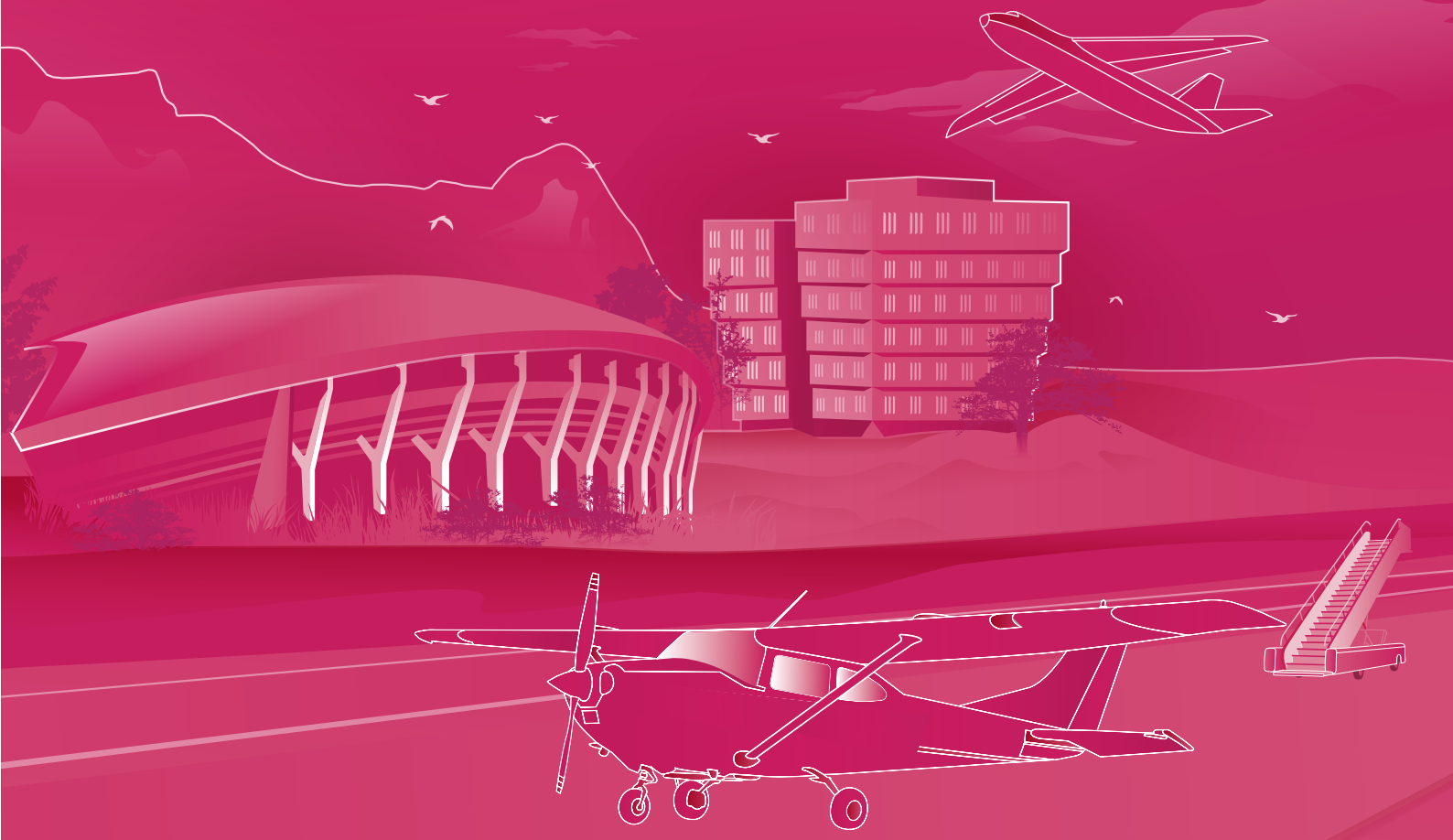
Ministry of Transport and Public Works

Malawi National Transport Master Plan

Civil Aviation Sub-Sectoral Plan



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Acronyms

ACM	Air Cargo Malawi
ADL	Airports Development Limited
ADS-B	Automatic Dependent Surveillance Broadcast
AFCAC	African Civil Aviation Commission
AFRAA	African Airlines Association
AGL	Airfield Ground Lighting
AIS	Aeronautical Information Services
AMO	Approved Maintenance Organisation
AOC	Air Operator Certificate
ATC	Air Traffic Control
ATO	Approved Training Organisation
AU	African Union
AWS	Automatic Weather Stations
BASA	Bilateral Air Services Agreements
CAA	Civil Aviation Authority
COMESA	Common Market for Eastern and Southern Africa
DCA	Department of Civil Aviation
DCCMS	Department of Climate Change and Meteorological Services
EAC	East African Community
EASA	European Aviation Safety Agency
EU	European Union
GNSS	Global Navigation Satellite Surveillance
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
KIA	Kamuzu International Airport
KQ	Kenya Airways
LIHACO	Lilongwe Handling Company
MA	Malawi Airlines
MWK	Malawian Kwacha
MoTPW	Ministry of Transport and Public Works
NDB	Non Directional Beacons
NMHS	National Meteorological and Hydrological Services
PBN	Performance Based Navigation
PPPC	Public Private Partnership Commission
RFFS	Rescue and Fire Fighting Services
RPAS	Remotely Piloted Aircraft Systems
SADC	Southern African Development Community
SADIS	Satellite Distribution and Information System
SAA	South African Airways
SAR	Search and Rescue
SARPS	Standards and Recommended Practices
SEZ	Special Economic Zone
UAS	Unmanned Aircraft System
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Range
WMO	World Meteorological Organisation

Apron at Chileka International Airport

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Malawi National Transport Master Plan

1 Introduction, aims and objectives

Civil Aviation Sub-Sectoral Plan

1 Introduction, aims and objectives

1.1 Aims and objectives of the plan

The aims and objectives of this report are to develop a 20-year plan for the development of the Civil Aviation Sub-Sector in Malawi. This sub-sector plan is part of, and consistent with, the overall National Transport Master Plan for Malawi. It reflects a common approach in identifying key areas to be addressed and recommendations on how these could be developed to capitalise on opportunities.

The report covers the roles of the Ministry of Transport and Public Works (MoTPW), the Department of Civil Aviation (DCA), and deals with airports, air services and airlines, airspace management/air navigation services, meteorological services, aviation security, passengers and aircraft ground handling, air cargo, other services, responsibility for construction and maintenance of airports infrastructure, and inspection of aerodromes.

The following strategic objectives have been set for the Civil Aviation Sub-Sector in Malawi. These are in line with the overall NTMP objectives.

1. To reduce passenger fares and freight costs;
2. To have in place internationally acceptable practices in tandem. in compliance to ICAO standards and recommended practices;
3. To attract major intercontinental airlines to Malawi;
4. To improve the image and reliability of the domestic airline in the region;
5. To support and facilitate international and regional trade and tourism; and
6. To develop specific economic activities that benefit from air transport.

1.2 Sector context

Traditionally, Africa has been an important destination for western countries in maintaining links with commercial, strategic and leisure opportunities. Many of the landing rights at key global airports are jealously guarded by airlines to ensure access is available when new opportunities emerge, but it is also restrictive to new operators who then cannot gain footholds into key international markets. As a market, currently Africa is not seen as significant and the market share for global airlines operations is small compared to that in North America, Europe and the Middle East.

In the western world, deregulation of air services since the 1970s has produced major upheavals in airline operation, with many established brands disappearing through non-competitiveness, lack of state support and proliferation of smaller, lower cost operators. The embracing of full 'Freedom' rights has also allowed airlines to pursue cross border markets and compete with national carriers coupled with evolution in passport and border control methods supporting free movement of people.

Middle and Far Eastern nations are now established in many African markets and are contributing to airport/ infrastructure financing so have replaced several western countries as the prime movers in supporting civil aviation development.

The administration of airspace has also changed in many regions, with open-sky concepts being implemented, facilitated by a new generation of navigational aids based on satellite and global positioning. Worldwide communication networks and regional control centres have been created. They are expanding encompassing combined nations and regions.

Airports are still difficult to gain landing rights in, due to Bilateral Air Services Agreements (BASAs) and system designation, with many seeking to maximise the high revenue services and large capacity aircraft, so new entrants can only gain a foothold by teaming up with established occupants in a code share arrangement or operating sectors of a multisector route on their behalf. South African Airways, for example, has long established rights through its originating airlines and has become a dominant player in the busiest airports around the world, so it is often seen by smaller, newer African carriers as a logical partner to enable access to geographies such as Europe or North America.

Some older incarnations of current African airlines also benefit from rights connected to slots previously operated. Air Malawi, now Malawi Airlines, has this through the service originally flown to London. It is unlikely in the immediate future to be able to use these but they remain as a bargaining tool for possible trade to other operators, through pursuit of BASAs.

The continent has several differences in the way regions operate, with the north and Middle East area being closely tied to Europe and east Mediterranean markets, the remainder of the continent is divided into individual markets other than central Sub-Saharan Africa being predominantly an internal market.

Africa has suffered longer for the protectionist aspect to its markets with nations only venturing into bilateral agreements to operate air services with immediate or near neighbours, based around a fear of losing their home market to another country. This has made adopting 3rd, 4th and 5th Freedoms difficult so economic opportunities have been stifled.

In 1988 and 1999 the African nations came together in the Ivory Coast city of Yamoussoukro to abolish BASAs and create a 'single' market opportunity where all air services could be freed to operate across nations and route agreements made more open to emerging carriers. Whilst most nations signed up to what became the Yamoussoukro Decision, Kenya, Egypt and South Africa have only just (2015) agreed to its implementation through a 'solemn commitment' statement, it is believed mainly due to their reliance on state-funded flag-carrying airlines which, without state finance, would struggle to survive in their current form.

However, several south eastern African nations have not fully adopted the agreement, including Malawi. Lack of capacity and finance to upgrade facilities to meet the demands of newly liberated air operators and border channel infrastructure in airports is maybe acting as a deterrent. At a continent level, the Joint Competition Authority would ensure that fair competition would be practiced. However there are fears that the more well financed airlines would stand a better position in the single African market and most likely use this to stifle competition.

The agreement calls for a 'Single African Air Transport Market' and implementation has been patchy due to discussions on visas, nationals working in other countries and numerous administrative matters. Jointly along with the market, there has been a call to adopt a single sky for air traffic like that in Europe, where nations can share navigational systems and jointly fund improvements in en-route services and equipment across the continent. Similarly, some nations have supported the principle, but stopped short of implementation due to fears regarding loss of control of national airspace, security and loss of revenue, along with possible loss in employment of nationals. The World Bank funded project "COMESA Seamless Upper Airspace Integration" which is currently underway is addressing this.

Yamoussoukro set up the African Civil Aviation Commission (AFCAC) to oversee implementation, with the African Union (AU) acting as the political driver to facilitate any 'border' and nation to nation issues that may obstruct adoption. One of the recent developments occurring from this is the 2016 agreement to initiate a common intra Africa passport arrangement for signatories to relax border controls and free up movement like the European Schengen arrangement.

Security remains an important consideration for unity and how the Agreement is viewed outside Africa is focussed on such matters with some nations seen as harbouring the sources of terrorism or acting as potential 'hot spots'. With free movement of people this is considered a weakness in an already weak situation, so the challenge to convert this view is adding to the concerns of African nations yet to sign the 'solemn commitment' to implementation.

The next steps are for the agreement of a single market to be put in place in 2017 and the 'road map' for implementation to be agreed prior to that. Nations yet to join the agreement will be under further pressure at that time, having not only been part of the decision-making process, but also probably having to adopt measures they cannot implement without external assistance.

Initiatives are continuing to be developed to bring the continent into more of a regional global role in air transport, and work is in progress to establish cooperation agreements in East African Community (EAC), Common Market for Eastern and Southern Africa (COMESA) and Southern African Development Community (SADC). Discussions and schemes have been implemented such as the merging of airspace control in the western Indian Ocean working with India. Meanwhile foreign investment in infrastructure is increasing, partly for personal gain, but also as part of facilitating wider development schemes, such as airport terminal construction or modifications in Angola, Mozambique and Malawi.

The control tower at Kamuzu International Airport

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Malawi National Transport Master Plan

2 Existing facilities

Civil Aviation Sub-Sectoral Plan

2 Existing facilities

2.1 Airports in Malawi

The current range of airports and their facilities are set out in Appendix A. The main international airports serve the capital, Lilongwe (Kamuzu International), and business centre at Blantyre (Chileka International). The airports at Karonga, Likoma, Mzuzu, Salima and Club Makokola are secondary airports with international access, but varying quality of facilities.

The remaining 26 airfields are restricted to basic airstrips of grass or low grade material and little or no buildings associated with them. The locations of all airports are presented in Figure 2.1.

Most airports are operated by Malawi's Ministry responsible for transport through the Department of Civil Aviation (DCA).

Airports Development Limited (ADL), a wholly owned Government company, owns and manages non-aeronautical services at Kamuzu International Airport in Lilongwe.

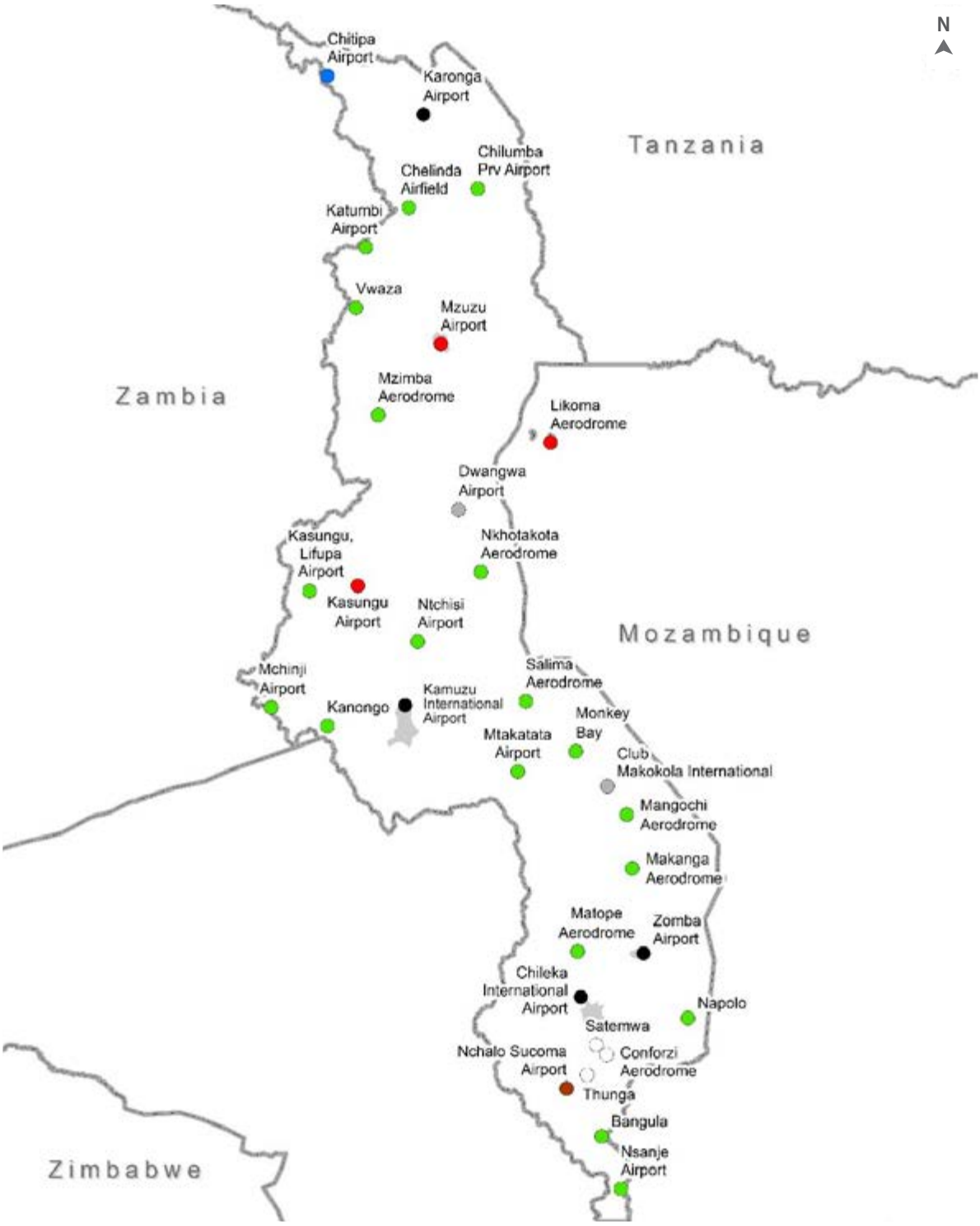
The national parks and industry owners account for other secondary airports, being linked to local tourist or produce centres.

2.2 Lilongwe/Kamuzu International Airport (KIA)

KIA is currently handling aircraft in the 150-seat category such as the Boeing 737 and Airbus A 300 family, however the runway length and width (3,540m x 45m) and capacity is capable of handling code D & E aircraft such as the Boeing 767 and 747. The current airport schedule is limited to a period of 3 to 4 hours in the middle of the day largely due to previous restrictions when works were underway. Following the completion of the works, airlines were not requested to revert to "old" times due to the airlines finding the scheduling more appropriate to feed long haul operators from Johannesburg, Nairobi and Addis-Ababa.

Aircraft parking is available for 14 aircraft, but the orientation of the apron at 90 degrees to the runway (Figure 2.2) means the aircraft size is restricted closer to the runway, where obstacle limitations apply. Handling is by vehicle with the apron sited approximately 80m from the terminal. There is space for additional runways and expanded airport infrastructure.

Figure 2.1 Airports in Malawi



Legend

Runway Type

- Asphalt
- Compacted Soil
- Grass
- Grass/Gravel
- Gravel
- Slurry Seal
- Unknown

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National Transport Master Plan

Figure 2.2 Apron and runway orientation, KIA

Source: Background image from Google Earth

The runway is in good condition along its surface and relatively flat. However, termite mounds and tall grass beyond the clear and graded areas of the runway strip make this a harbour for migrating birds up to crane size and wildlife freely roams over the site. As flying is often in the middle portion of the day incidents involving wildlife are small.

The Instrument Landing System (ILS) is available and functioning, and locational beacons are operational. All airlines rely on conventional navigational systems as the primary means of air navigation in line with most of Africa. Radar is not available.

Airport Rescue and Fire Fighting Service (RFFS) is set at International Civil Aviation Organisation (ICAO) Category 9 to cover up to ICAO Aeroplane Design Code (e.g the Boeing 777). However, the maintenance serviceability of the appliances is low and complete outages are not unknown. This coupled with irregularity of utility supply payments such as water, means airport operation capability can be seriously reduced. This affects all operations, not just firefighting.

Passenger facilities are based on a terminal capable of handling 300,000 passengers per year. Although it is a relatively modern structure it suffers from capacity issues at certain processing stages such as immigration and the arrivals hall where passengers are funnelled into a narrow queuing space and then a small baggage pick up, customs check and retail zone. At present work is being funded by the Japanese Government to improve these areas although this is concentrating on enlargement rather than reorganisation.

The departing passenger facilities are underutilised with the limited flight schedule, but could handle larger aircraft loads in the lounge with gates being sizeable. Baggage make up and drop off is combined and relies on a single carousel inbound which can be supplemented by manual handling, though a large number of passenger bags would be problematic to handle.

Cargo handling is at about 3,000 tonnes annually using 5,000m^2 of warehousing. The goods are mainly bulk items and local produce, as more significant commodities such as tobacco go by road internationally.

Car parking is extensive and VIP facilities are available on the site. Retail is limited to snacks and currency exchange as well as car and taxi hire. Advertising is under used and opportunities in the form of sites and hoardings are widespread at the terminal and along the approach road.

The DCA School of Aviation has a facility on the approach road which has good security management.

2.3 Chileka International Airport, Blantyre

Chileka was the original airport serving the previous capital Zomba; it dates from just after the second world war and facilities reflect little major update since the 1950s. The 2,325m x 30m runway is in poor condition and operates 120 to 150 seat aircraft similarly to KIA, it was last rehabilitated in 1966. A cross wind runway exists and is used as a taxiway or for aircraft remote parking. The runway is undulated along its length and sight lines from the ATC tower and the fire station watch room are limited to poor at the eastern end making air traffic management and crash response problematic.

On 17th March 2014, the main runway at Chileka (Figure 2.3) was closed for safety reasons, owing to the large number of potholes on the runway. Following emergency repairs, the runway was fully re-opened on 26th March 2014. However, the condition of the runway remains poor, and is a continuing cause for concern for airlines. The terrain profile, land availability for future expansion, taxiway and runway configurations have implications for runway occupancy and utilisation.

