **Nitric Oxide**

Reduction of harmful emissions help improve the environment. The global use of the ATS system can play a very important role in improving the environment. Airports can apply for government grants for environmental protection by implementing ecological systems such as ATS. The emission reductions may be monetized by converting the savings into emission credits and selling them to companies paying fines for emission violations.

The table below shows savings in emissions of different harmful substances:

Harmful Substance Consumption	Emission from aircraft (oz/gal)	Emission from aircraft (g/L)
Hydrocarbon	0.06	1.71
Carcinogenic Nitric Oxide	0.16	4.60
Carbon Monoxide	0.73	20.62
Carbon Dioxide	0.13	3.70

Operating Parameters

ATS system has a very high rate of return on investment (ROI) after installing the system. Main parameters influencing the ROI are as follows:

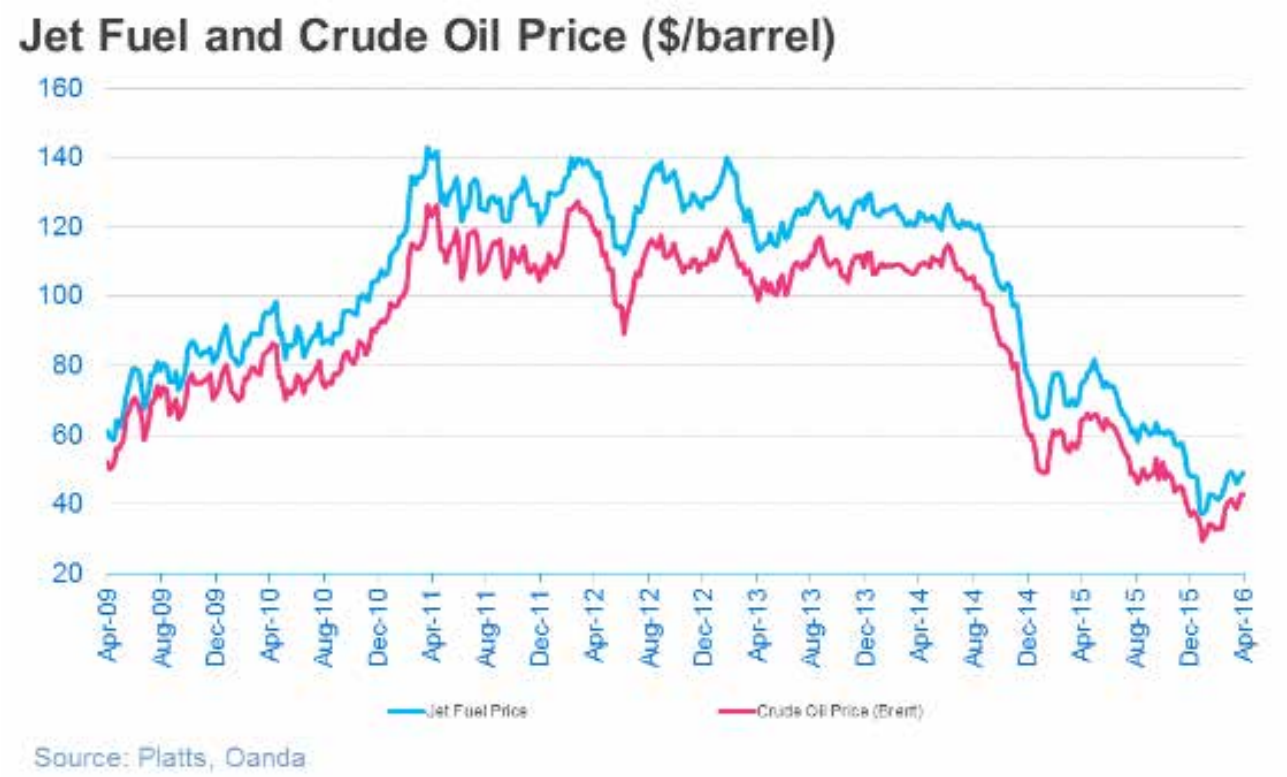
- **Fuel consumption**
- **Number of flight movements**
- **Taxiing time**
- **Length of taxiways**
- **Number of ground crew required to operate the traditional system**

These parameters very for each airport and have significant impact on the ROI. On page 16 is an analysis of three key operating parameters (KOP) – fuel price, number of flight movements and length of taxiing time.

Fuel Prices

One of the major advantages of implementing ATS system for aircraft transport at an airport is significant fuel savings. Aircraft engines (on medium and large airfields) burn an average 35 liters (9 gallons) of fuel/minute. For example, taxi time at Frankfort Airport averages 16 minutes per flight, which translates to burning approximately 560 L (148 gal) of fuel on every aircraft movement. Utilizing the ATS system allows the aircraft to power down engines shortly after landing and conversely, aircraft are not required to use their aircraft engines until reaching the runway for take-off and only perform the required engine run-up just prior to takeoff. Depending on the type and size of aircraft, fuel usage for 1 minute of taxiing is 20-70 liters (5-18 gal) per minute. Average fuel usage for passenger aircraft is 35 liters (9 gal) per minute while taxiing. Prices of fuel have a significant impact on the amount of savings from fuel usage; see graph below.

Crude oil analysts agree the price of oil is predicted to rise in the near future. It may not reach the record levels of $140/barrel, but even at $80-90/barrel, oil prices effect airline costs. With each price increase of crude oil, the ROI for utilizing ATS increases.



Frankfurt Airport Assumptions

- **Over 460,000 flight movements**
- **Approximately 50 km (31 mi) of taxiways**
- **Over 400 ground service crew employees**

Frankfurt Airport Calculations:

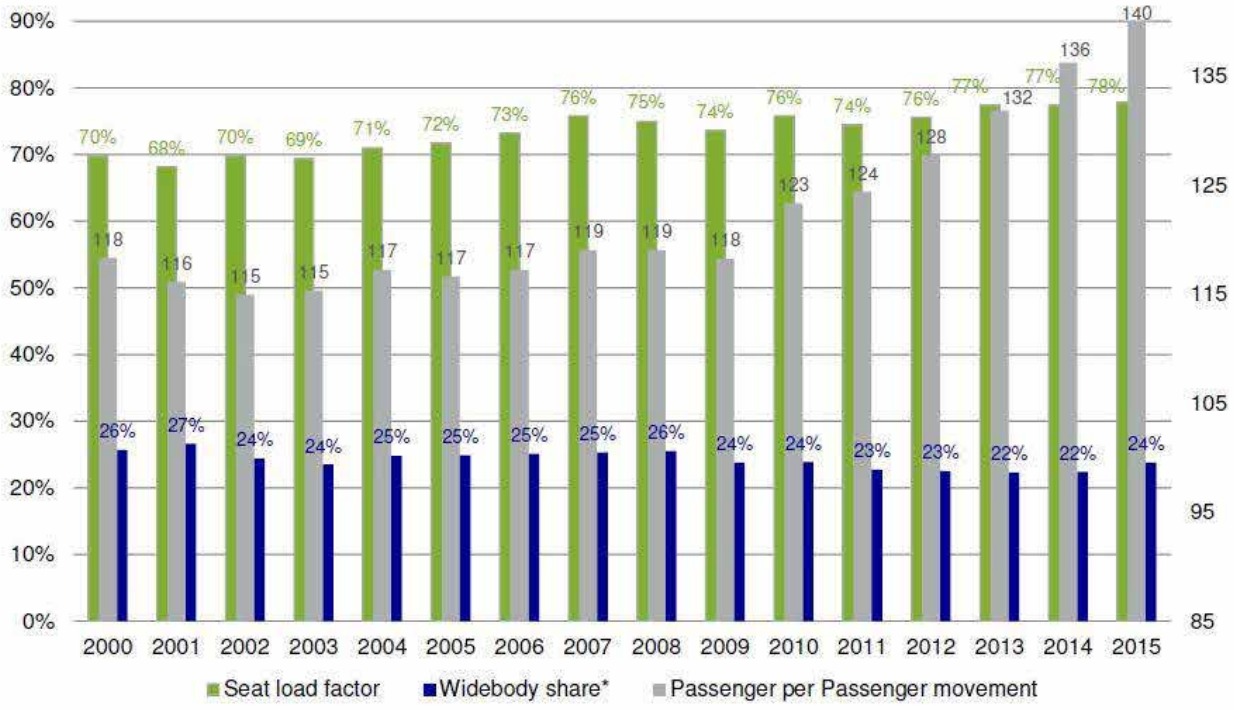
AIRPORT OPERATING DRIVERS:		
Flight movements	468 153	[pic]
Average taxitime	16	[min]
Distance: gates - runways	31	[mile]
Workforce (taxingways service)	400	[no]
Average salary	22	[$/h]
Average taxingway length	2 734	[yd]
No. of Pull Cars	90	[pic]
Administrative grants	20%	[%]

Fuel savings calculation:

468,153 movements x 16 min (avg taxi time) x 35 (avg L/min used) = 262,165,680 liters saved per year (69,256,846 gal)

Fraport

Features of Frankfurt Airport
Growth due to efficient Use of existing Infrastructure



* Excluding Cargo

Investment Expenditures and Maintenance Costs:

CAPEX	AIRPORT
ATS system [$]	156 969 697
ATS Pull Cars [$]	7 063 636
Project [$]	8 201 667
Grants [$]	-34 447 000
TOTAL:	**137 788 000**
OPEX	
Yearly maintenence cost [$]	6 561 333

Estimated Savings:

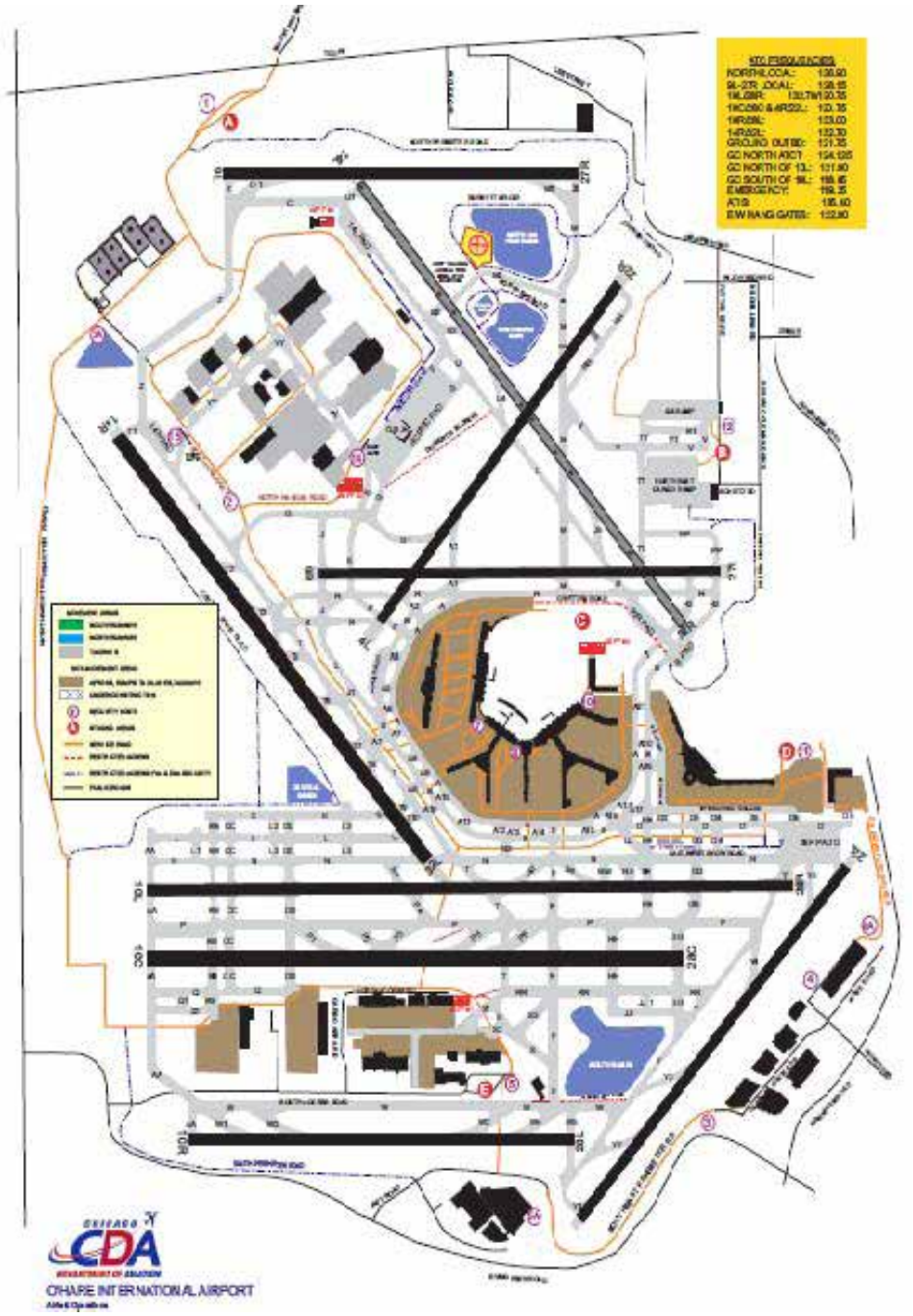
OVERALL SAVINGS/PROFITS	TOTAL	AIRPORT	AIRLINES	ENVIRONMENT
FUEL CONSUMPTIONS [$]	117 577 335	70 546 401	47 030 934	0
PAYROLL [$]	26 191 515	26 191 515	0	0
HYDROCARBONS [OZ]	15 813	0	0	15 813
CARCINOGENIC NITRIC OXIDES [OZ]	42 538	0	0	42 538
CARBON MONOXIDE [OZ]	190 683	0	0	190 683
CARBON DIOXIDE [OZ]	34 216	0	0	34 216

Yearly Profit & Loss		[$]
Fuel saving	[+]	70 546 401
Payroll saving	[+]	26 191 515
Maintanance costs	[-]	-6 561 333
TOTAL		**90 176 583**

RATIOS		
Return on Investment	[%]	65,4%
Return period	[years]	1,5

Chicago O'Hare Airport Assumptions:

- **Over 875,000 flight movements**
- **Approximately 47 km (28 mi) of taxiway**
- **Over 400 ground service crew employees**



Calculation Assumptions for Chicago Airport:

AIRPORT OPERATING DRIVERS:		
Flight movements	875 136	[pic]
Average taxitime	18	[min]
Distance: gates - runways	29	[mile]
Workforce (taxingways service)	400	[no]
Average salary	22	[$/h]
Average taxingway length	3 281	[yd]
No. of Pull Cars	140	[pic]
Administrative grants	20%	[%]

Fuel savings Calculation:

875,136 movements x 18 min (avg taxi time) x 35 (avg L/min used) = 551,335,680 liters saved per year (145,647,478 gallons)

Investment Expenditures and Maintenance Costs:

CAPEX	AIRPORT
ATS system [$]	147 551 515
ATS Pull Cars [$]	10 987 879
Project [Euro]	7 926 970
Grants [Euro]	-33 293 273
TOTAL:	**133 173 091**
OPEX	
Yearly maintenence cost [Euro]	6 341 576

Savings Generated by ATS System Usage:

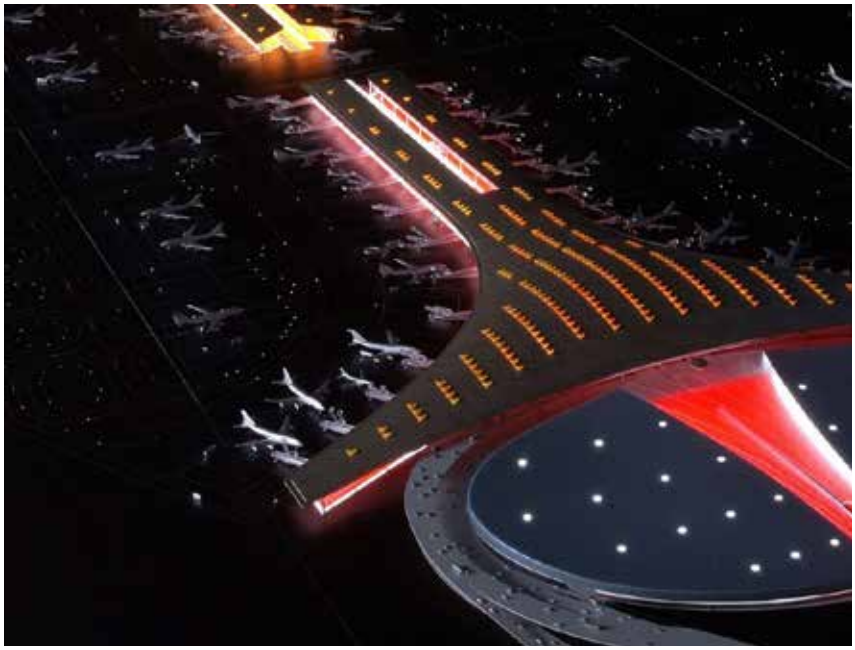
Yearly Profit & Loss		[$]
Fuel saving	[+]	148 359 419
Payroll saving	[+]	26 191 515
Maintanance costs	[-]	-6 341 576
TOTAL		**168 209 359**

RATIOS		
Return on Investment	[%]	126,3%
Return period	[years]	0,8

OVERALL SAVINGS/PROFITS	TOTAL	AIRPORT	AIRLINES	ENVIRONMENT
FUEL CONSUMPTIONS [$]	247 265 699	148 359 419	98 906 280	0
PAYROLL [$]	26 191 515	26 191 515	0	0
HYDROCARBONS [OZ]	33 255	0	0	33 255
CARCINOGENIC NITRIC OXIDES [OZ]	89 458	0	0	89 458
CARBON MONOXIDE [OZ]	401 007	0	0	401 007
CARBON DIOXIDE [OZ]	71 956	0	0	71 956

Beijing International Airport Assumptions:

- **Over 590,000 flight movements**
- **Approximately 52 km (32 mi) of taxiways**
- **Over 400 ground service crew employees**



Calculation Assumptions for Beijing Airport:

AIRPORT OPERATING DRIVERS:		
Flight movements	590 169	[pic]
Average taxitime	18	[min]
Distance: gates - runways	32	[mile]
Workforce (taxingways service)	400	[no]
Average salary	22	[$/h]
Average taxingway length	2 187	[yd]
No. of Pull Cars	110	[pic]
Administrative grants	20%	[%]

Fuel savings Calculation:

590,169 movements x 18 min (avg taxi time) x 35 (avg L/min used) = 371,806,470 liters saved per year (98,220,878 gallons)

Investment Expenditures and Maintenance Costs:

CAPEX	**AIRPORT**
ATS system [$]	163 248 485
ATS Pull Cars [$]	8 633 333
Project [Euro]	8 594 091
Grants [Euro]	-36 095 182
TOTAL:	**144 380 727**
OPEX	
Yearly maintenence cost [Euro]	6 875 273

Savings Generated by ATS System Usage:

OVERALL SAVINGS/PROFITS	TOTAL	AIRPORT	AIRLINES	ENVIRONMENT
FUEL CONSUMPTIONS [$]	166 749 568	100 049 741	66 699 827	0
PAYROLL [$]	26 191 515	26 191 515	0	0
HYDROCARBONS [OZ]	22 426	0	0	22 426
CARCINOGENIC NITRIC OXIDES [OZ]	60 328	0	0	60 328
CARBON MONOXIDE [OZ]	270 429	0	0	270 429
CARBON DIOXIDE [OZ]	48 525	0	0	48 525

Yearly Profit & Loss

		[$]
Fuel saving	[+]	100 049 741
Payroll saving	[+]	26 191 515
Maintanance costs	[-]	-6 875 273
TOTAL		**119 365 983**

RATIOS

Return on Investment	[%]	82,7%
Return period	[years]	1,2

Summary of Financial Results for the Airports

		Frankfurt	Chicago	Beijing
CAPEX	[$]	137 788 000	133 173 091	144 380 727
OPEX (yearly)	[$]	6 561 333	6 341 576	6 875 273
Total fuel savings	[$]	117 577 335	247 265 699	166 749 568
Total payroll saving	[$]	26 191 515	26 191 515	26 191 515
Airport P&L result	[$]	90 176 583	168 209 359	119 365 983
ROI	[%]	65%	126%	83%
Return period	[years]	1,53	0,79	1,21