Figure 2.3 Runway at Chileka International Airport

The apron is capable of handling up to 4 Boeing 737-size aircraft simultaneously and expansion space does exist. It is also parallel with the runway making extension relatively simple. An unpaved area to the eastern end of the apron is used by light aircraft, but could be incorporated into the main apron.

Chileka is situated in a mountainous region and terrain obstacles present significant challenges to larger aircraft operation and so specific flight procedures and navigational aids would be paramount. The current ILS is unserviceable and no radar service is available, but Very high frequency Omnidirectional Range (VOR) and Non Directional Beacon (NDB) radio location beacons are working and used in combination with Global Navigation Satellite Surveillance (GNSS).

The terminal is small and congested internally, with all processing facilities only capable of handling up to 50 people in each area at a time. Some updating has been done, but most areas need rebuilding. The departure lounge on the first floor is being enlarged using finance from the Government of Malawi and is designed to cater for around 200 passengers. This is part of a phased scheme to rehabilitate the building and address some technical issues.

The biggest risk for the terminal is evacuating passengers and staff from a fire as the congested interior would make this difficult. On a routine basis, the processing of inbound passengers is hampered by the immigration area which can hold about 15 passengers at a time and then the arrivals baggage pick up which is limited to about 50 people as a maximum. These cause the remainder of the passengers from a 150-seat flight to remain queued on the apron in the open until space is available. This is also a security issue.

Figure 2.4 Firehouse, Chileka International Airport

Cargo handling is limited to a small warehouse of approximately 1,000m^2 dealing in small package items that can be loaded onto Airbus A320 or Boeing 737 sized holds.

Wayfinding to the airport is poor and advertising sites are numerous, but totally unused. The terminal entrance car park is small, and is further restricted by a community sports area and VIP facility access. The remainder of the landside area is taken up with single storey administrative buildings dating back to the airport's origins.

The RFFS facilities consist of a large vehicle building, but appliance serviceability is variable and under supported in terms of maintenance facilities. The fire watch room is on ground level and has a very limited view of most of the runway (Figure 2.4).

Air traffic occupies a visual control room on the roof line of the terminal, but it is low compared to the need on site for visibility and is only basically equipped.

2.4 Secondary airports

Although airports such as Karonga, Likoma and Mzuzu have basic bitumen surfaced runways, these are considerably more developed than the remainder of Malawi's airports at the tertiary level which have little more than an indicated grass strip. To that end the variety of aircraft able to operate at the secondary airports range from 50 seat turboprops to single engine light transports (such as the Cessna Caravan).

Navigation aids (VOR and NDB) at both Karonga and Mzuzu are out of service. Instrument flight procedures based on Global Navigation Satellite System (GNSS) have been developed for the two airports but are yet to be put into operational use.

Karonga and Mzuzu are linked to industrial and agricultural concerns where feeder aircraft can fly in to pick up goods or small passenger loads for destinations in country or the neighbouring states. Mzuzu is the main commercial city in the northern region of Malawi. Its airport is the subject of encroachment and has little room for expansion. Karonga could become important with respect to introduction of mining and linkage with northern corridor development programme.

Figure 2.5 Mzuzu Airport control tower

Most secondary airports have a single building dated in construction and air traffic is managed on a radio communication basis and Visual Flight Rules (VFR). Runway dimensions are included in Appendix C.

Likoma features a single storey terminal building and runway (1,680m x 18m) and like Club Makokola (1,090m x 19m) and Salima (1,384m x 45m) are as much tourist destination pick up and drop off points to access national parks, and Lake Malawi resort locations. As passengers are normally brought to the airports as contained groups for specific flights such as through Ulendo Air Link, they spend little to no time in the airport and so facilities are no more than waiting rooms or assembly areas.

The main issue for Malawi at these types of airport is management of security and retaining control over who is entering, or leaving the country. Only Karonga, Mzuzu and Salima feature immigration facilities to allow direct international air movement, but could benefit from improved passenger facilities.

Aircraft operations are confined currently to small twin engine types and light single-engine, the Cessna Caravan (Figure 2.6) being the most numerous and typical of this operation across the continent. These aircraft have capacity for 8 to 10 passengers and under fuselage baggage pod to convey a safari group to a national park usually from neighbouring countries such as Zambia or from KIA as part of a package tour.

Figure 2.6 Cesna Caravan – a similar model is operated by Ulendo Airlink

2.5 **Airlines**

Malawi Airlines, the current national carrier, was created in July 2013 from Air Malawi which had been set up in 1964. Air Malawi itself had broken out of Central African Airways and initially used Douglas DC-3 aircraft transitioning to the BAC 1-11 jet in the 1970s. It started using a leased Vickers VC-10 from British Caledonian to run services as far as London, but the majority of flights operated internally or to neighbouring countries. The airline suffered from continual losses and was liquidated in 2012 following interest from Ethiopian Airways. The new airline was created in partnership with Ethiopian Airways with Government holding 51% of shares and Ethiopian Airways (49%).

Malawi Airlines is still unprofitable on passenger services and the Public Private Partnership Commission (PPPC) stated in 2016 that they would be willing to offload the Government's 51% of shares once a profit is achieved. This is currently valued at around US$6 million.

It is possible that historical rights at other international destinations for operating slots held by the Government may generate further revenue of approximately US$3million, but the status and validity of these would need to be established.

Malawi now operates a Boeing 737-700 (118 seats) and a Bombardier Dash 8 Q400 (67 seats), both on dry leases, which provide flexibility and economy on short and medium haul routes to the following destinations:

- Lilongwe (Line Maintenance Base and Administrative Base);
- Blantyre;
- Johannesburg;
- Dar-es Salaam;
- Nairobi;
- Lusaka;
- Harare; and
- Zanzibar (added in April 2017).

There are plans to introduce a further route to Lumumbashi in DRC.

Services are one or two flights daily to most destinations and alternate days for less patronised routes. There are also services from Ethiopian, South African and Kenyan airlines using Boeing 737, Airbus A320 or Embraer 190 aircraft and scheduled to link with connecting international long haul services. Proflight (Zambia) operates daily flights to/from Lusaka. Management at KIA and Chileka believe that this is a key driver for the schedule timing and that attempts to fill the operating day at these airports is difficult with the middle of the day proving convenient for operators.

Table 2.1 Low cost airline fares – typical regional routes

FASTJET Tanzania	Distance (km)	Fare (US$)	Fare (US$)/km
Dar es Salaam-Johannesburg	4880	100	0.02
Dar es Salaam-Nairobi	1346	70	0.05
Dar es Salaam-Kilimanjaro	896	60	0.07
Dar es Salaam-Mbeya	1362	70	0.05
Dar es Salaam-Lusaka	3000	50	0.02
Average	**2296.8**	**70**	**0.03**
MANGO AIRLINES Route	**Distance (km)**	**Fare (US$)**	**Fare (US$)/km**
Route			
Johannesburg-Durban	1000	45	0.05
Johannesburg-Cape Town	2560	65	0.03
Johannesburg-Port Elizabeth	1800	55	0.03
Johannesburg-Zanzibar	5000	256	0.05
Cape Town-Durban	2480	55	0.02
Average	**2568**	**95.2**	**0.04**

The partnership with Ethiopian Airlines provides some advantages for Malawi in that with the aircraft registered to Ethiopia the certification and maintenance support is more established and reliable with line maintenance being carried out at KIA in Lilongwe, although this creates some oversight difficulties. Ethiopian Airlines is currently one of Africa's progressive carriers and its growth and profitability makes it the major player on the continent, whilst both Kenyan and South African suffer from poor financial performance, are susceptible to debt from the fluctuating air transport industry and, to some extent, rely on Government intervention[1].

Low cost operators have attempted to break into the Malawi market. African start-up Fast Jet was the first to propose operations, but these did not survive due to poor strategy within the airline on fuel purchase leaving it open to currency fluctuations with the Malawi Kwacha as opposed to using the US Dollar as the standard for the sector. No other carriers have attempted this, but Comair of South Africa and a rejuvenated Fast Jet have investigated potential for re-entry to Malawi.

Emirates operate a cargo service from KIA. Emirates and Turkish airlines have also shown interest in developing cargo and business travel links with Chileka airport and this should be monitored a potential driver for attracting airport development investment.

1 The Government of Kenya agreed in June 2017 to take an additional approximately US$0.25 billion stake in Kenya Airways in an intricate restructuring of the national carrier's balance sheet that will see the Government significantly raise its shareholding of the loss-making airline. The capital restructuring will see the US$243 million debt that KQ owes the Treasury converted into shares, thereby raising its ownership without injecting fresh cash.

Figure 2.7 Passenger destinations available directly by air from Malawi

Tourism and feeder services are operated by small, independent companies such as Ulendo Air Link based at Lilongwe KIA. Ulendo use six single-engine aircraft mainly for supporting safari holiday groups and charters. They have access to a range of the smaller airstrips in Malawi and fly to Mfuwe in Zambia as part of safari package service. The main destinations internally are:

- Lilongwe (base);
- Likoma;
- Club Makokola; and
- Mzuzu

The Cessna Caravan is one of the main types in use and is ideally suited in range and capacity for small groups and charter work as tourist opportunities become available to serve.

2.6 **Air navigation and airspace management**

Malawi is landlocked in south-eastern Africa and so has a number of overflight routes from neighbouring countries. The reliance on satellite-based navigation currently has reduced the priority in some quarters for land-based navigational aids (navaids) which means that typically, ILS are not funded with only way point radio beacons receiving priority in those respects.

Africa as a whole is patchy in terms of surveillance coverage and although aspirations exist to provide networked area coverage similar to that evolving in Europe under Single Sky initiatives, the continent has some way to go in nations agreeing to this, creating joint funding schemes and adopting a continent-wide programme of technical enhancement. Feasibility studies are being conducted for cooperative management of upper airspace in EAC, SADC and COMESA.

Although an en-route radar service or radar was used in KIA a few years ago, Malawi currently does not have it at the main airports. Malawi has procedural means for surveillance for upper airspace and international overflight traffic.

Radio beacons such as VOR and NDB are used for location fixing; in conjunction with GNSS procedures. The latter requires little specialist maintenance other than trained radio-system engineer monitoring.

This allows people with that skillset to be used rather than aviation specialists as these could be attracted to bigger operations in other countries with better pay.

Air Traffic Control (ATC) is often tower-based local or airfield control in terms of service and controllers are employees of the DCA, trained abroad at a school (e.g. in Nairobi, which is the nearest). Some engineers and controllers are sent further afield to countries such as the UK where there are more established and comprehensive training opportunities.

En-route and navigation charges are established in Malawi. Revenue collection by International Air Transport Association (IATA) is based on an Agreement mutually agreed between Department of Civil Aviation (DCA) of the Government of Malawi and IATA. The main problem is data collection and collation. However, DCA is in the process of implementing an automated billing system through a project called MAABS. The project is expected to address the significant revenue loss that has risen from manual processes (which has no adequate capacity to audit the system used) delays in billing and incorrect computation of billings. The manual processes have proven to be heavily inefficient and while actual revenue loss cannot be estimated it is expected with a proper and automated system the Department of Civil Aviation (DCA) has the potential to double its revenue within the current airports and increase more than double by including other airports and airstrips which has been difficult to bill due to lack of manpower and a proper system. Thus the project will eliminate paper work to a great extent by putting data in electronic format, timely generate bills and accurately, facilitate audit at Head Office.

The project, in addition to the aforementioned, aims to have an automated information system whereby information can be stored and exchanged electronically efficiently and timely.

Erratic power supply by the national electricity supply corporation is a matter of serious concern especially for Chileka and there is a lack of alternative means of power supply[2]. For most of the year the airport largely depends on diesel which is very expensive.

[2] *KIA has limited solar power back-up.*

2.7 **Meteorological services**

The Department of Climate Change and Meteorological Services (DCCMS), within the Ministry of Environment and Climate Change Management, is responsible for the provision of meteorological information to the Civil Aviation sector. Its overall functions are:

- Provision of weather and climate observation and communication services;
- Provision of weather and climate forecasting services and climate projections for the development of climate change adaptation and mitigation programmes;
- Provision of technical coordination and implementation of climate change issues;
- Provision of weather and climate data and information for various socio-economic sectors;
- Provision of climate change and meteorological education and outreach services; and
- Provision of climate change and meteorological research services.

In line with the World Meteorological Organisation (WMO) Convention adopted on 11 October 1947, and reviewed in 2007, National Meteorological and Hydrological Services (NMHS) are the single authoritative voice and source on weather and hydrological warnings. The views of NMHSs are considered to be scientifically sound and impartial when advising their Governments.

The present Department started as a small unit in the Department of Civil Aviation then became a fully-fledged Department in 1983. It has about 300 staff across the country. Resolution 40 of WMO mandates members to "provide on a free and unrestricted basis essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of the nation." As a result NMHS provides support to the safety and efficiency of national shipping and maritime affairs and civil aviation.

The DCMMS provides weather forecasts and updates for:

- Short-term (up to 3 days);
- Medium-term (5 to 10 days); and
- Seasonal (up to 6 months).

The meteorological infrastructure comprises:

- Data observational systems and network;
- Data telecommunication systems and network;
- Data procession, analysis and forecasting systems; and
- Product and information dissemination systems.

The current observational network comprises:

- Synoptic Stations – 22 manned 24-hr Surface Synoptic Stations, and 15 agro-meteorological stations;
- 33 Automatic Weather Stations (AWSs);
- Satellite Distribution and Information System (SADIS) at KIA;
- EUMETSAT Satellite Data Receiving Station;
- Upper Air Observation Station - not functional; and
- Weather radar - not functional.

The DCCMS provides tailor-made forecasts as a decision support tool for planning and preparedness in weather and climate sensitive sectors for Civil Aviation forecasts, pilot briefing, air traffic controllers, terminal forecasts, en-route and landing forecasts.

Malawi Airlines,
the national carrier of Malawi

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Malawi National Transport Master Plan

3 Current and forecast demand

Civil Aviation Sub-Sectoral Plan

3 Current and forecast demand

3.1 Introduction

The Department of Civil Aviation submits data against a series of established targets[3] for Kamuzu and Chileka International Airports. These show a varying decline against targets and previous years over the 2012 to 2015 recording period.

Passenger processing in 2013 achieved 95.3% of its target, but had fallen to 68% in 2015. This was attributed by DCA to the renovations at Chileka, which reduced processing capacity in the sector. It is believed that this will climb steadily once works are complete, but irregular funding is causing a slowing of work progress.

3.2 Flights

International air services are provided by Malawian, Kenyan, Ethiopian and South African national airlines to both Kamuzu International Airport (KIA) and Chileka International Airport. A private Zambian carrier (Proflight) operates between Lusaka and Lilongwe. The national carrier Malawi Airlines was formed following the liquidation of Air Malawi and it has Ethiopian Airlines as its strategic partner. The new airline started operations in January 2014 and is expected to expand on the network that was serviced by Air Malawi and improve Malawi's connectivity regionally and internationally.

Domestic services are provided by small private companies, largely in support of international tourism. The company dry leases 2 equipment: a Boeing 737-800 and Bombardier Dash 8.

Total flights from KIA and Chileka have dropped around 12% against target levels with 13,800 in 2013 and 12,600 in 2015. A fall in airline schedule frequencies is cited as the cause with many carriers re-aligning services to feed hub destinations in South Africa, Kenya and Ethiopia. This situation may change over the shorter term as such things as the progressive improvements in Malawi to air traffic procedures, airports and air navigation services already underway could encourage airlines to review opportunities at the seasonal scheduling markets. Table 3.1 lists typical monthly flight schedules at the two international airports.

3 Reviewed annually by Joint Transport Sector Reviews.

Table 3.1 Passenger at KIA

Airline	Kamuzu, January 2015		Chileka, Feb 2014	
	International	Domestic	International	Domestic
Malawi Airlines	131	83	47	72
South African Airlines	46	0	16	0
Ethiopian Airlines	36	32	27	27
Kenya Airways	113	9	24	0
Proflight	28			0
Other		40	2	4
Freight	0		10	
Private		11	10	14
Flying Clubs	64			
State	0	0		
Military	0	8		
Local	0	74		16
Total	**418**	**257**	**136**	**133**

Source: DCA

3.3 **Passengers**

Passenger numbers at KIA and Chileka are down from 99.3% (405,000) of target in 2013 to 79.3% (355,300) in 2015. DCA believe that tourism has not recovered regionally and globally due to terrorism incidents and the economic climate.

Historical and forecast passenger numbers at Chileka and KIA are shown in Figure 3.1 and Figure 3.2 respectively. Modest growth is forecast over the next ten years by CAA compared to the 2014 peak. For the NTMP, a growth rate of 4.5% per year has been used, as predicted by Boeing for Africa as a whole. For KIA this means that passenger numbers could increase from less than 300,000 per year currently to over 700,000 in 20 years' time. For Chileka, the growth over the same period could be from 200,000 to 500,000.

Figure 3.1 Passenger at KIA Airport

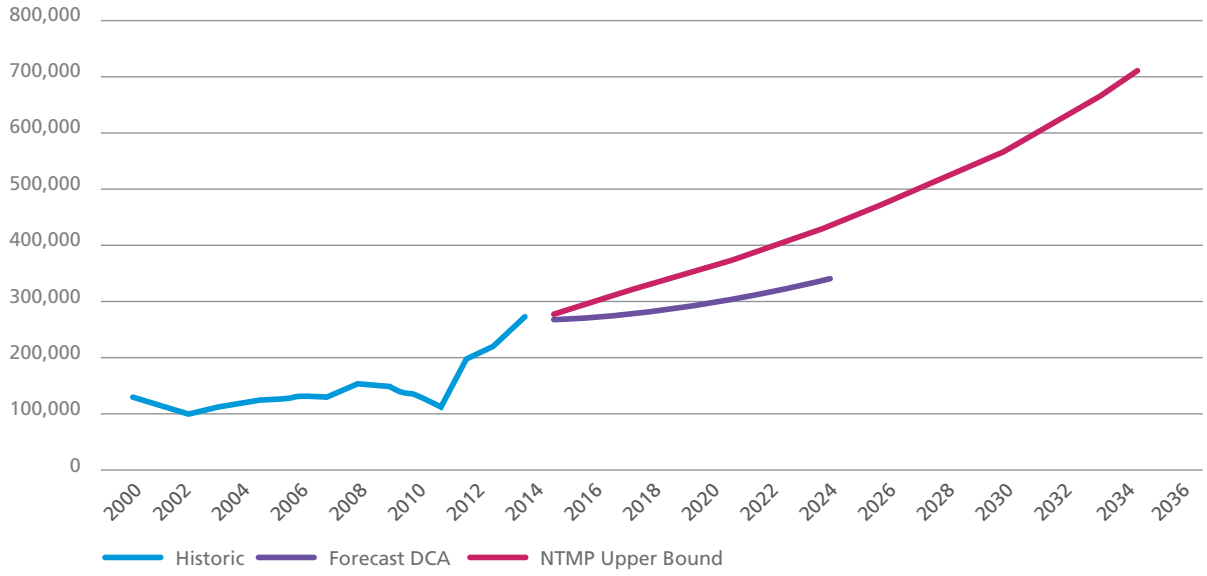
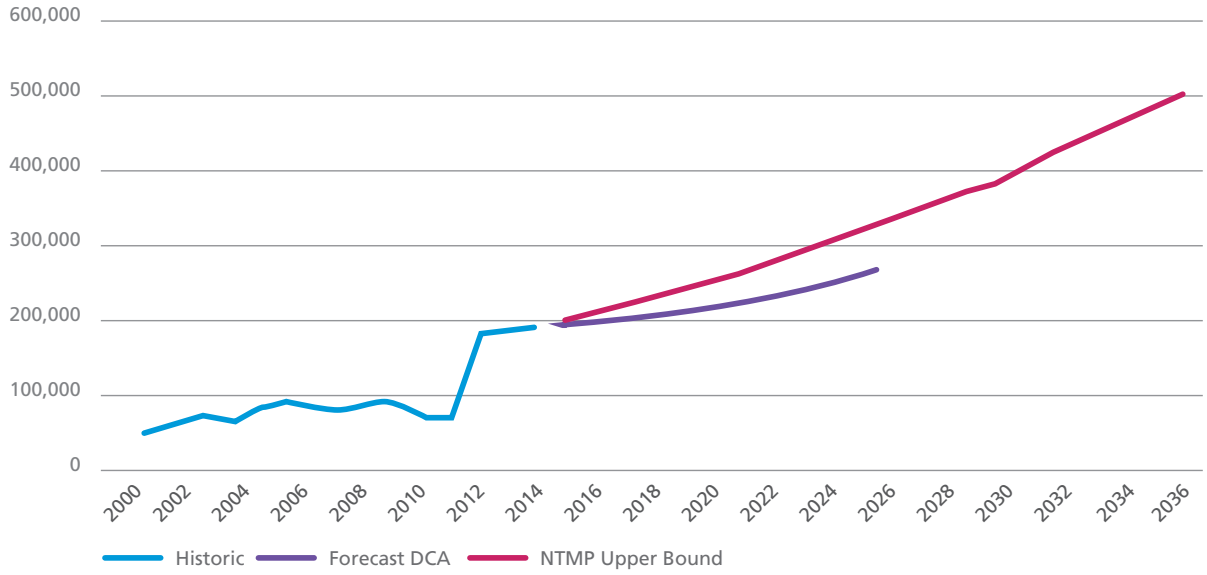


Figure 3.2 Passengers at Chileka International Airport



3.4 **Cargo**

The Civil Aviation sector has an even lower share of freight movement, which totalled 3,750 tonnes in 2015. Up to four carriers were operating in this market between 2014 and 2015, but following further increases, the tonnage has dropped in 2015 which DCA linked to the fall in overall air traffic and economic conditions and believes they are unlikely to recover significantly in the immediate future.