Competition

Currently, there are two taxi systems designed to move aircraft without using aircraft engines to power aircraft to and from the airport gates. The first uses a unique type of tow vehicle to pull aircraft (two companies utilizing this technology) and the second mounts electrical engines to the airplane's wheels on the front and rear landing gear (one company utilizing this technology). They are as follows:

1. WheelTug – Gibraltar – designed a tug system installed on the nose wheel
2. Taxibot – Israel Aerospace Industries- offers an autonomous vehicle which tows aircraft from the gate to the runway and back
3. EGTS International- joint venture between Safran and Honeywell – requires installing its electric green taxiing system (EGTS) on the main landing gear

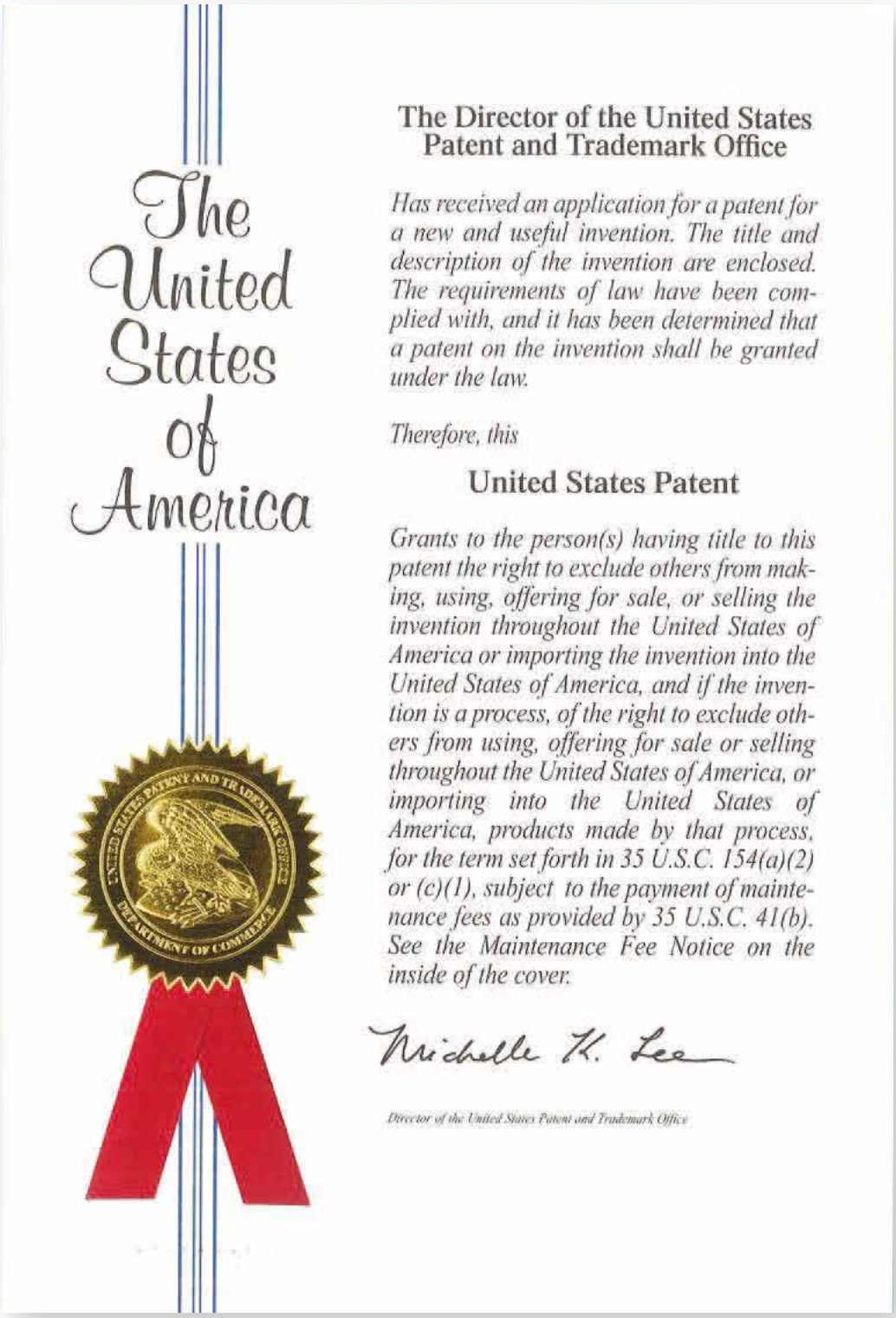
None of these systems improves safety by eliminating or reducing the probability of collisions, reduces manpower and equipment, or addresses the need to increase airport capacity. Some of these systems may even require additional ground personnel to operate the systems. Currently, several of these systems are prone to failure and are less reliable in unfavorable weather conditions.