Considering the historic cargo growth at the main airports and future growth of national economy, a high level cargo growth projection has been developed as shown in Figure 3.3 and Figure 3.4. By 2025, the cargo movement through both Chileka and Kamuzu airports are expected to be more than one and half times the amount handled in 2014.

Figure 3.3 Cargo at KIA (tonnes)

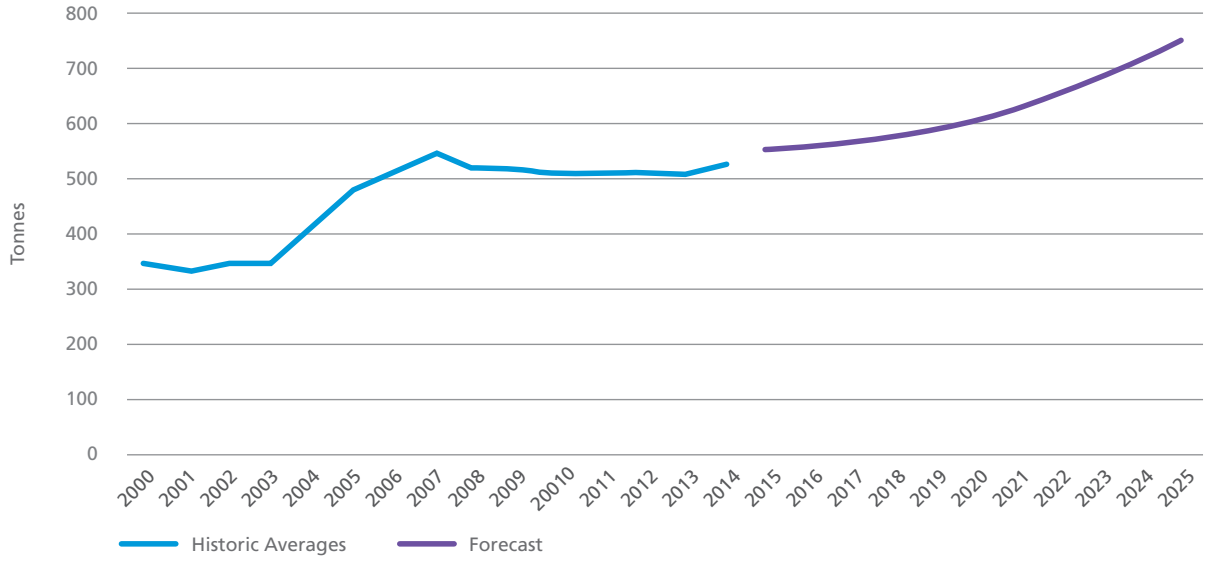
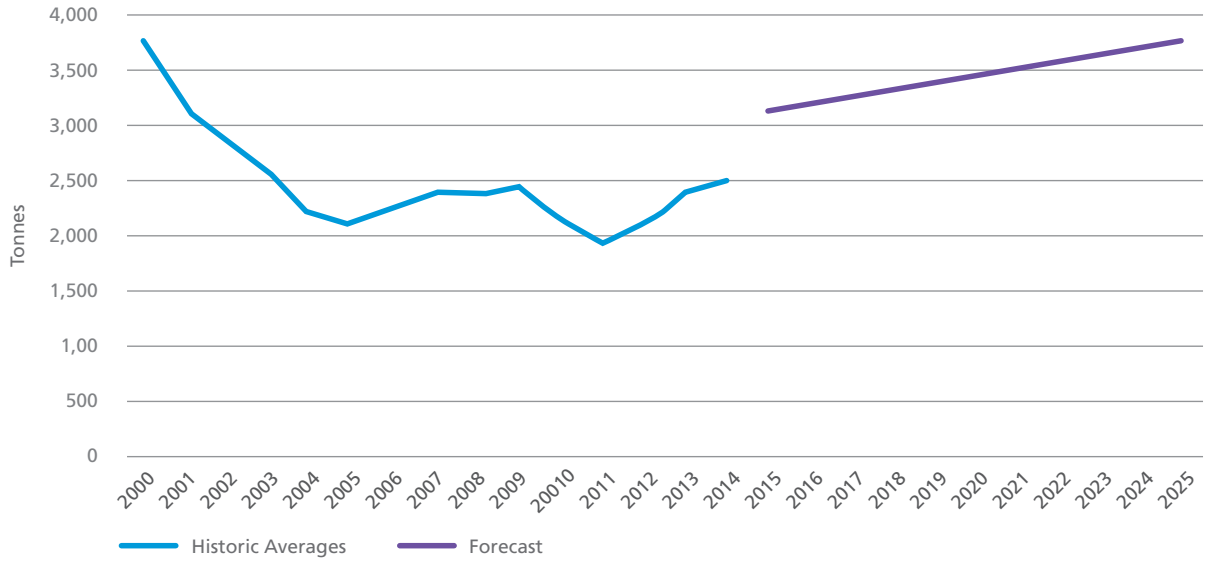


Figure 3.4 Cargo at Chileka (tonnes)



Main terminal building at KIA with rehabilitation and upgrade works underway

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Malawi National Transport Master Plan

4 Current costs and revenues

Civil Aviation Sub-Sectoral Plan

4 Current costs and revenues

Malawi relies upon a small number of carriers to serve the country's airports, but aircraft type and the use of foreign bases has led to relatively high operating costs. Further to that, due to geographical location and lack of demand, seat/killometre costs of any long haul flights are more expensive that of a typical European flights.

The air fare per km for Malawi Airlines is relatively less than its competitors like South African Airways or Kenyan Airways (Table 4.1).

Over the past years aviation revenue has been above the target set by The Ministry of Finance as shown in Figure 4.1.

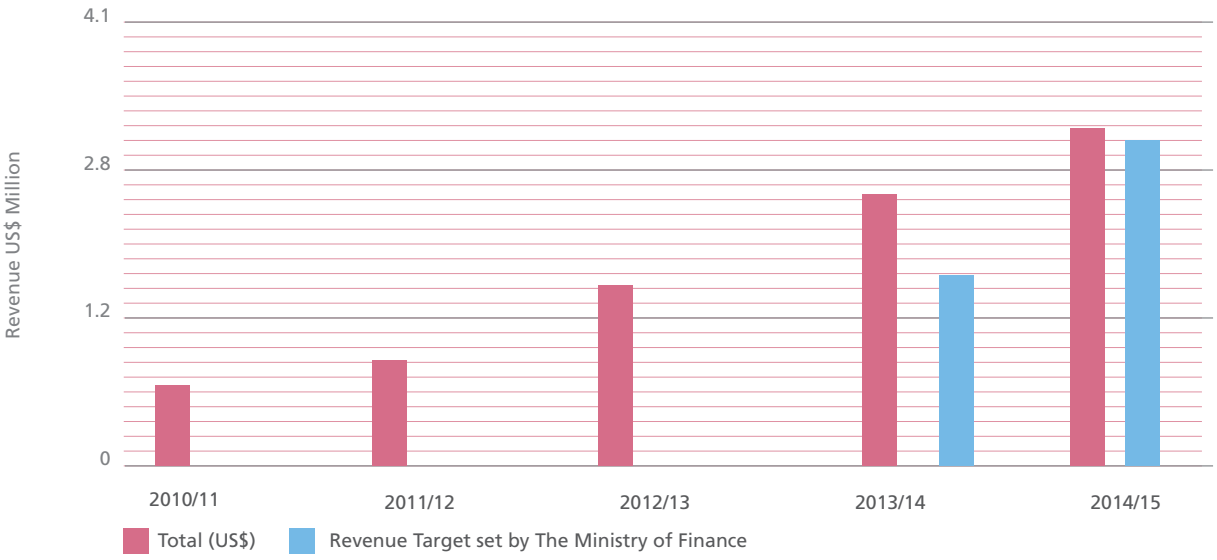
Although not limited to Malawi, the issues of high airline operating costs often are generated as a result of similarly high charges such as:

- Airport charges - The DCA and individual airport management tend to rely on landing fees and passenger load supplements, security levies and service charges to provide income. The revenue from retail is minimal as outlets are small and few in numbers with consumer or tourist goods being similar across retailers and too few customers.
- Lack of other revenue streams - Airports in Malawi do not fully target other revenue streams such as advertising or car park fees and tend to regard the commercial operation as a function of handling companies or by Airports Developments Ltd, with the DCA managing the technical operation. The two prime functions of operation and commercial are therefore split and do not feed into each other. The airport security is handled by the Malawi Police Service and Malawi Defense Force.
- High tax on operation - The Government does not allow DCA to retain revenues and these are passed to the Treasury, but taxes on operators, public and commercial bodies are high to maximise revenue nationally. This is then prioritised to national schemes where funding is needed specifically and budgets to such areas as the Civil Aviation sector are tailored to upkeep of facilities in the most basic sense so airports and air traffic management have to similarly direct budget allocation to specific priorities and not across all parts of the sector to keep this running at a sustainable level.
- Fuel costs - Fuel prices across Africa are higher than the global average due to the supply costs across the continent. Malawi does not have direct port access and so fuel is supplied by road or rail and the main airports rely on road tanker deliveries from distributors. The airlines tend to fuel at destination airports such as in South Africa where fuel costs are lower, but salawi has little control over fuel costs and is subject to demand of oil product producers alongside the rest of the continent.

Table 4.1 Typical passenger fares

Blantyre to Johannesburg		**Lilongwe to Dar es Salaam**	
Airline	**Fare (US$)/km**	**Airline**	**Fare (US$)/km**
South African Airways	0.16	Malawi Airlines	0.09
Malawi Airlines	0.07	Kenyan Airways	0.11
Lilongwe to Johannesburg		**Blantyre to Dar es Salaam**	
Airline	**Fare (US$)/km**	**Airline**	**Fare (US$)/km**
South African Airways	0.08	Malawi Airlines	0.08
Malawi Airlines	0.07	Kenyan Airways	0.21

Figure 4.1 Civil aviation revenues



Mzuzu Airport

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Malawi National Transport Master Plan

5 Legal, institutional and regulatory framework

Civil Aviation Sub-Sectoral Plan

5 Legal, institutional and regulatory framework

5.1 Existing legislation and regulations

The key existing legislation, the 1970 Aviation Act, and regulations pertaining to the Civil Aviation sector are set out below. A Civil Aviation Bill was approved by Parliament on 13th June 2017, and was assented to by the President.

5.1.1 Aviation Act

The Aviation Act [Cap. 69:01, Laws of Malawi] (AA), which was enacted in 1970, provides for the control, regulation and orderly development of aviation and air services in Malawi. Section 18 of the AA excludes the application of the Act to state aircrafts. A state aircraft is defined as any aircraft used exclusively for military, customs or police services in Malawi.

Section 3 of the AA empowers the Minister responsible for transport with the duty of administering the AA, including the general duty of organising, carrying out and encouraging measures for the development of aviation, for the promotion of safety and efficiency in the use aircrafts and for research into questions relating to air navigation.

Under Section 4 of the Act, the Chief Civil Aviation Officer or Director of Civil Aviation (the titles are used interchangeably) is responsible for the registration of aircrafts in Malawi. Under subsequent sections, the Director or Chief Civil Aviation Officer is also responsible for the control, regulation and orderly development of aviation and air services in Malawi. His or her role includes issuing, renewing and revoking various licences relating to aircrafts and flight crew.

The AA is a piece of legislation which includes wide and elaborate regulations that relate to: the registration, licensing, safety and fitness of aircrafts; the registration and licensing of various members of the flight crew; and the safety of aircraft users. The AA generally provides for an adequate framework by vesting sufficient powers in the Minister to make suitable regulations for registration, licensing, safety and fitness of aircrafts and aviation services operators. In 2013, the Minister approved comprehensive regulations on safety which has complemented effectively the provisions of the AA. The new regulations are line with the National Transport Policy and the SADC Protocol on Transport, Communications and Meteorology, and ICAO standards.

Article 9.2 of the SADC Protocol recommends Member States to promote compliance with International Civil Aviation Organisation (ICAO) standards. Pursuant to the SADC Protocol, Statement 3.2.3 of the National Transport Policy promotes the strengthening of the safety provisions in the AA in accordance with the ICAO standards and environmental standards. The provisions of Statement 3.2.3 were, in 2013, complied with through the promulgation of the various new regulations by the Minister.

On 11th September 1964, Malawi adhered by notification to the Convention on International Civil Aviation that was concluded at Chicago, 7th December 1944 (Chicago Convention). Pursuant to the Chicago Convention, section 14 of the AA protects any aircraft belonging to any party to the Chicago Convention which lawfully enters into, or transits from, Malawi, with or without landings, and also protects any spare part or equipment for an aircraft, imported or stored, in Malawi from detention or seizure on the ground that the construction, mechanism, parts, accessories or operations of the aircraft is or are an infringement of any patent, design or model.

Section 19 of the AA mandates the Minister with powers to make regulations for the better carrying out of the purposes of the AA, amongst others, to make regulations for registering, licensing and controlling of aircrafts and provision of Civil Aviation services. Section 19 also gives the Minister the mandate to make regulations for giving effect to and carrying out the provisions of the Chicago Convention, its annexes and amendments. In 2013, the Minister promulgated by publishing in the Gazette several regulations, which have been developed based on the Chicago Convention that states the International Civil Aviation Organisation (ICAO) Standards and Recommended Practices. The new regulations, which abolished the former regulations, are as follows:

5.1.2 Civil Aviation (general policies, procedures and definitions) regulations

Civil Aviation (general policies, procedures and definitions) Regulations [G.N. 27 of 2013] establish minimum standards for all aircraft operated in Malawi. The regulations apply to all persons operating Malawi registered aircrafts, aircrafts registered in another Contracting State that is operated by a person licensed in Malawi and aircrafts of other Contracting States in Malawi. The regulations provide the definitions of terms in the Civil Aviation subsector, govern the general administrative testing, regulate the procedures for issuing licences and certificates and regulate the inspection of licences and certificates. The licences and certificates governed under these regulations are: pilot licence, flight instructor licence, other airman licence, approved training organisation certificate, aircraft certificate of registration, aircraft certificate of airworthiness, approved maintenance organisation certificate, medical certificate, aerial work certificate and air operator certificate.

5.1.3 Civil Aviation (personnel licensing) regulations

Civil Aviation (personnel licensing) Regulations [G.N. 28 of 2013] set out the general requirements for licences, ratings, authorisations, certificates, endorsement, authority to act as a flight crew member, credit of flight time and designations of representatives of the Director of the Civil Aviation. The regulations prescribe: the requirements for issuing, renewal and re-issue of aviation personnel licences, ratings, authorisations and certificates; the conditions under which those licences, ratings, authorisations and certificates are necessary; and the privileges and limitations granted to the holders of those licences, ratings, authorisations and certificates. The type of pilot licences regulated under these regulations, include: student pilot licence, private pilot licence, commercial pilot licence, airline transport pilot licence, instructor for pilot licence, flight engineer licence, instructor for flight engineer licence, flight navigator licence, air traffic controller licence, flight operations officer licence etc.

5.1.4 Civil Aviation (approved training organisations) regulations

Civil Aviation (approved training organisations) Regulations [G.N. 29 of 2013] prescribe the requirements for issuing approvals to organisations for the training of aviation personnel and also prescribe operating rules for the holders of an Approved Training Organisation (ATO) certificate. The requirements include application for an ATO certificate, duration, renewal, amendment, suspension or revocation of the ATO certificate, location of ATO, ATO personnel and facilities, facilities required for flight crew training etc.

5.1.5 Aviation (airworthiness) regulations

Aviation (airworthiness) Regulations [G.N. 31 of 2013] prescribe the requirements for original certification of aircraft and aeronautical products, supplemental type certificates, issuance of a certificate of airworthiness, continued airworthiness of aircraft, continued airworthiness of aeronautical component, aircraft maintenance and inspection requirement and maintenance of records and entries.

These regulations presume that Malawi does not presently have the capabilities or demand to issue its own original type certification and will hence not be the State of Design or State of Manufacture. Nonetheless, Malawi will either issue its own Certificate of Airworthiness or validate a Certificate of Airworthiness issued by another State in accordance with these regulations. Malawi accepts the United States Airworthiness Standard and associated requirements and the Joint Airworthiness Requirements code of airworthiness.

5.1.6 Civil Aviation (approved maintenance organisation) regulations

Civil Aviation (approved maintenance organisation) Regulations [G.N. 32 of 2013] prescribe the requirements for issuing approvals or certification to organisations for maintenance, preventive maintenance and alterations of aircrafts and aeronautical products and also prescribes the administration and general operating rules for an Approved Maintenance Organisation (AMO).

5.1.7 Civil Aviation (instruments and equipment) regulations

Civil Aviation (Instruments and Equipment) Regulations [G.N. 33 of 2013] prescribe the minimum instrument and equipment requirements for all aircraft in all operations, including flight instruments, navigation equipment, communications equipment, aircraft lights and instrument illumination and engine instrument.

5.1.8 Civil Aviation (operations) regulations

Civil Aviation (operations) Regulations [G.N. 34 of 2013] prescribe the requirements for operations conducted by a flight crew member certified in Malawi while operating aircraft registered in Malawi, operations of foreign aircraft registered in another State by a holder of Air Operator Certificate (AOC) of Malawi and operations of aircraft within Malawi by flight crew or AOC holders of another State. For operation outside Malawi, the regulations require all Malawi pilots and operators to comply with these requirements unless compliance would result in a violation of the laws of the State in which the operation is conducted.

5.1.9 Civil Aviation (commercial air transport by foreign air operators) regulations

These prescribe requirements applicable to the operation of any civil aircraft, i.e. approval to operate in the territory of Malawi, including aeroplane or helicopter for the purpose of commercial air transportation operations by any operator whose Air Operator Certificate (AOC) is issued, and controlled by a civil aviation authority other than Malawi.

5.1.10 Civil Aviation (search and rescue) regulations

Civil Aviation (Search and Rescue) Regulations [G.N. 38 of 2013] are applicable to the establishment, operations and maintenance of search and rescue (SAR) services in the territory of Malawi, including SAR organisation and facilities, SAR plan and SAR operating procedures. Agreements with other countries have proved difficult to conclude.

5.1.11 Civil Aviation (investigation of air accidents) regulations

Civil Aviation (investigating of air accidents) Regulations [G.N. 39 of 2013] prescribe the requirements, such as accident investigation, review board and public enquiries, in relation only to civil aviation, which shall apply: to accidents arising out of or in the course of air navigation that occur to civil aviation aircraft in over Malawi; and, to such accidents that occur elsewhere to civil aircraft registered in Malawi, amongst others.

5.1.12 Civil Aviation (aerodromes) regulations

Civil Aviation (aerodromes) Regulations [G.N. 40 of 2013] prescribe the requirements in relation to the design, establishment, certification, registration, operation and procedures of aerodromes in accordance with the AA.

5.1.13 Civil Aviation (environmental protection) regulations

Civil Aviation (environmental protection) Regulations [G.N. 41 of 2013] prescribe regulations of noise and aircraft engine emissions restrictions at aerodromes and other places designated as noise sensitive areas in Malawi.

5.1.14 Other regulations

Other regulations under the Act cover:

- Rules of the air and Air Traffic Control;
- Smoke;
- Fees;
- Aircraft performance;
- Air transport licensing;
- Aerodrome charges;
- Airport security; and
- Air operator certification and administration.

5.2 Cape Town Convention

Effective May 2014, Malawi ratified the Cape Town Convention and Aircraft Equipment Protocol of 2001. As the 2001 Cape Town Convention and Protocol are yet to be domesticated in Malawi in terms of section 211 of the Constitution of Malawi, the Convention and Protocol are not yet applicable under Malawi law.

5.3 Carriage by Air Act

The Carriage by Air Act [Cap. 70:02, Laws of Malawi] (CAA), which was enacted in 1981, gives effect to the Warsaw Convention, The Hague Protocol and the Convention supplementary to the Warsaw Convention for the unification of certain rules relating to international carriage of air performed by a person other than the contracting carrier. The CAA provides the carriage to which the Warsaw Convention and The Hague Protocol apply. It also provides the carriage to which the Warsaw Convention without The Hague Protocol applies. It also provides the carriage to which the Guadalajara Convention applies. It also provides the other carriage to which the CAA itself applies.

5.4 1972 Hijacking Act

Provides for the prevention and punishment of unlawful acts against aircraft, and, in relation to aircraft, to give effect to the Convention on Offences the Convention for the Suppression of Unlawful Seizure of Aircraft, and the Convention for the Suppression of unlawful Acts against the Safety of Civil Aviation.

5.5 Regulatory gaps

There are no regulations covering the operation of remotely piloted aircraft systems (commonly known as drones), and these should be prepared urgently. Similarly, there are no regulations covering air navigation services.

5.6 Civil Aviation governance

In governance terms, civil aviation falls under the Ministry of Transport and Public Works and specifically the Department of Civil Aviation (DCA). The latter has responsibilities for the airports, airworthiness and air traffic as well as national regulatory compliance against international standards. Like other MoTPW departments, it combines policy making, regulatory and operational functions, with a Government commitment to reform and separate these roles into different organisations going forward.

The DCA does not collect or hold any revenue from civil aviation activity, but receives funding via the Treasury. Revenues are fed back directly into the Treasury and so are available for use on non-aviation expenditure. This means that aviation budgets are often under-funded for requirements and there are often shortfalls in covering day to day running costs. Vital repair, replacement or supplements for operational items and infrastructure can be affected by lack of finance, occasionally resulting in suspension of operation at airports.

Air traffic is handled by a department within the DCA and covers personnel, technical systems, navigation aids and aeronautical information services (AIS). The national aviation documentation is in need of update and the DCA in general requires automating with AIS being a priority to ensure current conditions as facilities are available.

DCA also has an 'economic regulation group' that oversees statistical management and market development as well as input to international agreements and negotiations. Most liaison with airlines on commercial operation is carried out by these staff as well as linking to Government tourism initiatives and opportunities.

Responsibility for security at airports comes under the Malawian Police and they provide a proportion of their personnel to staff the main facilities at Lilongwe and Blantyre, including passenger search and perimeter control. The staff are not specialist civil aviation security personnel, but drawn from the wider resource, so if numbers of Police are required elsewhere, then that becomes the priority risking understaffing at airports. The DCA does believe it is has some control over police resources, but this is through inter-department liaison rather than a formal chain of responsibility. Improved human resource management is needed is in this area (recruitment, conditions of service, training) in order that security is accorded the priority is needs.

The DCA does not have comprehensive statistics for passengers and cargo or traffic records coming through the administration on a regular basis and airline returns are often infrequent. This leads to the conclusion that sector performance and that of individual airports is difficult to monitor. Also, opportunities for revenue generation could be missed across the sector.

Airworthiness regulation reflects similar issues on lack of digital records with many skilled personnel administered from outside Malawi under different national authorities. The national aircraft register is not large and so airframes tend to be registered abroad with compliance certification supplied as required from host authorities. As with air traffic, loss of skilled personnel out of Malawi is seen as a major concern making it difficult to create apprenticeships or set up training schemes for future trade entrants.

The Government, through the Ministry of Transport and Public Works, has established a Board for accident investigation. Search and rescue is not well specified within the current structure. However, it is expected to be a core function of the proposed CAA.

5.7 **Airport management**

Chileka Airport is managed by DCA. KIA is managed by Airports Development Limited (ADL). ADL was created under the Companies Act, as a requirement of the loan from Japan used to develop KIA originally. The expectation was that a private company would inject an element of commercialisation and transparency into airport management and accounting, and by and large, this has been achieved. ADL now also manages Likoma Airport, which is designated as an international airport.

Handling at KIA and Chileka is concessioned to the Lilongwe Handling Company (LIHACO). No airlines self-handle at KIA. Air Cargo Malawi is also a concessioned cargo handling agent based at KIA. It has a branch at Chileka.

Malawi Catering Services Ltd is a subsidiary company of Airport Development Limited. It operates a restaurant and bars at KIA and specializes in in-flight catering and can cater for outside functions such as weddings, parties and meetings.

Air traffic management at KIA and Chileka works on local area control by radio and procedure, with basic flight planning systems and meteorological reporting relying on manual observation and forecasting. Most systems for reporting are paper-based and are in need of automation.

Airport management appears to feature a lack of independent authority or empowerment within the structure and commercial expertise is required to ensure that the airport site, terminal, facilities and operational areas are maximising revenue potential. A significant factor is recognition between the central DCA and airport representatives that underfunding in some vital services is causing temporary shutdowns and preventing airlines from operating services. This is the case with airport fire service equipment which requires large capital investment, but more importantly, regular maintenance funding. Operations are also disrupted when the supply of water is terminated through non-payment of bills

With the DCA running most of the nation's airports, these issues are typical. The privately-operated airports and strips have less facilities which are funded for a purpose so remain basic to that need.

5.8 Economic and regulatory environment - African context

Africa is experiencing considerable growth in urbanisation and economic growth, with tourism also high; this is driving air transport growth. Also, poor ground infrastructure or unreliability due to political instability is making air travel more attractive for ease as well as speed. Middle and far eastern countries are seeing Africa as still untapped in terms of investment so air routes and financing infrastructure are seen as profitable ventures to expand their airline networks as well as influence in the regions and nations as western powers have taken steps back through economic necessity.

Climate change is a growing factor and unseasonal weather or extremes damaging road and rail frustrating movement of people and goods is becoming recognised as a consideration for air service enhancement.

The Civil Aviation sector is continentally growing and is a major employer of 6.7million jobs. It is worth US$68 billion in African gross domestic product. Currently passenger demand has grown by 45% and freight traffic 80% with a projected growth of 4.5% to 5.1% per annum across the next 20 years (Source: African Union).

The African Union published its vision in the document 'Agenda 2063,' which sees the Civil Aviation sector playing a significant role in the continent's socio-economic transformation over the next 50 years. The key statements are:

- To support the growth of air transport, a concerted effort needs to be made to finance and implement airport and ATM (air traffic management) infrastructure;
- The efficiency and competitiveness of the African aviation sector needs to be improved through the implementation of the Yamoussoukro Decision; and
- Africa's commitment to curbing climate change and preserving the environment, which are key criteria in the development of the air transport sector.

The ICAO has put forward an agenda on safety and security, which global regions are gradually adopting, with a purpose towards improving alignment with the convention annexes. African nations have been moving toward consensus on a strategy to meet this since the 1980s and this has culminated in the Yamoussoukro Decision.

Yamoussoukro in the Ivory Coast was the venue for a pan-African conference to address poor air transport coverage across nations and create an open market for air transport to remove national constraints and improve competition for services. The original meeting in 1988 produced the Yamoussoukro Declaration and then in 1999 44 nations agreed the 'Decision' to enable market liberalisation.

The African Union set up AFCAC to monitor and co-ordinate the aviation sector work towards the agreement and to assist in producing the policy framework across the continent. The idea is for the national bodies and economic councils to use this as the basis for changes in internal policy.

In 2007 at an aviation security conference in Addis Ababa, and in 2012 the conference in Abuja on air safety, endorsed the Yamoussoukro Decision and progress on compliance to the ICAO programme was made along with other sector initiatives. The current state is that most regions of Africa have adopted the Yamoussoukro liberalisation policy, but some key states such as South Africa have been slow to sign up. Improvements in safety and security that the ICAO programme requires are mandatory.

Malawi had an audit in in 2009 and 2012 on safety and security audits respectively and many of the findings remain to be addressed, however the creation of the independent CAA would be a major step towards progressing much of the implementation.

5.9 Sector staffing and personnel

Skilled personnel in the sector are in low supply, as they are in other transport sub-sectors and economy-wide in Malawi. Factors contributing to this situation in the air transport sub-sector are:

5.9.1 Government controlled occupations

The DCA manages a number of the airport-job related opportunities from operational staff to air traffic controllers. Personnel are classified as civil servants and linked to Government employee pay rates and conditions which are not competitive with the private sector, particularly abroad. This leads to many staff, once trained, leaving Malawi for posts in other countries as well as the opportunity to develop their skill set on a wider number of systems or activities. Skilled posts such as air traffic control, are particularly susceptible to this as Malawi does not have the traffic or systems like radar for them to reach all round qualification in a reasonable time. The Government also finds that it is difficult to recruit people into these areas for those reasons.

5.9.2 Externally based operators

Airlines operating into Malawi draw personnel from their base countries and even those sourced in Malawi need to go abroad for specialist training.

As the Civil Aviation sector in Malawi is relatively small, personnel qualified to fly or fulfil engineering posts are few. Also for flight crews, opportunities in larger countries and airlines are more common and enable higher living standards.

5.9.3 Support companies and maintenance

As with training in many trades, some support activities in engineering are out-sourced to other countries and even outside Africa. Most airlines are prone to using their larger and better equipped catering partners at destination airports outside Malawi and so catering is supplied for both inbound and outbound sectors on flights. MCSL supply Malawi Airlines, and have no potential to supply other airlines.

Engineers are required to work on specific aircraft types and their pay is linked to certification on a range of aircraft so opportunities at the foreign airports and airline bases are much more attractive. With increasing technological complexity, African education and resources do not offer the conditions for engineers to keep up with advances. This results in may training in Europe or USA and subsequently not coming back to Malawi to practice.

5.9.4 Aircraft leasing

Most airlines globally now operate leased aircraft as this is seen as the most cost effective way of managing the fleet and keeping operating costs to a minimum. In some cases, wet leasing, where a crew is also provided, is popular in Africa so that issues with sourcing indigenous flight crews are overcome. However, in Africa leasing costs are higher than global averages due to fuel, maintenance and safety premiums, with the latter largely driven by hull loss rates in aircraft accidents. Security vulnerability is also a factor, with African regional political instabilities being prominent.

Luggage carousel at Kamuzu International Airport

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Malawi National Transport Master Plan

6 Responsive Civil Aviation strategies

Civil Aviation Sub-Sectoral Plan

6 **Responsive Civil Aviation strategies**

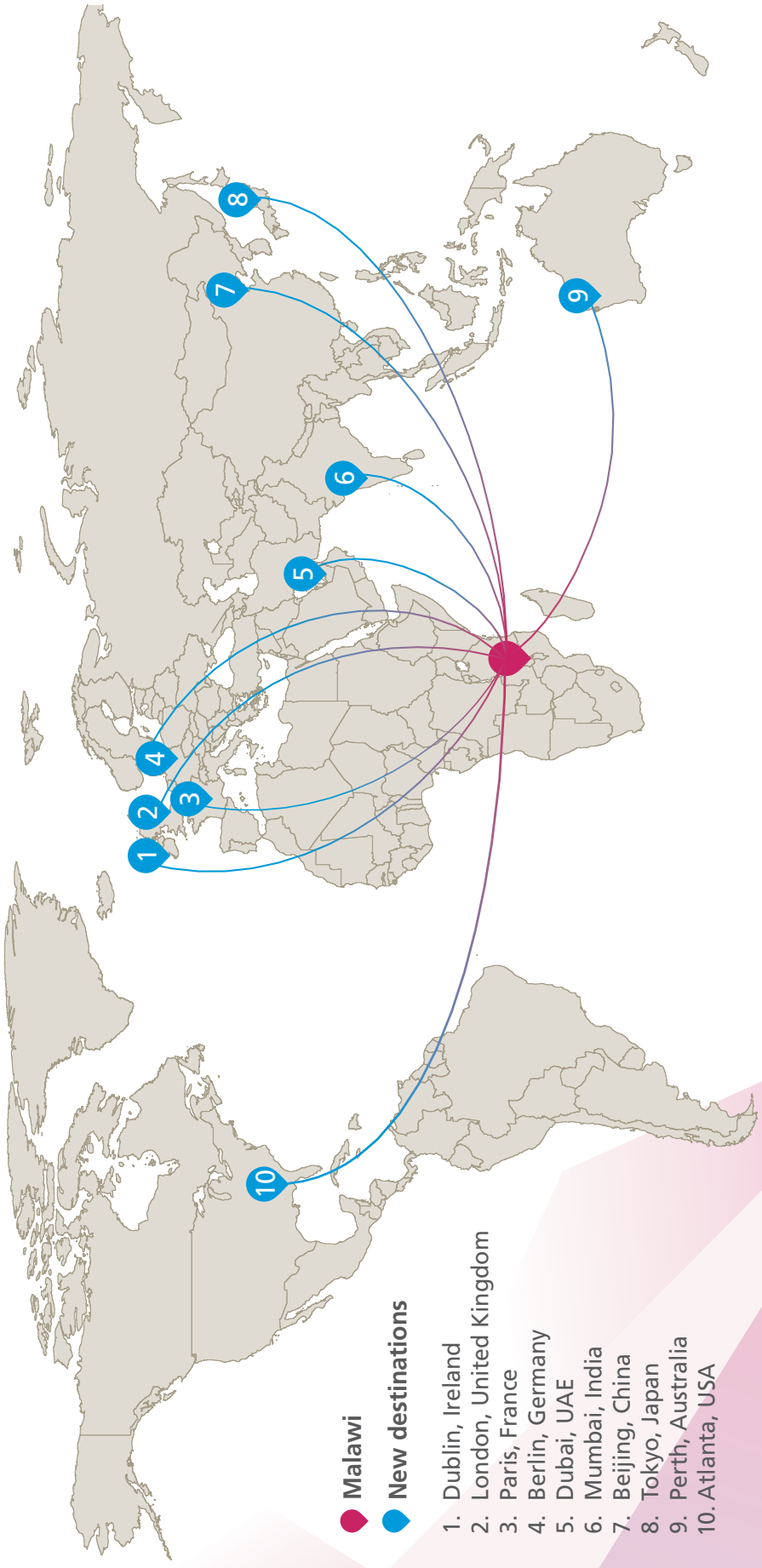
6.1 **Strategies**

The main vision of the Civil Aviation sector in Malawi would be to provide efficient, safe and effective air transport services in both domestic and international markets. The following are the strategies that can support further development of the sector and can help to meet the Civil Aviation sub-sector objectives as described in Chapter 1 of this report.

1. Improve reliability and the image of the Civil Aviation sub-sector through the sustained development, maintenance and utilisation of air transport infrastructure;
2. Deploy and foster the introduction of advanced technologies and systems for the optimal growth of the sector;
3. Establish and maintain policy, planning and regulatory settings that support Civil Aviation sector growth;
4. Use BASAs as the primary means of increasing the range of destinations linked directly to Malawi by air (see Figure 6.1 and Figure 6.2);
5. Safeguard the environment by reducing fuel consumption;
6. Improve customer care in the entire value chain of the Civil Aviation sub-sector;
7. Encourage competition as a strategy to raise standards;
8. Foster the sustainability of, and increase the frequency of, the Malawi's regional air services;
9. Facilitate the development of specific economic activities in Mining, Tourism and Agriculture sectors, through improved air transport infrastructure and services adjacent to development areas; and
10. Improve land transport links to Malawian airports.

Figure 6.1 Potential new African destinations from Malawi

Figure 6.2 Potential intercontinental destinations from Malawi



The appron at Kamuzu International Airport

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Malawi National Transport Master Plan

7 Infrastructure proposals

Civil Aviation Sub-Sectoral Plan

7 Infrastructure proposals

7.1 Kamuzu International Airport

7.1.1 Committed interventions

In 2015 the Japanese Government announced a joint venture investment to develop Kamuzu Airport to take place from 2016 to 2019 centred on developing the current terminal to international standards. The project investment is approximately US$ 0.02 billio for a 33 months programme to rehabilitate the current terminal and create arrival and departure wings additionally for example as per Figure 7.2. It also includes the provision of radar at KIA.

The project would address immigration delays at the visa processing stage on arrivals and also provide greater capacity for larger aircraft baggage loads. The project also features a domestic terminal so that passengers are properly segregated and capacity is matched to schedules. Additionally, security search equipment is to be upgraded enabling greater compliance within the national response to the Yamoussoukro principles.

As part of the South African Development Co-operation (SADC) group, Malawi has also negotiated for improvements to air traffic surveillance as its contribution and so the project includes finance for installation of Automatic Dependent Surveillance Broadcast (ADS-B) which works with satellite navigation systems to allow accurate aircraft positioning in airspace and assist safety separation of traffic. This will replace the radar service discontinued at KIA in the 1980s and provide a state of the art system. It also will dovetail with similar equipment and procedure across the southern Africa region.

Figure 7.1 KIA – new arrivals hall

7.1.2 New interventions

7.1.2.1 Runway development

KIA has the ability to operate code E aircraft currently, although as part of aspirations to establish the airport as truly international in standing, the runway could utilise space to the east to improve stopway and runway end safety area provision. The work would also seek to lengthen the taxiway to make this full length and allow runway capacity in busy periods to be managed effectively, as well as add flexibility should an aircraft blockage occur due to incident. The runway extension would not affect the perimeter road. (Appendix C).

Due to the restrictive positioning of the apron, the airfield package should include a new apron built parallel to the runway and west of the existing apron to allow parking of more, larger code D and E aircraft. This would also permit access to the cargo shed facilities and allow direct aircraft loading for types such as Boeing 747F.

In the medium term the runway width should be expanded to accommodate wide bodied jets, such as the Airbus A380, in line with the vision of direct inter-continental flights. ICAO Annex 14 Volume 1 on airport design specifies a runway width of 60m for Code F aircraft.

Figure 7.2 KIA terminal development

However, both the European Aviation Safety Agency and the US Federal Aviation Administration have now approved A380 operations on 45m (150ft)-wide runways, which at present is the standard width for major airports.

Major airports operating such aircraft are providing 60m width (75m including the shoulders). An interim measure would be a 45 metre wide runway with 7.5 meter shoulders on both sides, which can be used for Airbus A380 operations if the runway is also provided with these additional "outer" shoulders[4]. Outer shoulders[4] should be prepared for jet blast protection, engine ingestion protection, and to accommodate run-off by an aircraft, with use by supporting ground vehicles as a minor benefit.

The bearing strength has to match as well though, including aprons and taxiway, as long as the market supports this (i.e. operators with route connections). Since Code F also covers the B747-800 the freight variant in that instance (as well as pax or pax/cargo combinations) should also be considered. The other consideration is that for aircraft of that size, the operators would expect the ILS to be serviceable and available, but could be part of an overall airport upgrade package that includes the ADS-B surveillance as well.

The taxiways at KIA will need to be 45m width for Code F and bearing strength needs to match A380 PCN (bearing), and work will be needed to achieve this.

7.1.2.2 Navaid strategy

The Japanese investment package currently includes proposed installation of an ADS-B system, which would then address the lack of surveillance at KIA currently. The ILS is unserviceable and may be a drain on finances over the short to medium term. The adoption of ADS-B would align with airline use of GNSS and improve future proofing of air navigation at local and a regional level in line with SADC aspirations. No modification to radio beacons are proposed as these will dovetail with satellite based aids, however a replacement programme would need to be set out with the DCA / CAA for the medium term. This needs to be placed within the whole framework of CNS/ATM, taking into context performance based navigation. Later the principle of Aviation Systems Block Upgrade (ASBU) may be considered.

7.1.2.3 Terminal development

The Japanese investment plan is based on recreating the terminal (Figure 7.3) to create two new wings, one each for arrivals and departures. This is combined with rehabilitation of the departures lounge and arrivals hall areas to allow current flights to be handled at immigration without excessive queuing. It would also relieve pressure on the baggage collection facilities as multiple flights arrive. The addition of a new apron as described above would facilitate further expansion to the west of the terminal and possible departure gate development. The plan is to increase passenger numbers using the terminal at a time by over 500 people. This can be achieved by one or two small aircrafts, up to Code D with carrying capacity up to 300 people, arriving at the same time.

7.1.2.4 Cargo expansion

KIA has sufficient building space for an upgraded cargo warehouse and despatch area. This may encourage local enterprise to use the airport site and haulage businesses. It would also compliment the facility at Chileka and enable a degree of competition.