An additional barrier for implementing the competing systems is the investment cost verses a much longer ROI. The Taxibot system costs approximately €1M ($1.1M USD) per tug and rather than decrease runway incursions, it seems to increases them. With Taxibot, after towing the aircraft to the runway, the tow vehicle must then return to the parking area or staging area. These returning tugs create a new significant logistics problem for ground controllers and could increase the likelihood of collisions with the aircraft. Taxibot utilizes electric batteries and drive motors similar to electric cars. Battery lifetime is very limited and requires recharging quite frequently.

The EGTS (green taxiing system) mounts electric drive motors to the main landing gear (MLG), which adds approximately 450 kg (551 lbs) to the aircraft reducing payload capacity. The electric motors require sufficient electrical energy to drive the system making it necessary to modify the electric power generator on the APU system. Also, the EGTS system generates large amounts of heat from the electric motors creating an increased fire danger and may require modifications to dissipate the heat. Cooling the system does not seem to be a problem during taxi or when the landing gear is deployed. The potential problem occurs when the landing gear is retracted after takeoff. Lastly, there could be problems with traction, especially on wet or snow covered surfaces by electric drive motor mounted only on the nose landing gear (NLG) .

Patents

All Patents are assigned to ATS World Wide LLC.



The United States of America

The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Michelle K. Lee

Director of the United States Patent and Trademark Office

Europäisches Patentamt
European Patent Office
Office européen des brevets

URKUNDE

Es wird hiermit bescheinigt, dass für die in der Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

CERTIFICATE

It is hereby certified that a European patent has been granted in respect of the invention described in the patent specification for the Contracting States designated in the specification.

CERTIFICAT

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet, pour les Etats contractants désignés dans le fascicule de brevet.

Europäisches Patent Nr. | European patent No. | Brevet européen n°

2534050

Patentinhaber | Proprietor of the patent | Titulaire du brevet

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Munich,
Fait à Munich, le

19.03.14

Benoît Battistelli
Präsident des Europäischen Patentamts
President of the European Patent Office
Président de l'Office européen des brevets

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 534 050 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
19.03.2014 Bulletin 2014/12

(21) Application number: **11709226.2**

(22) Date of filing: **26.01.2011**

(51) Int Cl.:
B64F 1/22 *(2006.01)*

(86) International application number:
PCT/PL2011/000009

(87) International publication number:
WO 2011/096833 (11.08.2011 Gazette 2011/32)

(54) **SYSTEM FOR TRANSPORTING AN AIRPLANE FROM A PARKING LOCATION TO A TAKEOFF LOCATION AND FROM A LANDING LOCATION TO A PARKING LOCATION**

SYSTEM ZUM BEFÖRDERN EINES FLUGZEUGES VON EINER PARKPOSITION ZU EINER STARTPOSITION UND VON EINER LANDEPOSITION ZU EINER PARKPOSITION

SYSTÈME POUR DÉPLACER UN AVION D'UN EMPLACEMENT DE STATIONNEMENT À UN EMPLACEMENT DE DÉCOLLAGE ET D'UN EMPLACEMENT D'ATTERRISSAGE À UN EMPLACEMENT DE STATIONNEMENT

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **05.02.2010 PL 39036510**

(43) Date of publication of application:
19.12.2012 Bulletin 2012/51

(73) Proprietor: **Malicki, Slawomir**
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(72) Inventor: **Malicki, Slawomir**
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(74) Representative: **Budzinski, Slawomir et al**
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(56) References cited:
WO-A1-89/08051
WO-A1-03/078250
DE-A1- 19 902 803
JP-A- 4 317 852

Printed by Jouve, 75001 PARIS (FR)

EP 2 534 050 B1

Europäisches Patentamt
European Patent Office
Office européen des brevets

URKUNDE

Es wird hiermit bescheinigt, dass für die in der Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

CERTIFICATE

It is hereby certified that a European patent has been granted in respect of the invention described in the patent specification for the Contracting States designated in the specification.

CERTIFICAT

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet, pour les Etats contractants désignés dans le fascicule de brevet.

Europäisches Patent Nr. / European patent No. / Brevet européen n°

2776320

Patentinhaber / Proprietor of the patent / Titulaire du brevet

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EPA/EPO/OEB 2011 0730

München, den / Munich, / Fait à Munich, le 16.09.15

Benoît Battistelli
Präsident des Europäischen Patentamts
President of the European Patent Office
Président de l'Office européen des brevets

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 776 320 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
16.09.2015 Bulletin 2015/38

(21) Application number: **12806186.8**

(22) Date of filing: **07.11.2012**

(51) Int Cl.:
B64F 1/22 *(2006.01)* ***B61B 5/02*** *(2006.01)*

(86) International application number:
PCT/PL2012/000122

(87) International publication number:
WO 2013/070102 (16.05.2013 Gazette 2013/20)

(54) **A CARRIAGE ASSEMBLY FOR AN AIRPLANE TRANSPORTING SYSTEM ON AN AIRPORT APRON**

WAGENANORDNUNG FÜR EIN FLUGZEUGTRANSPORTSYSTEM AUF EINEM FLUGFELD

ENSEMBLE CHARIOT POUR UN SYSTÈME DE TRANSPORT D'AÉRONEF SUR UNE AIRE DE TRAFIC D'AÉROPORT

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **08.11.2011 PL 39692211**

(43) Date of publication of application:
17.09.2014 Bulletin 2014/38

(73) Proprietor: **Malicki, Slawomir**
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(72) Inventor: **Malicki, Slawomir**
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(74) Representative: **Budzinski, Slawomir**
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(56) References cited:
WO-A2-2011/096833