7.2 Chileka International Airport

7.2.1 Committed interventions

The Government of Malawi has allocated US$250million for the development of the existing terminal to upgrade departures. This has begun on the first floor and is a step towards accommodating passenger loads beyond the 150-seat aircraft that the DCA wants to see operating. The project includes security search equipment upgrades.

Since the announcement of the scheme in 2014, the Government has identified that a larger project is required to completely redevelop the terminal and make it more attractive as a destination for operators (see Figure 7.1). The proposal is based around phases where departing passenger facilities are upgraded in stages and expansion takes place within the original building envelope.

7.2.2 New interventions

The proposed plan for Chileka development is presented in Appendix B of this report and the main interventions are introduced below.

7.2.2.1 Runway rehabilitation

The current runway has poor surface condition and requires resurfacing to improve stability and braking action (which is affected by large rubber deposit build up). This resurfacing would offer an opportunity to increase the length of the western approach to increase length from 2325m to 3500m and the width to 45m to allow code E aircraft to land comfortably.

The taxiway to the south of the runway could also be extended to facilitate the full length and link the south-eastern end of the cross-wind runway as well.

7.2.2.2 Re-provision of ATC tower and fire station

The ATC visual room is sited on the roof line of the current terminal and lacks a clear view to the runway ends. A new standalone tower could be sited to the south of the existing maintenance apron at a central point to the runway. The new structure would allow compliance with the ICAO for siting the tower and improve visibility for controllers of approaches and visual circuit enhancing safety.

Figure 7.3 Impression of redeveloped Chileka International Airport

The fire station is of adequate size, but relocation to the west of the maintenance apron would provide a central position to both thresholds and facilitate expansion of the existing aircraft apron. It would also benefit from close location to the ATC tower for communication links and could be more efficiently tailored to the fire appliances in use.

7.2.2.3 Navaid strategy

Chileka does not have an operational ILS and radar is not installed. Plans by investors have included installing ADS-B as a means of improving surveillance and enabling integration with other systems as proposed at Lilongwe and across the region. As this links into GNSS aircraft systems then current airline operations would be enhanced. The surveillance coverage is also more critical at Chileka due to the high ground terrain surrounding the airport and the need to create a flexible operation for larger aircraft with less manoeuvrability.

Performance Based Navigation (PBN) is being promoted by ICAO and Malawi must align its strategies with this new concept.

Airfield Ground Lighting (AGL) at Chileka should include; approach, runway, taxi and apron, and obstruction lights, but these are not all currently serviceable and require urgent attention. At the time of the field inspection by the Masterplan study team, 50% of the runway lighting was working, which is one operational circuit, and the second circuit had been out for some time.

Whilst the problem may be anywhere in the circuitry, it is recommended that the whole AGL system needs rehabilitation and probably a control system upgrade, which could cost in the order of US$0.9million to US$1.8million. It is recommended that there be two interleaved circuits where 50% of the runway is on each and the interleaving allows control crossover from one to the other if one fails, but also allows switching runway direction as part of normal operation.

7.2.2.4 Cross-wind runway cargo facility

The cross-wind runway at Chileka is not used and is a large paved area that could ease demand for apron parking space with increased operations. The current cargo facility is small and adjacent to the terminal where terminal expansion would benefit from using the space. The capacity is limited to small volume freight although larger handling equipment can be brought in. A new phased cargo facility based on the north side of the airport utilising the cross-wind runway as access and for apron would be a catalyst for an important revenue stream.

Blantyre as the business centre could provide a major market and take advantage of short distances to border communities with other countries; having a cargo facility with potential global reach using the improved runway and cargo facility in combination would give the airport regional significance. The operation would attract new employment potential and opportunity for hauliers and transport providers locally as well as possibilities as a goods distribution hub. Construction could be phased to allow a build-up of the business and capacity as operations and market demands.

7.2.2.5 Car parking

Car parking at Chileka is congested in front of the terminal with little distinction between local use, long and short stay or drop off. Use of airport land to the west of the terminal may provide significant space for staff, long term and car hire storage, with short stay and drop off re-planned in front of the terminal and a separate VIP drop off to the east at the VIP terminal. It is also possible that a concession could be devised to run the facilities on behalf of the airport similarly to airports in the UK and around the world.

7.2.2.6 Wayfinding strategy

The airport is very poorly signed from Blantyre city and it has been recognised at many airports around the world that the wayfinding strategy has been a significant driver to marketing the location and providing additional advertising (at virtually no cost other than initial provision and maintenance).

7.2.2.7 Terminal development

Chileka is expected to complete terminal departures improvements, but whilst much of this will address current and short term capacity issues, the increase in schedule and aircraft size would require a much larger facility capable of handling flights of 250 to 300 passengers. Forecasts and market predictions suggest that Malawi may not provide the indigenous numbers for growth, but external originating traffic is on the increase. The ability to operate larger aircraft would also create demand for larger space in check-in, security, lounge, immigration and baggage hall facilities. The proposed Government plan to expand the terminal would need to be a phased stage in developments already underway, but funding continuity would be important to this.

In the absence of a bankable project in the short term, it is necessary to expand arrival and check in concourse areas to address the problem of arriving passengers queueing on the apron, departing passengers congesting at security areas and passenger dropping areas requiring users to stand in the rain or hot weather conditions.

7.3 Other airports

Plans have been announced by the Government to build new airports at Mzuzu in the north and Mangochi in central Malawi, but little detail has been put forward other than that these would be aimed at supporting tourism as well as providing regional hubs for the country.

The existing Mzuzu airport is deemed to be operational but attracts no flights. A new airport at Mzuzu would be a costly addition, without any formal traffic numbers. A better alternative would be to locate a new airport for the north of the country at Nkhata Bay. This would tie in with proposals for a Special Economic Zone (SEZ) at Chintheche, and the proposed development of NKhata Bay port on the Mtwara corridor. The development of the oil and gas industry could generate additional justification for an international airport in this location.

The DCA currently has a grass strip airport at Mangochi, but this does not attract flights either. The drive from Lilongwe to Mangochi (3 hours) via the S127 takes in some of southern Africa's most stunning scenery, and is likely to be competitive in terms of both time and cost with air for journeys from Lilongwe to lakeside resorts. As a potential international entry/exit point Mangochi has a larger customer base than Likoma, although this is still relatively small in terms of direct international flights.

7.4 Meeting long-term demand

The above development proposals start from the point of addressing capacity constraints that exist at immigration/arrivals and departure lounges now. The forward plan would see initial expansion at KIA based on an increased schedule and occasional larger aircraft. At Chileka, the terminal constraints are significant if more movements are experienced, so arrivals space will need expanding during the plan period (in addition to the current works), with the rebuild of the terminal as above being a necessity as it has to be tied to promoting the airport in the market.

The traffic figures do not support large-scale development at KIA in a single step, so the new wings to the terminal may be phased. Attracting the large body aircraft will change this, and even a once or twice-weekly A380 or B777 service could overwhelm facilities. Hence, the proposed runway/apron developments need to be accompanied by expansion of the terminal and its processing facilities. The design consequences of this will need to be assessed in the light of future daily schedules.

The runway at Chileka International Airport

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Malawi National Transport Master Plan

8 Strategies for reducing costs

Civil Aviation Sub-Sectoral Plan

8 Strategies for reducing costs

8.1 Airports

The underutilisation of certain facilities at the main airports is resulting in opportunities to generate revenue and offset operational cost being missed. The facilities at KIA and Chileka are outdated, and poorly maintained equipment that needs prioritisation for replacement, which would allow greater efficiency in use. Much of this has already been identified and schemes to address this already brought forward.

Car parking at the airports is largely uncontrolled and although KIA has an exit fee based on time charge, there is no scale of charges in operation that would allow more revenue to be collected from different users and vehicle classes. The car parks themselves could also be divided to facilitate long term, short stay and VIP parking as this is haphazard at present. Chileka does not devote enough space to parking and this could be organised into long stay areas and drop off plus short stay to avoid congestion outside the terminal entrance.

Car hire facilities at the airports could be enhanced to attract users from outside the airport on local demand in both locations. This could be offered as a concession to stimulate local business and employment.

Wayfinding at Chileka is very poor with virtually no guidance to the airport from Blantyre, and opportunities to promote the location through this are lost. KIA is better facilitated. Advertising concessions and sites are an issue at both airports with hoardings in poor condition and advantageous sites not provisioned. In UK airports advertising is a major revenue stream and KIA and Chileka have prominent sites at the approach and entrance to the airport terminal areas that could be developed. The stream could be offered to an agency as a concession and site rental as well as advert revenue could be made available. ADL have secured a contract with JCDeceaux for advertising at KIA, and this concept should be extended to Chileka.

At all airports, secure perimeter fences should be constructed and maintained. This will enable airports to fully utilise their land for operational activities.

Land around the airports is often used for agricultural purposes or left vacant. As the amount of available land is extensive, then following a review of ownership status, airport lands should be made available for rent to farmers and small business. At KIA the approach road is very long (almost 3km) and could be offered for sites to build small business or industrial units that would earn rent.

The VIP terminal facilities at both airports are underused and although maintained for presidential and Government VIP use should be considered for use by business passengers. This would enable premium charging for services and possible development of a business operator community, particularly at Chileka where the city has a reputation as a business centre already.

8.2 Malawi Airlines

The Government's 51% shareholding is the most tangible cost in terms of operation of the airline. Following the acceptance of Yamoussoukro, the Government should plan to sell this stake and realise the possible US$6million value of this for re-investment in the sector. The airport developments and commitment to improving the sector governance and liberalisation would make this attractive to external investors including regional airline players.

The aircraft types operated are efficient and commonly used in the region so little to no saving would be gained from re-equipping at this stage, however a fleet procurement plan should be negotiated with Ethiopian Airlines to ensure that they are competitive and compliant environmentally in the future short term. The airline should examine the potential for smaller capacity equipment on domestic routes. Although Ulendo has explored this market with little success, the market will expand in the future.

8.3 Open Skies and Yamoussoukro Agreement

Implementation of the 1988 Yamoussoukro Agreement in Malawi and other states in southern Africa is intended to reduce fares and increase consumer choice. The full implications are discussed in Chapter 9.

8.4 Ground handling

Since there is a single ground handling company at KIA, its monopoly position may contribute to costs which could be reduced. The introduction of a second handling company is contingent on passenger volumes reaching a level that provide sufficient business for two companies.

A licence to a second ground handling company was awarded at Entebbe International Airport to DAS Handling in 2002, when passenger numbers were around 500,000 annually. This figure is expected to be reached at KIA in 2028, and has already been reached if Chileka is included.

It is recommended that the concession to LIHACO is re-negotiated under a tender arrangement, and a license to a second handling company is also awarded under a competitive tender process. This is also in line with the Airports Council International Policy and recommended Practices for Ground Handling concessions which stipulates for open tendering, fair, competitive, transparent and accountability in the selection of the ground handlers with clear defined criteria to be met. This will reduce handling costs, which should be passed onto the passenger.

The apron at Chileka International Airport

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Malawi National Transport Master Plan

9 Strategies for sector development

Civil Aviation Sub-Sectoral Plan

9 Strategies for sector development

9.1 Overall investment strategy

9.1.1 Major airports

DCA should discuss with investors and create an infrastructure investment programme that can be used to show commitment to customer airline operators who can then align service commitments and marketing strategies to the developments. This is critical to get stakeholder engagement underway and to ensure that developments meet the needs of the airlines. This will also create the possibility of airlines deciding to invest in handling facilities based at the locations and expanding operation.

9.1.2 Domestic economic development

The Government should establish Joint Action Plans between ministries, agencies and private sector interests in the key growth sectors of mining, oil and gas, tourism and agriculture. Their aim should be to develop a co-ordinated approach that allows the air transport sub-sector to play a strong supporting role in fostering development in these sectors.

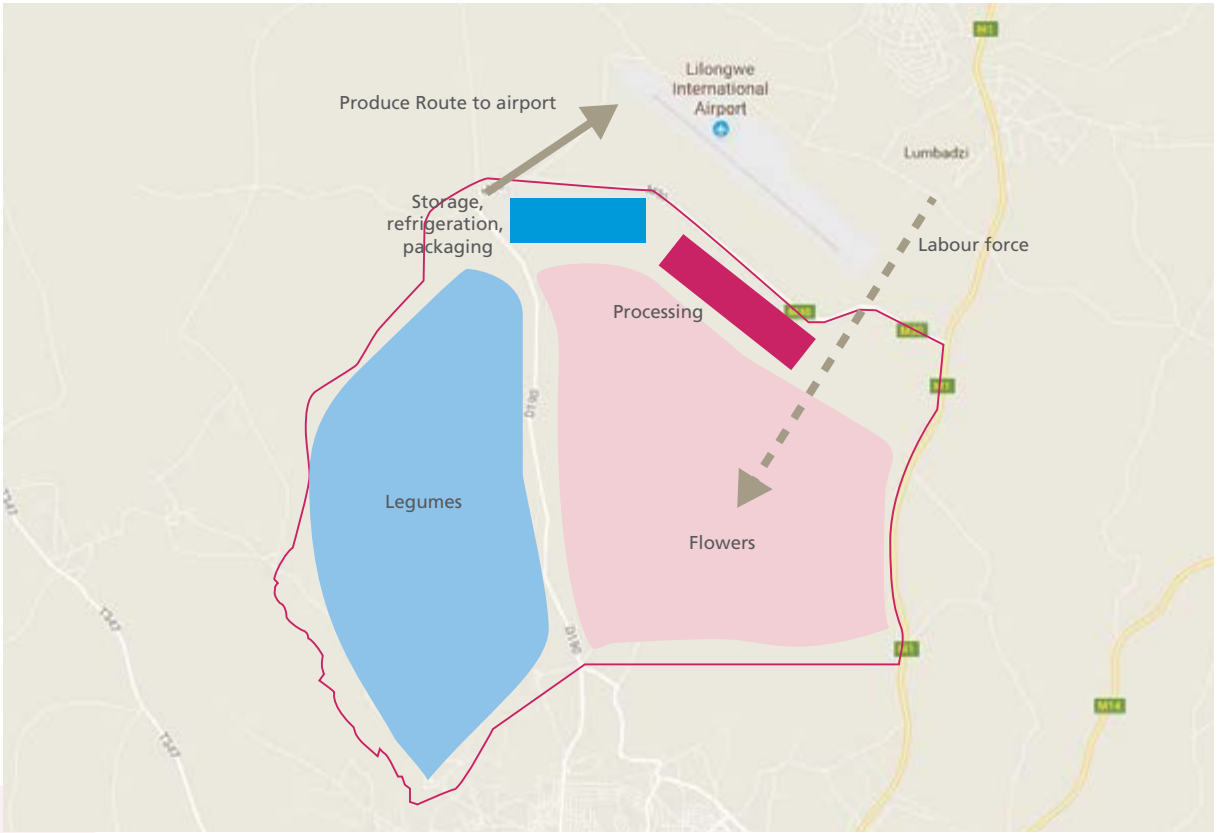
To this end the Government should establish a standing committee, led by the Ministry of Transport and Public Works, that includes representatives of concerned ministries, PPPC, and private sector interests. Its mandate would be to:

- Identify areas where air transport can assist productive development;
- Identify specific proposals for the development of the sub-sector;
- Identify projects and project leaders; and
- Source funding and develop implementation arrangements.

9.1.3 Specific proposals

The Government should identify specific development areas close to airports that can benefit from an airport's proximity. Such areas may be developed as Special Economic Zones (SEZs) with various tax and land servicing incentives for investors. An example in Area 55, Lilongwe, is shown as Figure 9.1. Other potential development areas or SEZs close to airports are: Salima, Chintheche, Kasungu, Mchinji, Kanengo, and Chigumula.

Figure 9.1 Potential SEZ, Area 55, Lilongwe



Source: Background map from Google Map

9.2 **Unmanned Aircraft Systems (UAS)**

The Government of Malawi, in conjunction with UNICEF, has established an air corridor to test potential humanitarian use of UAS (see Figure 9.2). The corridor around Kasungu airport, with a maximum radial distance of 40km, is the first in Africa and one of the first globally with a focus on humanitarian and development use. The corridor is designed to provide a controlled platform for the private sector, universities, and other partners to explore how UAS can be used to help deliver services that will benefit communities.

UAS are also more generally being used in Malawi. Currently there are three main applications:

- Imagery – generating and analysing aerial images for development and during humanitarian crises, including for situation monitoring in floods, and also used by the mining and extractives industries;
- Connectivity – UAS may be able to extend Wi-Fi or cellphone signals across difficult terrain, particularly in emergency settings; and
- Transport – delivery of small low weight supplies such as emergency medical supplies, vaccines and samples for laboratory diagnosis, including for HIV testing.

The transport application is limited by the payload capacity and range of UAS, but technology is advancing rapidly and each year longer range UAS with higher payloads are being developed. There are already fixed wing Remote Piloted Aircraft (RPA) in production with a payload of 100kg, equivalent to 200 blood-bags or 50 chickens.

Figure 9.2 UAS at Lilongwe

Courtesy of UNICEF

In the medium term, with a favourable regulatory and operating environment, UAS could be used in Malawi's commercial sectors for transporting:

- Fish from Likoma to the mainland;
- Tobacco samples from farms to processing companies and buyers;
- Materials used in road construction to central materials laboratories for testing;
- Mineral samples for testing;
- Medical supplies from a central store to rural areas, to avoid unnecessary stocks in many rural locations; and
- Larger-scale humanitarian aid, food and similar in emergencies.

The Ministry of Transport and Public Works can also use aerial data obtained from drones. UAS fitted with high definition cameras can explore ways to enhance mapping practices and regular inspections of roads, bridges and rail infrastructure, as well as documenting progress in work zones. UAS can play a role in increasing efficiency and improving employee safety by reducing the need to have workers in the field in high-risk situations.

Commercial applications for UAS will be facilitated by Unmanned Traffic Management (UTM) Systems which allow drones to go beyond the visual line of sight. In the short-term Malawi needs to adopt regulations for licensing pilots and registering craft.

ICAO has published a "Manual on Remotely Piloted Aircraft Systems (RPAS)". This document shows how the existing regulatory framework that was developed for manned aviation applies to unmanned aircraft; it gives insight into the changes that will be coming for RPAS. It gives an outline of ICAO's Standards and Recommended Practices (SARPs) and guidance material, with a view to other standardisation organisations to harmonise their activities.

The manual serves as an educational tool for states, industry, service providers and other stakeholders on most of the topics that comprise the regulatory framework.

ICAO's development of Standards and Recommended Practices (SARPs) for 2018 relates to airworthiness, operations (including RPAS operator certification) and licensing of remote pilots. This will include guidance material related to command and control in support of airworthiness and operations certifications will be part of the 2018 deliverable.

ICAO intends to complete SARPs for air traffic management and "detect and avoid" requirements for unmanned aircraft in 2020.

The commercial applications of UAS have the potential to reduce transport costs. Already, UAS can transport pre-paid mobile phone vouchers to remote rural areas at a lower cost to the user than conventional transport.

Infrastructure facilities for UAS are cheap. Rotary wing UAS require a landing area of less than 3m x 3m, whilst fixed wing UAS currently need a 100m grass landing strip without rocky intrusions.

Aside from the regulatory aspects for UAS which are being addressed, the Government needs to develop a strategy for UAS as part of the overall transport network, within which the private sector will be expected and encouraged to operate.

9.3 Proposals for other airports

It is strongly recommended that ownership of airfields is confirmed by DCA and title deeds acquired. Table 9.1 lists the proposals for non-international airports. In finding alternative owners, the first priority should be the relevant local authority. Some airfieds maybe candidates for humanitarian operations but with the advent of UAS's (drones) full facilities such as these are not necessary.

Table 9.1 Proposals for non-international designated airports

Airstrip	Owner	Proposal	Reasoning
Bangula	DCA	Find alternative owner or rent land for alternative uses	Nsanje is better strategic alternative, and close to Lengwe National Park
Chelinda	National Parks and Wildlife	Market Nyika National Park, and encourage air services from Blantyre and Lilongwe	-
Chilumba	DCA	Find alternative owner, handover to MDF or give license for lodge construction	Vwaza is close alternative
Chitipa	DCA	Secure with fencing	Potential strategic facility
Conforzi	Conforzi Ltd	Status quo.	-
Dwangwa	Dwangwa Sugar Corporation	Status quo. Seek sharing agreement for potential tourism flights to Nkhotakota Game Reserve	-
Kanongo	Kanongo Estate	Status quo	-
Karonga	DCA	Maintain and secure for mining and oil industry users	-
Kasungu	DCA	Maintain part for UAS. Consider selling, renting or develop for agro-processing	Potential SEZ
Kasungu Lifupa	Kasungu National Park	Status quo	-
Katumbi	DCA	Sell or give license for lodge construction	Chelinda is close alternative
Liwonde	Liwonde National Park (African Parks)	Status quo	-
Mangochi	DCA	Find alternative owner or rent for alternative uses	Alternatives at Club Makakola or proposed international airport
Matope	DCA	Find alternative owner or rent for alternative uses	Too close to Blantyre to be a feasible air destination
Mtakataka	Malawi Police	Handover to police for upkeep	-
Nchalo	Illovo	Status quo	-
Mchinji	DCA	Keep secure and fenced off	Growth area, potential SEZ
Monkey Bay	DCA	Keep secure	Strategic; close to HQ of Marine Unit
Mzimba	DCA	Find alternative owner or rent for alternative uses	Served by Mzuzu
Mzuzu	DCA	Relocate to Nkhata Bay	SEZ (Chintheche), Oil and Gas
Napolo	Nyasa Tours	Status quo	-
Nkhotakota	DCA	Explore land titles and find alternative owner	Encroached beyond recovery
Nsanje	DCA	Secure with fencing etc.	-
Ntchisi	DCA	Find alternative owner or give license for lodge construction	Nkhotakota is alternative and closer to the Lake
Salima	DCA	Keep and secure	Potential SEZ
Satemwa	Satemwa Tea Estate	Status quo	-
Thunga	Central African Co. Ltd.	Status quo	-
Vwaza	National Parks and Wildlife	Market Vwaza National Park, and encourage air services from Blantyre and Lilongwe	-
Zomba	DCA/Military	Handover to military for upkeep	-

Figure 9.3 shows a summary of the recommendations for airports and airfields in Malawi.

Figure 9.3 Summary of recommendations for airports

Legend

- Develop
- Dispose
- Dispose to Military
- Dispose to Police
- Foster Use
- None
- Promote for Mining
- Relocate
- Secure

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9.4 Regional safety oversight

Malawi is seeking to develop its Civil Aviation sector and create an autonomous Civil Aviation Authority (CAA). This is partly in response to the pan-African Yamoussoukro Agreement to liberalise aviation and foster co-operation between states and regions to boost efficiency, compliance and commercial aspects.

Among the southern African states, there are varying degrees of adoption of the Yamoussoukro principles and coordination on safety in civil aviation is required among these states. This will ensure that compliance with international standards is promoted and that national standards compliment those in neighbouring states to remove or minimise disparities.

The Malawian CAA should set up a national dedicated team of indigenous negotiators, regulatory experts, airport, air traffic and airworthiness specialists, which as a concept should be mirrored in neighbouring states. These national teams would set the scope of the coordination body and standards based on the African continental initiatives such as Yamoussoukro to create terms of reference. The regional co-ordinating bodies should also seek to join with other African regions, ideally under the African Civil Aviation Commission, and lead liaison with the ICAO and IATA safety councils to plan and implement safety actions, with safety council representatives as participants. Regular meetings of teams and regional bodies would encourage prioritisation of safety initiatives and attach importance at national leadership level.

The emphasis should be on establishing compliance with ICAO standards in Civil Aviation, particularly where previous inspections have flagged issues to be addressed. However, the following areas would be important to enable efficiency to be improved and co-ordination to get underway:

- Airspace multilateral agreement – to pave the way for regional single sky and enhance surveillance coverage, controller resourcing and develop the case for a regional centre to improve air safety.
- Industry safety management standards - to address the external perception that standards are poor and air services vulnerable to age, lack of maintenance and poor training.
- Co-ordination of training schools and skills retention - to foster new generations of apprentices, retain skilled engineers, air traffic controllers and operations staff. Develop regional pooling of resources to remove the burden from single nations.
- Air worthiness - to set standards on fleet age and support, regional engineering hub co-ordination, inspectorate retention and expansion.
- Digitisation regional roll-out - to modernise record keeping and management and encourage regional information sharing.
- Airport rescue and fire services - to develop a regional based framework of standards, backed by centralised training and equipment maintenance hubs.
- Collective regional security plan - to raise the profile of addressing vulnerabilities in airport and aviation security as well as develop training standards and coordinate regional procurement of new detection technologies.

The newly formed CAA should act as a conduit for implementation of the regional safety oversight and set out to target non-compliances as far as possible to enable the country to show by example how the wider region could operate.

9.5 Other activities

A number of other activities are recommended. These are listed below:

- Aviation school and apprenticeships in a variety of aviation trades to foster next generations and provide a career path of opportunities for Malawians. With the location of a CAA headquarters to KIA, it would be opportune to co-locate this with the aviation school to create a centre of excellence and provide courses and training that would draw people into the sector as well as aid retention through development.
- CAA to mandate records and sector performance returns to allow sector monitoring and publish statistics for growth analysis.
- Discussions with operators to broaden schedule range so that more of the operating day is utilised at KIA and Chileka.
- Greater priority on embracing natural power generation technology, with investment at Chileka in solar power as a priority for back-up.
- Cargo is a growth area and Malawian cargo has experienced profitability. This area should be expanded at Chileka to develop ground transport businesses and opportunities. The airport could act as a cargo distribution hub for local hauliers and transport.
- Airports should be encouraged to facilitate hotel development and support infrastructure (such as car hire) as additional facilities and business streams. This could also generate employment in these areas for a variety of trades.
- KIA and Chileka are received names from political or local origination, however in examples elsewhere such as the UK, it has been found that linking the name of the airport to its main customer base the city has had marketing benefits. DCA should consider this in the case of Kamuzu International Lilongwe and rename Chileka as Blantyre City Airport to emphasise this link.

9.6 Cross-cutting issues

The future development of air transport will need to take account of key cross-cutting issues. All stakeholders will need to ensure that they fully meet their obligations in reducing climate change and environmental harm. In particular:

- Airlines should be encouraged to use fuel-efficient and less noisy aircraft types and will be expected to meet any future requirements under the Kyoto Agreement or under current and future Emissions Trading Schemes;
- ATM routing distances should be minimised to reduce aircraft fuel burn;
- Noise preferential arrivals and departure routings should be established at all African airports to minimise aircraft noise exposure for local residents;
- The development of public transport in preference to road surface access to the major airport hubs should be encouraged where financially feasible (for example the NTMP proposes a Bus Rapid Transit (BRT) link to KIA); and
- In terms of gender equality, the air transport industry will need to provide equal employment and training opportunities in line with best global practice.

Fire service facility at
Chileka International Airport

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Malawi National Transport Master Plan

10 Proposals for legal and regulatory reform

Civil Aviation Sub-Sectoral Plan

10 **Proposals for legal and regulatory reform**

10.1 **Civil Aviation Act**

Following an audit of Malawi aviation sector by ICAO in 2013 and the recent European Aviation Safety Agency study, a series of recommendations were made to enable the Country to align with International best recommended practices and standards in the aviation sector and the region aviation strategies in response to the 2012 Abuja Conference on safety.

A key recommendation was that to provide regulatory and oversight function for the aviation sector, there was need to separate the function of regulatory and oversight functions from the ownership, management and operations of the airports where the regulatory and oversight functions should be undertaken by the Civil Aviation Authority (CAA) while the management and operations of airports is left in the hands of an Airports Company.

The Ministry of Transport and Public Works, and also through the Public Service Reforms under the Ministry responded to this in 2015 by proposing a Bill to create the new CAA on the basis that it would add credibility to Malawi's aviation governance and encourage overseas operators to add Malawi as a destination while the Public Service Reforms extended the Airport Developments Limited (ADL) mandate to manage and operate the key airports in Malawi.The Bill sets out to create a CAA to provide the regulatory and oversight functions for the service providers in the aviation sector while ADL operates in similar manner of the British Airports Authority or Airports Company of South Africa(ACSA), to own, manage and operate key airports in Malawi. This would pave the way towards creating a commercial body as evolved in the UK with British Airports and then privatized airport companies, so that the regulatory role is independent. The Bill was passed by Parliament in June 2017, and was assented to by His Excellency The President in August 2017.

10.2 **Overall institutional and regulatory reforms**

The key future institutional and regulatory development for the sector is the Civil Aviation Bill and the creation of a new autonomous Civil Aviation Authority and an extended mandate for ADL as an Airports Company. The latter is part of a wider Government reform agenda that should see policy, regulatory and operational roles functionally and organisationally separated across the Civil Aviation sub-sector.

The separation of the DCA and CAA has yet to be finalised and constitutions determined, as well as organisational development and capacity building for both organisations. The items below are summarised from strategies described above and should form the foundations of action in this area.

- Legal and practical creation of the (deleted Malawi) Civil Aviation Authority and extended mandate of ADL, according to an agreed implementation plan and timetable.
- Identification of dedicated civil aviation budget managed by CAA, with sufficient income to achieve financial sustainability.
- Creation of oversight by CAA of airport and aviation security – and jointly managed with the Police.
- Liberalisation of air route regulation to embrace the 5th freedoms.
- Appointment of airport management and operations out with the DCA to attract private sector candidates which can run airports as a business. This is important to bring commercialised operation closer to the technical operation and allow marketing

benefits to drive relevant operational decisions on strategy and budget.

- Airports have revenue generating areas and non-revenue making areas. When concessioning out operations it is best to segregate these areas to foster commercial development and to promote transparency, and avoid cross-subsidies.
- Reform of salary and reward scales for CAA professional and technical staff from civil service grades and rates to market-based scales, making posts and career more attractive/flexible for applicants.
- Assessment of residual functions of DCA to cover policy, standards, drafting regulations, either as a stand-alone functional review or a wider restructuring of MoTPW.
- Sale of the remaining Government stake in Malawi Airlines.
- Allowance of more private ownership and management of smaller regional airfields. Provide planning and tax incentives for development/competition.

10.3 Functions of the CAA

The new authority will regulate and be responsible for the safety, security, economic and technical oversight of Civil Aviation in Malawi generally. The Authority shall:

a. License and certify aircraft, aeronautical personnel, aerodromes, aircraft operators, training organisations, regulated agents and air navigation service providers;

b. Establish and maintain a system for the registration and the marking of civil aircraft, including rights and interest in aircraft;

c. Establish, coordinate and maintain national safety and security programmes;

d. Ensure the implementation of safety management systems by service providers;

e. Ensure fair trading practices and consumer protection;

f. Issue certificates of airworthiness and enforcement of approved technical standards of aircraft;

g. Approve, certify and license aircraft manufacturing, testing and maintenance organisations;

h. Facilitate provision of all the necessary support for aircraft accident and incident investigations conducted by or involving Malawi;

i. Carry out investigations on incidents that are not classified as serious incidents;

j. Ensure that meteorological services for air navigation are provided by an authority responsible for meteorological services;

k. Coordinate and direct search and rescue services;

l. Establish minimum knowledge and experience requirements for the technical personnel performing oversight functions and the provision of appropriate training to maintain and enhance their competencies;

m. Provide technical guidance, facilities and equipment to technical personnel to enable them perform their oversight functions;

n. Provide technical guidance to the Civil Aviation industry when necessary to enable compliance with the CAA Act;

o. Issue and disseminate aviation publications;

p. Establish, produce, promulgate and review of the National Civil Aviation Security Programme, National Civil Aviation Security Training Programme, and their quality control programs, and National Air Transport Facilitation Programme in line with the Government;

q. Investigate incidents of unlawful interference;

r. Ensure the implementation of measures to facilitate clearance of formalities at airports;

s. Develop an aviation policy framework to address the environmental impacts of aircraft and airport operations arising from noise, vibrations, emissions and the effects of work carried out at airports;

t. Ensure aircraft and airport operators and other entities take measures to reduce, control or mitigate adverse environmental effects generated by airport and aircraft activities and make available appropriate information to the public about environmental effects of Civil Aviation in Malawi;

u. Plan, develop and formulate airspace master plans and aerodrome master plans for the safe and efficient utilisation of Malawi airspace and land respectively;

v. Plan, develop and formulate the provision of technical services for the design, installation, and modification of electronic,

radio and other equipment used in the provision of air navigation services;

w. Produce accurate, timely comprehensive and relevant air transport data and information for planning and decision making purposes;

x. Coordinate all international civil aviation related matters; and

y. Ensure the provision of air navigation services, alerting services and coordination of search and rescue in Malawi airspace, and any areas outside of Malawi for which Malawi has in pursuance of international arrangements undertaken to provide air navigation services.

10.4 Air accident investigation

Serious incidents should be investigated by a body independent of the CAA. On a yearly basis between 30 - 40 incidents are reported. Some form of AAIB is critical regardless of scale and frequency of accidents occurring in Malawi's air transport industry. The AAIB is only called into action in the event of a serious incident or if instructed by the Minister responsible for air transport.

An Air Accident Investigation Board has been established under the Ministry of Transport and Public Works. This is appropriate for the scale and frequency of accidents currently, which is low.

However there are inadequate skills possessed by members in relation to the duties expected to be carried out. There is no dedicated office to house literature materials, reports, documents etc and the members themselves. There are two options:

1. Resource the AAIB through a line item in the Ministry's annual budget.
2. Resource the AAIB through stakeholders contributions (may require legal backing).
3. Outsource all accident investigations as and when needed.

10.5 European Aviation Safety Agency (EASA) support

Reviews by ICAO between 2008 and 2012 of Malawian sector issues concentrated on safety and security performance across airports, aircraft operation and inspectorate resources. EASA has provided continuing training for specialists in airworthiness, flight operations and licensing inspectors so that numbers and capacity are improved.

Additionally, this has helped attract investment from the European Investment Bank (EIB) to provide the funding for reviews into safety and identify measures that could improve the operations at the major airports, such as the rehabilitation or replacement of the ILS at Chileka International Airport and replacement of security and safety equipment at Chileka and KIA.

It is recognised that with plans to expand facilities and subsequently attract larger aircraft and greater numbers of passengers, safety standards may be compromised, so the support in training inspectors to accompany the new CAA and DCA functions would allow this to be monitored and actions addressed in the short term rather than await international inspection. The situation at the main airports in 2012 was verging on states banning flights to Malawi due to the state of safety provision particularly at Chileka. Subsequently an action plan by ICAO was put forward as a response to this.

10.6 Safety and security

ICAO surveys of the main airports found that passenger security and infrastructure were not fully integrated with airport operational management practice. This was largely due to the separate responsibility and operation by the Malawi Police at airports, which needs to be jointly managed by the CAA airports structure. Recommendations include the following:

- Malawi Police to share management of aviation security with the new CAA.

5 *The CAA Bill provides for the CAA to retain all revenues from charges it makes, including presumably any security charges.*

- Allow KIA and Chileka to recruit directly for terminal security staff – to boost employment and dedicated staff opportunities. This would give airports greater control on security operations and relieve pressure on the police to resource. The airport could also develop a specifically trained team that would create staff development opportunities and some loyalty to the operation and protection.
- Police to have responsibility for external security at airports with a specialist department for port of entry traveller scrutiny. ICAO is pressing for greater conformity in Africa with its policy on security (IACO Convention -Annex 17) which involves improving the security environment to generate confidence from external airline operators regarding safety. With political instability in various parts of the continent, ICAO are keen to ensure that regions cooperate on border traffic and immigration checks to manage this particularly at smaller and remote airports.
- National training standards in Civil Aviation security for specialist and Police staff to be set up with training contracts outsourced to a recognised provider (e.g. South Africa).
- Funding streams for terminal security equipment and perimeter control to be legislated as part of a dedicated Civil Aviation budget (complies with the Yamoussoukro requirements).[5]
- Greater liaison and co-operation with countries hosting recognised excellence in security management and training to raise Malawi's profile in the international context.
- New baggage handling technology and security systems at KIA and Chileka – with customer airlines to comply with international baggage security requirements. With proposed terminal developments, this is slated as part of the improvement programme and to provide a greater degree of resilience in equipment.

10.7 **Airport management**

Ideally there should be a variety of interests operating airports in order to promote competition and reduce costs. In the medium term it is recommended that ADL manage all the international and major domestic airports. To do this ADL need to absorbed some operational functions from DCA i.e. Fire services and Air Traffic Services.

ADL should also develop a clear commercial strategy that encompasses handling concessions, terminal retail, car parking, advertising, hotel franchises and external retail/commercial opportunities as well as car hire. There should be clear linkages with tourism bodies to maximise development of accommodation at domestic airports in or close to safari parks, and franchises should be offered for this.

By having the empowerment to deal with operational staff selection and employment as well as security staff, the burden of the Government doing this via the civil service or the Police is reduced in terms of need for bureaucracy and using Police manpower. There will be a need to bolster the airport security regulatory aspect within the Government, and this would address some of the fundamental comments by the ICAO inspections, as well as a response to Yamoussoukro.

The main advantage of expanding ADL's mandate will lie in its commercial freedom to pursue revenue opportunities that will generate finance to feed back into infrastructure at individual airports.

Table 10.1 International airports and population

Country	No. of international airports	2015 Population (millions)
Ethiopia	1	99.4
Malawi	5	16.3
Mozambique	3	28.0
South Africa	3	54.9
Zambia	4	15.5

10.8 Case for further privatising airport operations

There is a strong case for KIA and Chileka to be fully privatised airport operations by the end of the plan period. Of these, KIA would be first. In advance of privatisation, the changes proposed in this report need to bedded in and evidence of improvement over a measurable set of years that can be sustained needs to be shown.

Privatisation is a goal that fits with the spirit of Yamoussoukro as well as best international practice. It will require a strong traffic base and variety (passengers and cargo), so solid domestic connections, continental and global links will be important to support market interest in the airport, and for it to become self-supporting.

The smaller airports tied to say, industrial or tourist facilities, should be hived off sooner. ADL operates a limited set of the larger airports the same way as British Airports Authority (BAA) did in the past, with a body like the former British Airports International (BAI) overseeing the smaller regional and domestic airports in advance of any divestment.

10.9 Designation of international airports

10.9.1 Points of Entry

Many African countries designate a limited number of airports as international. South African and Ethiopia recognised the economic benefits of reducing the points of entry and international air outlets in their territories some time ago. Mozambique followed this trend in 2015, by re-designating Namula, Pemba and Vilankulos as domestic-only airports, and reducing the number of international airports to just three: Beira, Maputo and Nacala. Zambia has four international airports (Lusaka, Livingstone, Mfuwe and Ndola) and South Africa (Johannesburg, Cape Town, Durban) has just three (Table 10.1). Having one or two international designated airports would stimulate the growth of domestic airlines benefiting from traffic on domestic routes from Lilongwe/Blantyre to Likoma, Mzuzu.

It is recommended that a study be commissioned to determine the optimum number of points of entry that could lead to decreased operating costs and an enhanced domestic aviation industry.

10.9.2 **KIA and Chileka**

There is a significant gap in facility capability between KIA and Chileka and the other three designated international airports. The size/code of runway, apron and terminal capacity (or potential to develop), navaid use/compatibility and landside space for commercial/airport expansion (such as car parking, hotels and cargo) would be the normal criteria for designating an airport as international.

The traffic expectation for international airports would be medium haul aircraft and potential regular long haul, so for these design aircraft categories only KIA and Chileka would normally be designated as international airports. In the future, there will be fleet changes in airlines in other countries and therefore further investment in facilities will be needed to keep abreast of developments, which will be expensive. This will reinforce the case for only two international airports, within which it is likely that KIA and Chileka will end up prioritising markets. The priorities for KIA are likely to be continental and global international passengers, plus some cargo, whilst Chileka is expected to prioritise regional international and domestic passengers, with a cargo hub.

There are cases for designating other airports as international, as listed below, but care needs to be exercised; balancing the benefits of international traffic against the costs of facilities and the operating costs of customs, security and immigration.

10.9.3 **Karonga**

Karonga is a designated international airport and has, in the past, accommodated international (regional) flights associated with the Kayelekera uranium mine. This mine is expected to have five more productive years once operations re-start. However, there is a range of mining potential in the vicinity of the airport as well as the exploratory oil block 1 and 2. For these reasons, Karonga airport could have a long-term potential as an international facility. Runway repairs and improvements to passenger facilities are required.

10.9.4 **Likoma**

Although Likoma is designated as an international airport, there are no scheduled international flights. The designation is based on a desire to attract tourists directly to the island without first having to fly to Lilongwe first. The target market is initially tourists who have a game park holiday in Zambia, and wish to follow or precede that with a more relaxing time at Likoma. The primary target international flight would be Mfuwe to Likoma. Currently Ulendo operate both Mfuwe-Lilongwe and Lilongwe-Likoma. Not all passengers flying from Mfuwe are destined to Likoma, and the market is certainly not big enough at present to warrant direct flights. Indeed, the market is constrained by the capacity of accommodation on Likoma. Increasing accommodation on Likoma would act against its attractiveness as a niche destination, and its long-term potential is not in mass-market tourism. At the same time, there are benefits to Malawi in passengers stopping off elsewhere (e.g. Lilongwe) en-route to Likoma. Those that want to move without stopping over have a reasonably short wait at Lilongwe under the current flight schedule.