Printed by Jouve, 75001 PARIS (FR)

EP 2 776 320 B1

РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

НА ИЗОБРЕТЕНИЕ

№ 2556828

СИСТЕМА ТРАНСПОРТИРОВКИ ЛЕТАТЕЛЬНОГО АППАРАТА ОТ МЕСТА СТОЯНКИ ДО МЕСТА ВЗЛЕТА И ОТ МЕСТА ПОСАДКИ ДО МЕСТА СТОЯНКИ

Патентообладатель(ли): *МАЛИЦКИЙ Славомир (PL)*

Автор(ы): *МАЛИЦКИЙ Славомир (PL)*

Заявка № **2012137731**

Приоритет изобретения **05 февраля 2010 г.**

Зарегистрировано в Государственном реестре изобретений Российской Федерации ***18 июня 2015 г.***

Срок действия патента истекает **26 января 2031 г.**

Врио руководителя Федеральной службы по интеллектуальной собственности

Л.Л. Кирий

Your reference: **14864/12/MA**
Our reference: **2412-188871RU/7200**
Application No.: **2012137731**
Attorney Name: **Yury D.Kuznetsov**

GORODISSKY

TRANSLATION

FEDERAL SERVICE ON INTELLECTUAL PROPERTY
(ROSPATENT)

Bld. 30-1, Berezhkovskaya nab., Moscow, G-59, GSP-3, Russia, 125993 Telephone (8-499) 240-60-15. Fax (8-495) 531-63-18

To No. 2412-188871RU/7200 of 12.05.2015
Our No. 2012137731/11(061143)
In correspondence, please refer to the application number and report a receipt date of this communication

"Gorodissky& Partners" Law firm Ltd.,
B. Spasskaya str., 25, building 3,
Moscow, 129090, Russia

DECISION ON GRANT

A PATENT FOR INVENTION

(21) Application No. 2012137731/11(061143) (22) Application filing date 26.01.2011

As a result of the substantive examination of the application for invention, it has been stated that

[x] the claimed invention

[ ] the claimed group of inventions

relates to the objects of patent rights and complies with the patentability conditions stipulated by the Civil Code of the Russian Federation and, in view of this, a decision to grant a patent for the invention has been taken.

A Report on Examination Results is enclosed.

Enclosure: on 3 sheets in 1 copy.

Head *Signature* Kirii L.L.

WP12046IP

证书号第1657029号

发明专利证书

发明名称：一种用于在机坪上转移航空器的系统

发 明 人：斯拉弗米尔·马利基

专 利 号：ZL 2011 8 0006950.X

专利申请日：2011年01月26日

专利权人：斯拉弗米尔·马利基

授权公告日：2015年05月06日

本发明经过本局依照中华人民共和国专利法进行审查，决定授予专利权，颁发本证书并在专利登记簿上予以登记。专利权自授权公告之日起生效。

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局长
申长雨

中华人民共和国国家知识产权局
2015年05月06日

第1页(共1页)

THE STATE INTELLECTUAL PROPERTY OFFICE OF THE PEOPLE'S REPUBLIC OF CHINA

Applicant	MALICKI, Slavomir	Date of Issue:
Patent Appln. No.	201180006950.X	
Name of Patent Appln.	A SYSTEM FOR TRANSPORTING AIRPLANES ON THE AIRPORT APRON	February 3, 2015

NOTIFICATION ON THE GRANT OF PATENT RIGHT FOR INVENTION (for PCT-based Chinese Patent Application)

1. In accordance with the provisions of Article 39 of the Chinese Patent Law and Article 54 of the Rules for Implementation of the Chinese Patent Law, a decision is hereby made to grant patent right to the above-identified patent application on the ground that no cause for rejecting the patent application has been found in the substantive examination.

   After receiving this notification, the applicant should complete relevant registration formalities in accordance with the requirements in the Notification for Patent Registration Formalities.

   After the applicant has fulfilled the registration formalities within the time limit, the State Intellectual Property Office shall make the decision to grant the patent right, issue the patent certificate, register and announce the same accordingly. If the applicant fails to complete the registration formalities within the time limit, it shall be deemed by the State Intellectual Property Office that the applicant has abandoned the right to obtain the patent right.

2. The above-identified patent right for invention which is granted a patent right is based on

   ☐ The Chinese application documents or translation of the application documents of the original PCT application as filed;

   ☒ Application documents as listed below:

   The abstract amendment under the Article 28 or 41of the PCT
   The abstract drawing submitted on July 24, 2012
   Claims 1-4, description paragraphs 1-11, Figs. 1-4 of drawings submitted on December 24, 2014

3. The title of the granted invention patent application is:

   ☐ Not changed;

   ☒ Changed from SYSTEM FOR TRANSPORTING AN AIRPLANE FROM A PARKING LOCATION TO A TAKEOFF LOCATION AND FROM A LANDING LOCATION TO A PARKING LOCATION to the current title;

4. ☐ The applicant submitted the "Declaration of abandoning the Patent Right" on _____ for the patent No._____. Upon examination, the patent

   ☐ Entered into the procedure for abandoning the patent right;

   ☐ Did not enter into the procedure for abandoning the patent right based on the following reason: the patent the applicant declared to abandon does not belong to the same invention-creation as the present patent application;

5. ☒ The Examiner amended ex officio the application documents as following:
   The examiner deleted ex officio the drawing number of the abstract drawing.

6. No further voluntary amendments to this application will be accepted by this office after the issuance of this Notification.

Examiner **Examining Department:**

特　許　証
(CERTIFICATE OF PATENT)

特許第５８７８４８１号
(PATENT NUMBER)

発明の名称
(TITLE OF THE INVENTION)
航空機を駐機位置から離陸位置へ及び着陸位置から駐機位置へ輸送するためのシステム

特許権者
(PATENTEE)
ポーランド，０５－５０６　マグダレンカ，ウリツァ　ボドレスナ　６
国籍　ポーランド共和国
マリツキ，スワヴォミル

発明者
(INVENTOR)
マリツキ，スワヴォミル

出願番号
(APPLICATION NUMBER)
特願２０１２－５５１９４０

出願日
(FILING DATE)
平成２３年　１月２６日(January 26, 2011)

登録日
(REGISTRATION DATE)
平成２８年　２月　５日(February 5, 2016)

この発明は、特許するものと確定し、特許原簿に登録されたことを証する。
(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE JAPAN PATENT OFFICE.)

平成２８年　２月　５日(February 5, 2016)

特許庁長官
(COMMISSIONER, JAPAN PATENT OFFICE)

伊藤　仁

Australian Government
IP Australia

CERTIFICATE OF GRANT

STANDARD PATENT

2011213369

The Commissioner of Patents has granted the above patent on 25 August 2016, and certifies that the following are the particulars of this patent appearing in the Register of Patents:

Name and Address of Patentee(s):

Slawomir Malicki

ul. Podlesna 6 PL-05-506 Magdalenka Poland

Name of Actual Inventor(s):

Malicki, Slawomir

Title of Invention:
System for transporting an airplane from a parking location to a takeoff location and from a landing location to a parking location

Term of Patent:
Twenty years from 26 January 2011

Priority Details

Number	*Date*	*Filed with*
P 390 365	5 February 2010	PL

COMMONWEALTH OF AUSTRALIA
AUSTRALIA
PATENTS OFFICE

Dated this 25th day of August 2016

Commissioner of Patents

PATENTS ACT 1990

The Australian Patents Register is the official record and should be referred to for the full details pertaining to this IP Right.

Production Philosophy

Production of ATS system is envisioned to divide manufacturing into two main locations. One location will assemble pull cars from components constructed by subcontractors specializing in the required technical areas. The assembly facility will inspect supplied parts, oversee quality control of assembling pull cars, conduct testing and ship finished vehicles. Initial phase employment is expected at approximately 100 employees with the capability to run two -shift operations. Production capabilities should reach 10 pull cars per day.
Construction of the ATS channel modules are planned to be near the airport implementing ATS to reduce cost. Building the channel modules require large amounts of specialized concrete and steel. Average size airports have approximately 40 km (25 mi) of taxiways which require around 48,000 tons of concrete to install ATS. The ATS channel production facility is envisioned to be portable and reused. Production of ATS modules will require a crew of approximately 80 people working two shifts. Monthly costs of ATS module facility will be dependent on many factors such as geographical location, proximity of airport, proximity of material suppliers, and energy costs. Generally, channel production costs should not exceed pull cars production facility costs.

PROTOTYPE (100 m of channels and 2 pull cars)		
CAPEX	[mio $]	6,7
Length of channel	[yd]	109
No of pull cars	[pic]	2
Time of building and testing	[mths]	24

PRODUCTION		
Factory 1: pull cars production		
CAPEX	[mio $]	3,92
OPEX (Europe location)		
human factor	[mio $/year]	0,28
pull car variable costs	[$/pull car]	66 712
Factory 1: ATS channel production		
CAPEX	[mio $]	8,97
OPEX (Europe location)		
human factor	[mio $/year]	0,28
ATS channel variable costs	[$/ATS channel]	2 440

ATS SYSTEM PRODUCTION FOR FRANKFURT AIRPORT

Distance: gates - runways	**[mile]**	**31**
No. of Pull Cars	**[pic]**	**100**
CAPEX	**[mio $]**	**12,89**
Production costs		
pull car variable costs	[mio $]	6,67
ATS channel variable costs	[mio $]	133,42
Operating costs (24 months of operation)*		
payroll and other	[mio $]	13,45
TOTAL COSTS	**[mio $]**	**153,55**
Revenues		
Sale of ATS channel	[mio $]	156,97
Sales of pull cars	[mio $]	7,85
TOTAL REVENUES	**[mio $]**	**164,82**
OPERATING RESULT	**[mio $]**	**11,27**
ROI	**%**	**87,4%**
RETURN PERIOD	**years**	**1,14**

** time needed to build ATS system for Frankfurt airport*

Sources of information

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15-21juin 2015
www. siae. fr

We also thank all anonymous reviewers for their constructive suggestions