10.9.5 **Mzuzu**

Mzuzu Airport suffers from encroachment and is deemed to not be able to fulfil its function as an airport. There are very preliminary plans to relocate the airport outside the city. A new airport in such a location would be unlikely to be attractive to any international routes, and there is little to be gained from an international designation. Nkhata Bay offers much greater potential as an international airport in the medium to long term, as is lies close to oil exploratory blocks 3 and 4.

10.10 **Future role of the DCA**

With the establishment of a Malawian CAA, the primary role of the DCA in the future would cover policy, planning, and monitoring. These functions should be taken over by the Department of Transport Planning in the MoTPW. Not only is this a more efficient use of resources, it allows for greater co-ordination in planning across all the modes of transport that integrate with Civil Aviation.

The DCA would have a residual role in managing domestic airports not managed by ADL. These are listed in Table 9.1, which shows proposals for the divestment of a number of airstrips. This could be handled by the Buildings Department within the Ministry.

Those airports that remain under the DCA should be taken over either by local authorities and/or leased or concessioned to private sector airport operators who would take care of maintenance and development. Ultimately, the DCA can cease to exist.

Apron at Kamuzu International Airport

ATKINS

Malawi National Transport Master Plan

11 Implications of the Yamoussoukro Agreement for Malawi

Civil Aviation Sub-Sectoral Plan

11 Implications of the Yamoussoukro Agreement for Malawi

11.1 Context

Africa accounts for less than 1% of the global air service market. Part of the reason for Africa's under-served status is that many African countries restrict their air services markets to protect the share held by state-owned air carriers.

This practice originated in the early 1960s, through BASA arrangements, when many newly-independent African states created national airlines, in part, to assert their status as nations. Now, however, most have recognised that the strict regulatory protection that sustains such carriers has detrimental effects on air safety records, while also inflating air fares and dampening air traffic growth. In addition, any finance used to support a national airline could be better directed into infrastructure for the longer-term benefit to the economy.

The Yamoussoukro Declaration of 1988, committed a large number of African countries to principles of air services liberalisation.

African ministers responsible for civil aviation adopted the Yamoussoukro Decision in 1999, which commits its 44 signatory countries to deregulate air services, and promote regional air markets open to transnational competition.

The Yamoussoukro decision calls for:

- Full liberalisation of intra-African air transport services in terms of access, capacity, frequency, and tariffs;
- Free exercise of first, second, third, fourth and fifth freedom rights for passenger and freight air services by eligible airlines (These rights, granted by most international air service agreements, enable, among others, non-national carriers to land in a state and take on traffic coming from or destined for a third state.);
- Liberalised tariffs and fair competition; and
- Compliance with established ICAO safety standards and recommended practices.

In 2000, the Decision was endorsed by head of states and Governments at the Organisation of African Unity, and became fully binding in 2002.

Over the past decade, Africa's aircraft hull-loss accident rate is more than six times higher than those of Asia and Latin America, and more than 12 times higher than those of Europe and North America. This safety record creates a picture of an unsafe environment deterring investors. It also reflects a lack of regulation and effective safety oversight.

This poor accident rate is expected to improve if African states apply bilateral sanctions against airlines that fail to meet safety standards established by the International Civil Aviation Organisation (ICAO), as African air regulators agreed to do when they signed the Yamoussoukro Decision in 1999.

Establishing and enforcing penalties would penalise the worst performers and eventually force them out of the market.

Countries that were to abandon national airlines could be in a position to redirect state resources to investments that have more positive impact on economic development. Lower transport costs achieved through enhanced competition could reduce trade barriers for African countries, while also improving prospects for increased tourism.

20 percent of Africa's tourism-related jobs are supported by visitors arriving by air, compared with only four percent in North America. On the basis of studies showing increased air passenger traffic following air services liberalisation on other continents, as well similar findings for Africa sub-regions that have liberalised, there is a view that liberalisation could deliver similar gains for African countries that have yet to implement the Yamoussoukro Decision.

The African Civil Aviation Commission should have a significant role in ensuring the continentwide adoption of Yamoussoukro.

Experience with liberalised air services elsewhere has also shown that they result in increased trade, both regional and intercontinental. Competitive air carriers with more frequent flights and lower fares can also offer the potential to trade in perishables and high-tech manufactures.

The Yamoussoukro Decision applies to all its signatory states. Those that have not signed or properly ratified it are Djibouti, Equatorial Guinea, Eritrea, Gabon, Madagascar, Mauritania, Morocco, Somalia, South Africa, and Swaziland.

11.2 Advantages and disadvantages of Yamoussoukro to Africa

The key advantage of fully implementing the Decision in terms of de-regulation and full 5th Freedom Rights is expected to be higher frequencies and lower costs, leading to an increase of tourists to and within Africa and the creation of new business opportunities. Trade could also benefit through the availability of new air freight links. Set against this, under an indiscriminate exchange of 5th freedom traffic rights, African carriers could face direct and aggressive competition from 3rd country airlines on routes within Africa. Whilst this could assist in providing competition, the ability of Africa's airlines to compete on equal terms with 3rd country airlines must be considered.

Malawi could look to sell its legacy London slots as part of Yamoussoukro compliance. This would free up revenue for investment. Government's role would be to focus on governance aspects to ensure standards and safety are maintained.

Were new services to start up on a 5th freedom basis, this could stimulate the market which could ultimately lead to the introduction of air services on a 3rd and 4th freedom basis.

6 *5th Freedom Rights - The right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and to take on, in the territory of the first State, traffic coming from or destined to a third State*

Clearly, the introduction of a 5th freedom airline in competition with existing 3rd and 4th freedom airlines will increase consumer choice and convenience of travel due to a higher frequency of flights. The enhanced airline competition ought to lead to lower airfares. However, this introduces a potential element of unfair competition. For example, a 5th freedom airline operating services at intermediate and beyond points could subsidise the 5th freedom sectors to attract more traffic. In addition, 5th freedom airlines are in a strong position to sell seats at lower fares on the 5th freedom sectors as the long-haul passengers have to be conveyed to the point(s) of final destination. This enables the airlines to sell empty seats on 5th freedom sectors at reduced fares. 3rd and 4th freedom airlines could suffer losses as a result and this could lead to the withdrawal of some direct air services, thus reducing passenger choice.

AFCAC should establish the framework for implementation that reflects best practice elsewhere. Malawi could then position itself as a beneficiary of the airline market, not a player, thus encouraging full freedom traffic to gain revenue from destination, transiting and overflight traffic.

As the dominant airline in the region, reciprocal exchange and exercise of 5th freedom traffic rights should benefit South African Airlines through the creation of additional opportunities to convey traffic. However, South African Airlines needs to protect its fare revenue on routes where there is limited competition such as those to Malawi. For these reasons, South Africa is not keen to implement Yamoussoukro in the short term.

The free exchange of 5th freedom traffic rights will increase the attractiveness of major airports and assist in developing and strengthening the positions of the airports into significant regional hubs. However, 5th freedom carriers may erode the home base of local airlines to the extent that the local airline industry could collapse. Malawi should exploit the benefits to the airports.

11.2.1 Extent of implementation of Yamoussoukro by regional economic community

1. AMU (North African States)

- There has been no implementation of the Yamoussoukro Decision;

- No liberalisation of air services has been initiated, however the need for liberalisation has been recognised;
- Is expected to fall in line to implement, owing to commercial and diplomatic pressure.

2. CEMAC (Central African States)

- The principles of the Yamoussoukro Decision have been agreed upon in an air transport program, some minor restrictions remain;
- With regards to the liberalisation of air services, up to 5th freedom rights have been granted, tariffs are free and capacity and frequency are open. A maximum of two carriers per state can participate. Results not yet fully known; and
- This could support route expansion for Malawi and ease open sky traffic management.

3. COMESA (Common Market for East and Southern Africa)

- The status of the Yamoussoukro Decision implementation that full liberalisation has been agreed upon, but application and implementation remain pending until a joint competition authority has been established;
- Liberalisation of air services is pending. Once applied, operators may be able to serve any destination and tariffs, capacity and frequency will be free; and
- AFCAC is expected to push for liberalisation.

4. EAC (East African Community)

- The EAC issued a directive to amend bilateral among EAC states to conform to the Yamoussoukro Decision;
- Air services are not liberalised because the amendments to bilateral agreements remain pending; and
- Protected national airlines are an issue that needs addressing.

5. SADC (Southern Africa Development Community)

- No steps towards the implementation of the Yamoussoukro Decision have been taken, even though SADC's civil aviation policy includes the gradual liberalisation of air services within SADC; and
- No liberalisation of air services has been initiated within SADC.

6. WAEMU (Economic Community of West African States)

- The Yamoussoukro Decision has been fully implemented;
- The status of the liberalisation of air services is that all freedoms, including cabotage, have been granted. Tariffs have been liberalised. Low cost airlines have emerged; and
- As with Central Africa, regions that have implemented will form the basis of the continental solution for open sky business.

The issue of cabotage tends to be a challenge when security is weak. Implementing Yamoussoukro should therefore involve working to build confidence that security is a demonstrable priority. Malawi will need to resolve the control of airport security as part of its institutional reform agenda, and ensure that funding for dedicated resources are available.

11.3 Advantages and disadvantages of Yamoussoukro to Malawi

With just two airplanes, Malawi Airlines is not in a good position to break into new markets as a 5th freedom operator. Even if it were, the benefits to Malawians would be negligible as only 3rd freedom passengers would gain. Malawi Airlines could invest in new aircraft to take advantage of 5th freedom rights, but the Government is not in position to take the financial risk, and the strategic partner would be far better off investing in 3rd country routes for Ethiopian Airlines.

For Malawi to benefit from an open skies policy, there will need to be operators willing to take on new routes to/from and within Malawi either not already run by other operators, or to duplicate routes with improved services and lower fares, if they judge that there is sufficient market potential. Some potential examples, and possible consequences are outlined in Table 11.1.

Investment in infrastructure at airports will be crucial as some of these are not close to the standard required for modern airline operations. In addition, Malawi could become a victim of its own success and increase passenger numbers too quickly overwhelming existing facilities.

Table 11.1 Examples and implications of open skies policy to Malawi

Intervention	Current situation	Potential implications
Emirates to operate Lusaka-Lilongwe	One operator (Proflight) runs this a direct route 5 times per week. Malawi Airlines operate between Lilongwe and Lusaka, daily via Blantyre. There is no 5th freedom right between Lilongwe and Lusaka.	For Emirates, it may make sense to add a short sector to the long haul Dubai-Lusaka sector. This would enable it to increase load factors on this sector, while operating at well below 50% on Lusaka-Lilongwe. For passengers to/from Malawi a direct connection to Dubai with no change would be very attractive, and this could be augmented by passengers just for the short sector between Lilongwe and Lusaka. Traffic would be generated in this market. On the current schedule the short sector would operate from Lusaka in the afternoon, with the flight from Lilongwe being late evening. Emirates would need to be convinced that fuel and maintenance facilities at Lilongwe were credible, and that the layover time was sufficient. Given the timing, Proflight would expect to maintain a share of the market, even if Emirates operated daily. However, Emirate could offer a much reduced fare at first. This could force Proflight into cutting its fares, or, more likely, reducing services. It may useful to locate a hotel near the airport to cater for delays. This is being proposed, in any event.
Kenya Airways to operate Lusaka-Lilongwe as a 5th Freedom right	As above.	Kenya Airways operate Lusaka-Harare. Although the sector is part of a triangle serving Nairobi, and Kenya Airways would have 3rd and 4th freedom rights, they have also secured rights to pick up and set down passengers flying between Lusaka and Harare. Under 5th freedom, Kenyan Airways could also link their Lusaka and Lilongwe flights to/from Nairobi with a sector between Lilongwe and Lusaka. The attraction of this route would be centred on the Lilongwe-Lusaka sector, as passengers can already access Nairobi on Kenya Airways. Kenyan would not gain many passengers on the longer sector, but may be interested in extra revenue on the short sector. Impacts on Proflight would be similar as above, but more pronounced if Kenya Airways were able to schedule in the afternoons, as at present. Proflight may not be able to compete in the long term.
South African Airways to operate Lilongwe-Lusaka	As above.	Since SAA already operate shuttles between OR Tambo and both Lusaka and Lilongwe, a new operation would most likely be offered by one of its lower cost subsidiaries on a dedicated shuttle basis. This would compete with Proflight for a small market, but would expect to generate traffic. Lower fares could result in the short-term. However, Proflight's safety record is not good and may be reason for falling foul of the Yamoussoukro Decision requirements.

Table 11.1 Examples and implications of open skies policy to Malawi (continued)

Intervention	Current situation	Potential implications
Any carrier to operate Lilongwe-Johannesburg	SAA operate this route on a daily basis. Malawi Airlines run Lilongwe-Blantyre-Johannesburg daily.	This is the prime air route to/from Malawi, of which SAA takes the majority of the market at fares well above world averages. Competition on this route that led to reduced fares would benefit Malawians, and could enhance tourism. Profight, which currently operates Lusaka-Durban, might be interested in this similar length route, although its business model tends to shy away from direct competition. If Precision got a foothold in Malawi, then it would no doubt show interest too. Larger carriers such as Kenyan and Ethiopian may be less suited to a head-to-head with SAA. Air Rwanda is aggressively expanding in southern Africa, and would certainly review this opportunity carefully. Fast Jet is relocating its base to South Africa so may also be interested.
Any operator to run Mfuwe-Likoma	Currently there is no direct flight, although Ulendo operates Mfuwe-Lilongwe-Likoma, with the latter sector as a domestic leg. Ulendo could operate the whole route directly since Likoma is now designated as an international airport. Other operators could come into the market.	This is a niche route, nearly wholly for tourists from South Luangwa to Likoma, with very low traffic potential. High fares are possible with such a market, which could attract new operators, and is unlikely to reduce transport costs. The current flights from Mfuwe to Lilongwe are usually at capacity (13 pax). This could assist tourist access to Likoma, but the island itself has limited accommodation for this market.
Any operator to run Mfuwe-Mangochi	No direct flight.	Not such a niche market as above, but capable of withstanding relatively high fares. The advantage to Malawi and an operator is that there is a bigger range of accommodation in the Mangochi area, and hence the route could attract tourists to Malawi from Zambia, as well as generating potentially higher loads than a Likoma route. This may require additional airport infrastructure investment.
Any operator to run Blantyre-Lilongwe	Currently operated by Malawi Airlines twice daily.	This needs to cater for business passenger, and as well as competing with the existing operators needs to take account of the range of coach services between the two cities. Lower cost carriers could compete with Malawi Airlines and coaches by careful time-of-day scheduling. This could force Malawi Airlines to cut the route, but a monopoly on the route might not allow an operator to raise fares indiscriminately owing to the coach competition.

Table 11.1 Examples and implications of open skies policy to Malawi (continued)

Intervention	Current situation	Potential implications
Any new carrier to operate on Lilongwe/Blantyre-Dar es Salaam	Currently solely operated by Malawi Airlines on a 3 times per week basis	This route offers a relatively large market which a number of carriers, not least Precision Air, would like to operate. This is potentially Malawi Airlines' route most vulnerable to competition. Precision Air may have issues with its ownership and claims of protectionism, but the route in an open market is expected to attract more credible operators. Whilst a competitor would result in improved frequencies and probably lower fares, this might be only a short-term consequence.
Any new carrier to operate on Lilongwe-Harare	Operated by Malawi Airlines and Kenya Airways	Fares on this sector are already relatively low due to the competition. A further player in the short-term is unlikely.
Any new carrier to operate direct flights to Mozambique	No direct flights	The current civil situation in Mozambique argues against large scale interventions in this market. However, in the longer term and under stable conditions, direct flights from e.g. Lilongwe to Maputo, could prove of immense benefit to both countries' citizens in order to avoid flying via Johannesburg at well above world average fares. With both Malawi Airlines and LAM not geared up for such expansion, lower cost carriers such as Precision may be interested.
Any carrier to operate any route not currently operated	No current operations	The small market and lack of home base militates against a foreign carrier introducing many new routes in, to or from Malawi. The potential for large scale increased accessibility and lower fares by air for Malawians is small in this case.

There is a need for airport and air navigation infrastructure and safety oversight to be developed and improved as a matter of priority to set the stage for airline/ industry investments that should flow from Yamoussoukro.

Open skies under the Yamoussoukro Decision will only work if this includes greater investment and co-operation on en-route navigation and control technology. There are moves to do this at the regional level, but AFCAC and others need to encourage nations to combine in funding a continentwide coverage to provide up to date facilitation and control of revenues so that nations benefit from overflight traffic and are able to retain trained personnel and manage resources. Malawi needs to be part of this in the long term. Malawi, Zambia and Zimbabwe already have a joint agreement on 5th Freedom rights.

Table 11.1 suggests that Malawi has little to gain from embracing Yamousuokro in the short term. The current market is very small and potentially fragile to shocks that might occur from a unilateral open sky in Malawi. It is recommended that in the short term the status quo is maintained, and that Malawi continues to pursue new carriers into the country and increased accessibility through bi-lateral arrangements.

It could be argued that by not implementing Yamoussoukro, Malawi is in breach of its own Fair Trading and Competition Act. However, legal opinion suggests that this is not the case, particularly in view of the long term aim of embracing full liberalisation of the air transport market. There are other monopolies in the sub-sector which require attention.

Malawi could also benefit from cargo operation liberalisation. 7th Freedom rights should be granted to foreign freight operators at KIA, Chileka or both, with a view to developing the potential air cargo market.

The runway threshold at Chileka International Airport

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Malawi National Transport Master Plan

12 Climate change

Civil Aviation Sub-Sectoral Plan

12 Climate change

12.1 African Union response

In order to mitigate climate change impacts, African States have coordinated with ICAO and Civil Aviation authorities work through the African Civil Aviation Commission (AFCAC) in collaboration with the African Airlines Association (AFRAA).

Individual states in the region have embarked on several programmes to reduce emissions, which could equally be adopted in Malawi. These include the aircraft fleet renewal programme made possible by the Cape Town Convention, the modernization of the Air Traffic Management Systems, the use of environmental friendly Ground Support Equipment and the building of new terminal buildings powered by renewable energy sources (Solar/Wind turbine); and the adoption of the ICAO Environmental System Management by some African airlines.

The AU recognise an increasing need for better coordination between the aviation and environment experts to develop and enhance expertise, knowledge and harmonisation of positions on issues of environment and climate change. It is therefore important that Malawi includes aviation and environmental experts in their delegations to AU environmental protection meetings and conferences.

12.2 Mitigation measures

The recommended best practices for climate change mitigation are:

1. Fleet renewal - airlines will need to procure new generation lower emission aircraft. At present this is voluntary, but the new CAA could put in place regulations on emission standards for domestic and foreign carriers.
2. Improved operational practices - it include reducing APU (auxiliary power unit) usage, more efficient flight procedures, and weight reduction measures.
3. Infrastructure - full implementation of more efficient ATM (air traffic management) and airport infrastructure could reduce emissions by 10% in Malawi.
4. Engine retrofits and airframe technology - modifications to the existing fleet using current technologies (winglets, drag reduction, etc.) can also achieve a reduction in emission.
5. Biofuels - Recent tests carried out by the EU on biofuels have demonstrated that a reduction of 80% of CO2 emissions, on a full carbon life-cycle basis, can be achieved. IATA has set a target to be using 10% alternative fuels by 2017.

12.3 **Adaptation**

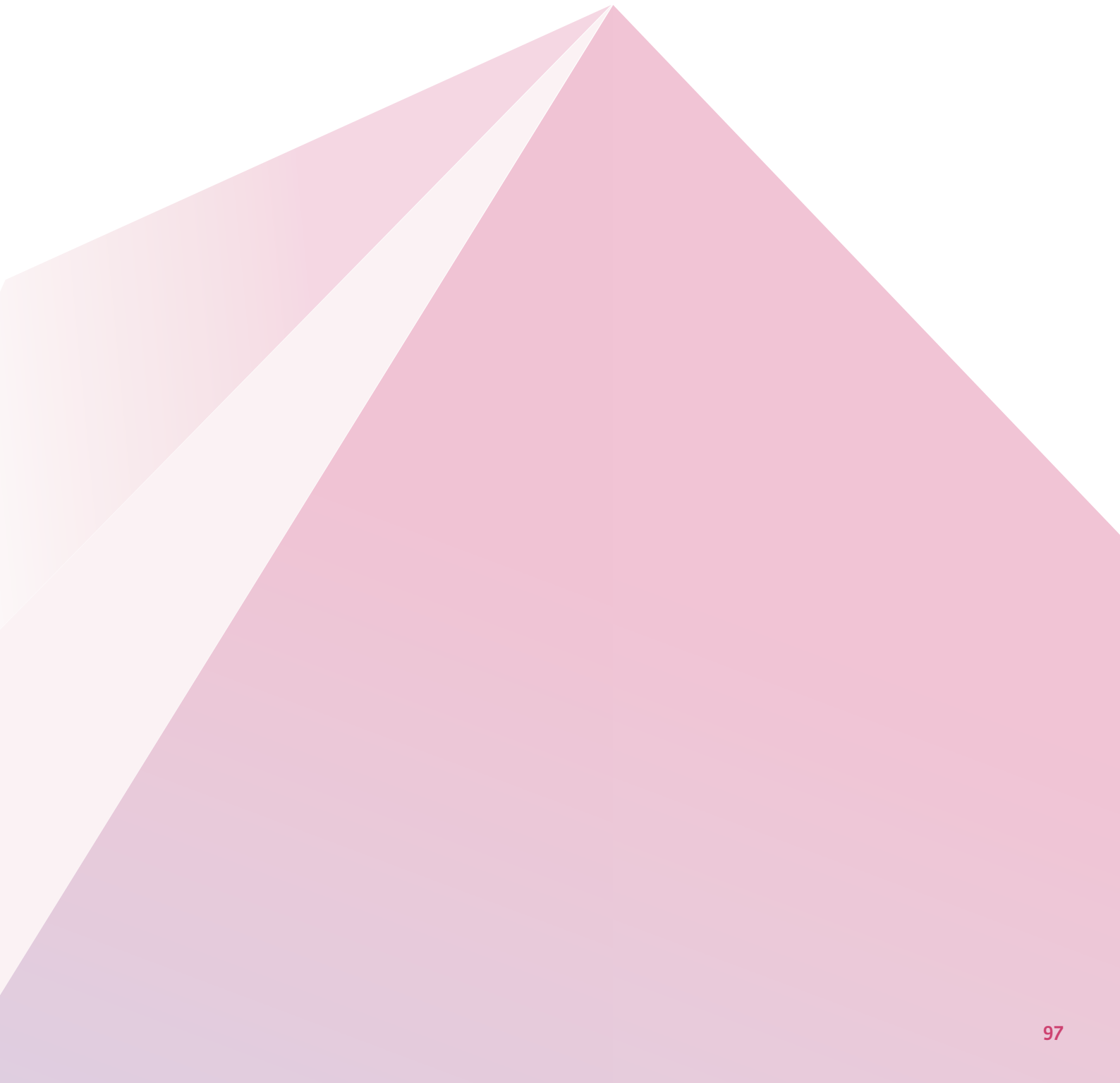
All indications are that in the future there will be increased frequency, amplitude, duration and severity of high-impact weather events due to climate change and increased variability. Accordingly, the need for improved and more timely weather information is becoming even stronger. Many parameters used in flight planning depend on weather and climate; ranging from the temperature dependence of the maximum take-off weight, climb performance (i.e. important for obstacle clearance), to maximum cross winds and tail winds. All of these variables are expected to be subject to significant changes with a more volatile climate.

Adaptation measures are those activities undertaken by stakeholders to manage the consequences of climate change on aviation. The main consequences as a result of high accumulation of GHG emissions in the atmosphere include sea level rise, temperature changes, changes in precipitation and increased storms. Some examples of tangible adaptation measures that can be implemented to counter the effects of climate change in aviation operations include: improving the defences of existing airports close to water bodies; relocating coastal airports further inland; and using modern technology like Light Detection and Ranging (LIDAR) to manage clear air turbulence.

Adaptation activities need to be integrated into the overall environment planning activities in the Civil Aviation sector, at both national and regional levels. The creation of a disaster operations group that provides airport operators, with a formal reference framework to establish and apply mutual assistance programmes, during the occurrence of regional catastrophes is an example of the types of initiative that could be implemented.

Further research is needed to better understand the potential impacts of climate change on capacity and demand, it is also necessary to progress with implementation, particularly since early action can be cost-effective. In particular, measures which are intended to build greater weather resilience and facilitate operations in adverse conditions, and address issues such as capacity, or improve infrastructure, can be cost and resource efficient solutions. The least expensive and potentially most effective ways to build resilience are: staff training, sharing of best practices, experiences and solutions, and the implementation of processes which facilitate collaborative responses to climate change challenges.

Adaption plans need to be prepared, preferably for individual airports. This can be based on a risk management approach similar to that used for safety issues. Hazards should be identified and rated on both their likelihood and the potential severity of the outcome. These can then be combined to provide a level of risk priority. Risk mitigation measures already in place should be assessed, along with the uncertainty or confidence associated with the projections. Finally, the process can define what adaptation responses need to be acted upon.



Airside support facilities at
Kamuzu International Airport

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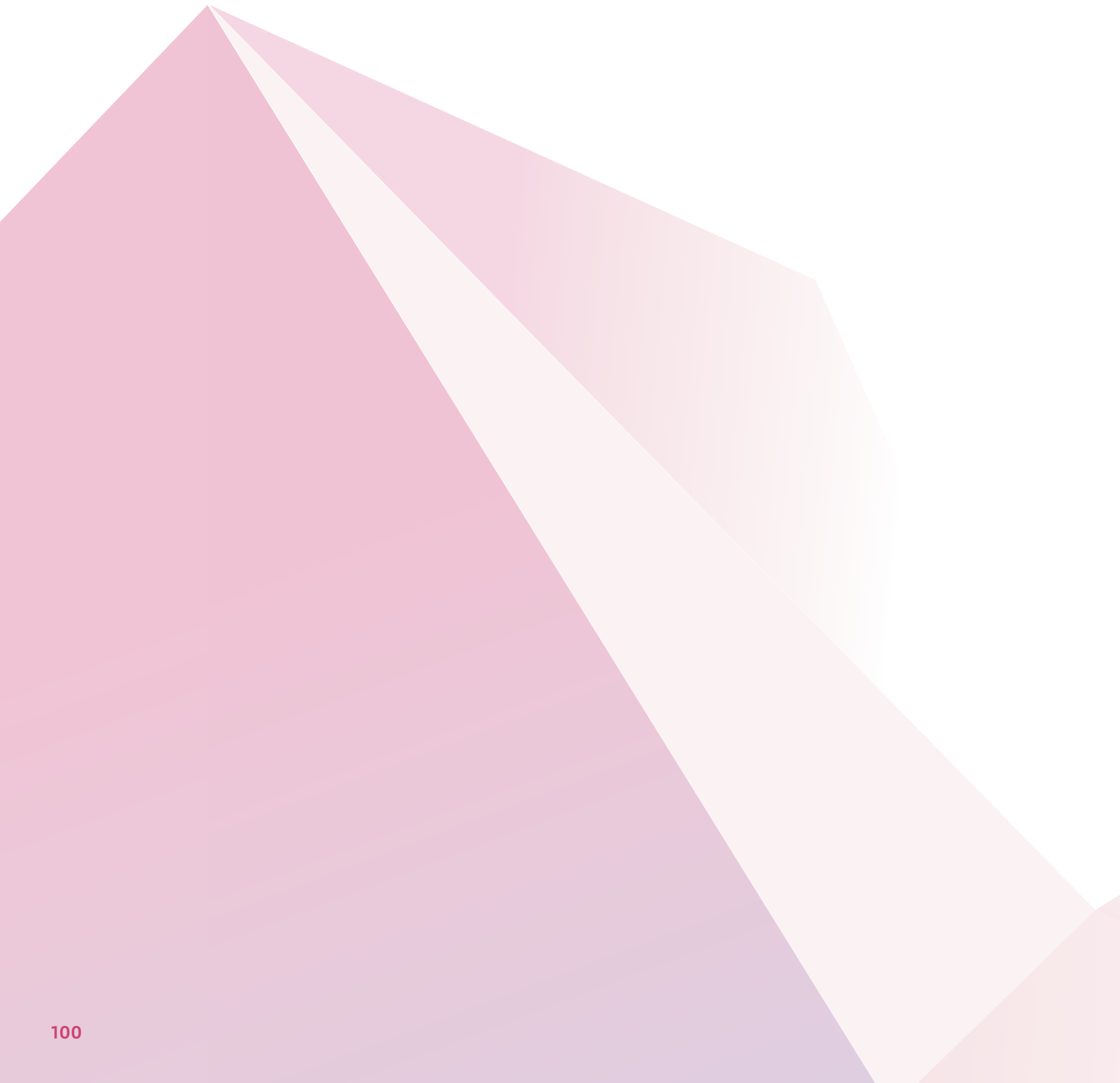
Malawi National Transport Master Plan

13 Improving land transport links

Civil Aviation Sub-Sectoral Plan



13 Improving land transport links

13.1 Lilongwe

Lilongwe city is reasonably well connected to its airport at KIA via the M1 and an access road for the almost exclusive use of airport traffic. The access road has sufficient capacity at 2-lanes for some time into the future.

The M1, being the strategic link between Lilongwe and the north of the country, as well as Kanengo traffic, has a high proportion of heavy goods vehicles, often slow moving in both directions, but particularly towards the north since it is uphill. There is a case for widening the M1 between Area 18 roundabout and the airport access road, in parallel with junction improvements at:

- Area 18, Puma;
- Ufulu Road;
- Area 25 Road; and
- M14, Salima turn off.

Airport signage is minimal, and can be improved on road signs on the M1 and within Lilongwe with the internationally used symbol.

13.2 Blantyre

Access to/from the airport to/from the city is on Chileka Road, which does not suffer from the same level of congestion as above. However, signage is extremely poor with no indication at the roundabout on the approach (Figure 13.1) and very little at the airport itself (Figure 13.2). The approach road should be re-classified as a Main Road, as Chileka is an international port of entry/exit, and given priority for maintenance.

Figure 13.1 Road signage to Chileka International Airport

Figure 13.2 Entrance sign at Chileka International Airport

Aircraft cleaning service in progress prior to departure from Kamuzu International Airport

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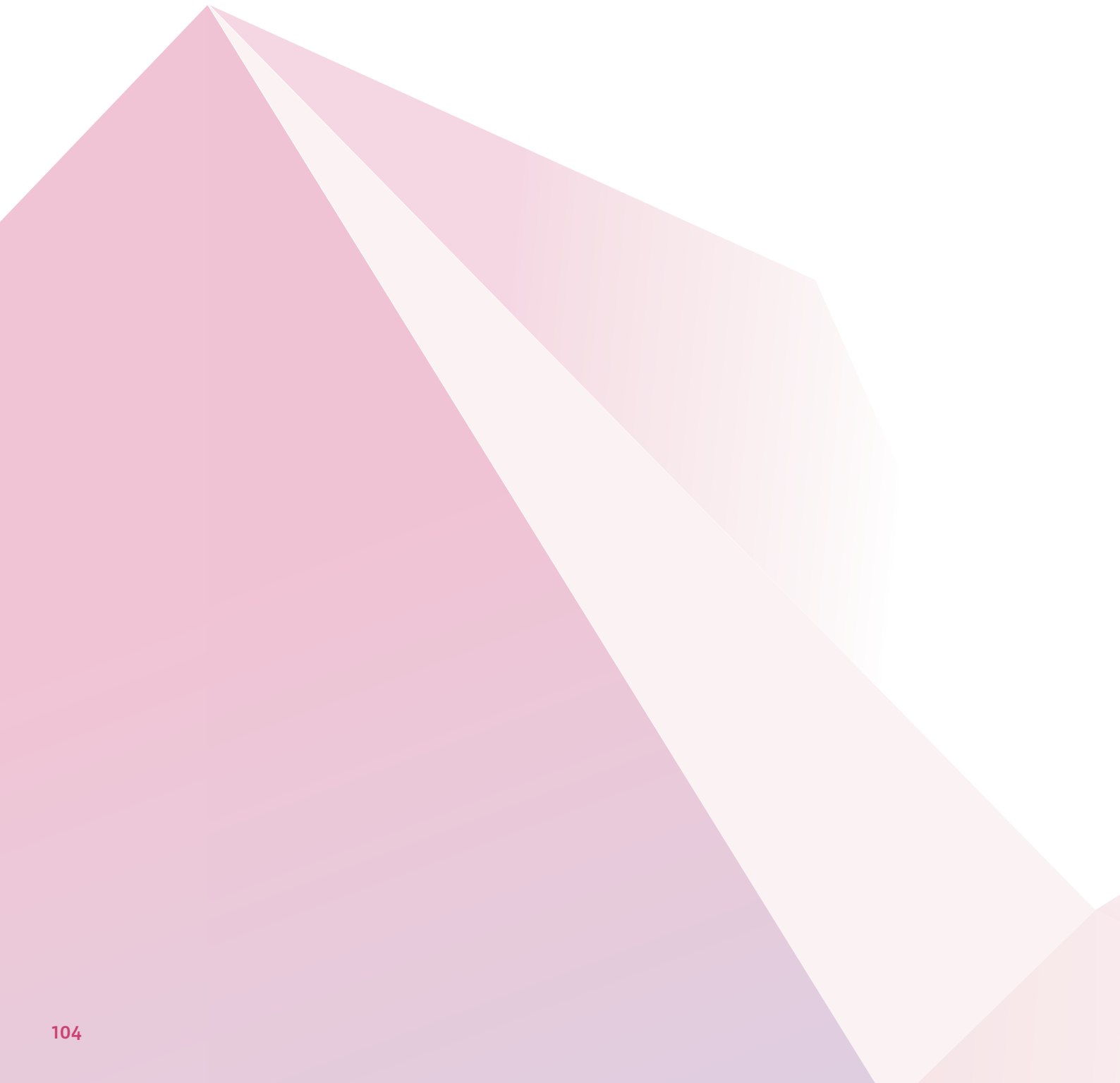
Malawi National Transport Master Plan

14 Funding sources and sustainability

Civil Aviation Sub-Sectoral Plan



14 Funding sources and sustainability

14.1 CAA

The separation of CAA from DCA requires a specific Civil Aviation budget to be identified at Government level and the facility for this to be able to capture Civil Aviation revenues for reinvestment. The need to secure revenues will be vital to maintaining sector investment and complying with the recommendations of ICAO and Yamoussoukro so that Malawi can continue to provide a benchmark level of safety and operational capability.

Critically, following the division of the DCA, the remaining DCA departments need to administer the budget so that this is not 're-assigned' outside the sector.

With overseas investment playing a significant role, sensible budget use and continued investment management will encourage more investment through increased sector credibility, but also to avoid current established investors stalling or pulling out from schemes through mismanagement.

Both DCA and CAA should promote use of renewable energy in power sources for the airports, this will have cost savings at smaller, remote sites and with the main airports the potential to sell energy back to the grid as such would be a revenue stream. With water supplies being a critical aspect of RFFS and terminal operation, the conservation of supplies and forecasted budget for utility supplied water are critical. The authority should encourage application of solar and wind energy, particularly where large amounts of land are available at the main airports.

Additionally, campaigns and community schemes to raise awareness of the benefits that could improve the acceptability of managing energy raising the profile of the sector to lead in these areas.

DCA should determine what navigation charges can be obtained from overflight traffic en-route and following developments such as ADS-B introduction at the main airports. This is critical to ensure national Navaid investment has continuity and airlines are involved as both users and stakeholders.

14.2 Airports

The following areas are potential funding streams that could be developed to increase revenue generation:

- Airport wayfinding and advertising strategy (specialist industry guidance would be advantageous). This should also be done in cooperation with tourist bodies and local marketing initiatives.
- Car parking and car hire concessions need to be better organised and provision made to maximise the sites at the main airports. The concessions should seek to provide the airport an income from sales and rental of space.
- Rental for non-airport agencies using land and support company facilities. This is already in existence, but needs to be maximised so that competition for space is generated allowing scaled increases to be made.
- Outsourcing retail and support functions as far as possible to avoid standing costs for the airport management and reduce operational expenditure.
- Developing energy generation (e.g. solar, wind) to build resilience and provide revenue for overcapacity sales back to local power companies.
- Determine and agree phased financial plan for facility improvements so that foresight of expenditure needs is available and can be matched to external investment opportunities.

Interior of Malawi Airlines Boeing 737

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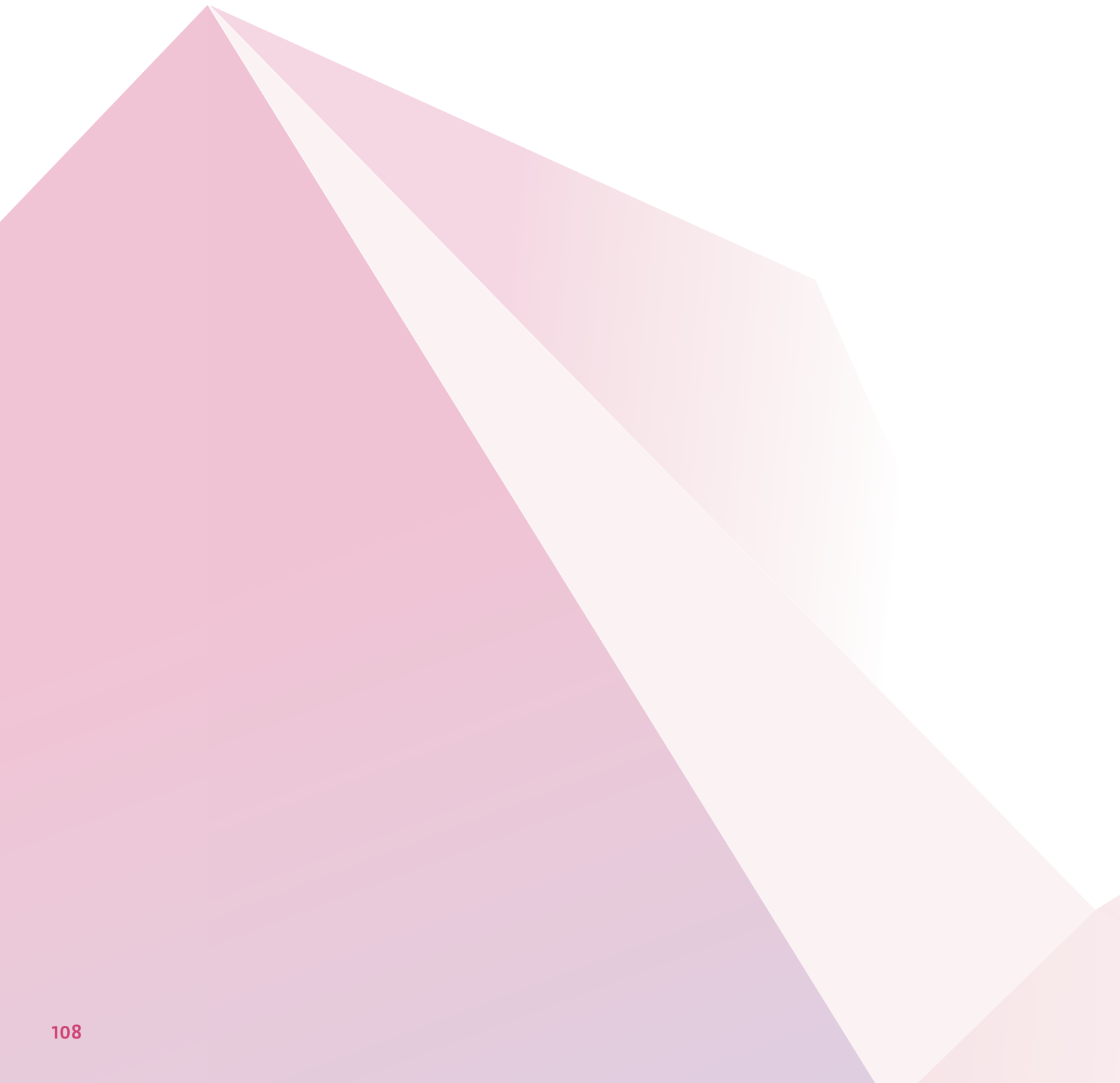
Malawi National Transport Master Plan

15 Implementation plan

Civil Aviation Sub-Sectoral Plan



15 Implementation plan

The NTMP implementation plan for priority developments in the Civil Aviation sector is shown in Table 15.1.

Table 15.1 Civil Aviation Sub sector costed (US$) action plan

Item	2017-2022	2022-2027	2027-2032	2032-2037	Total
Major Projects					
Chileka terminal development phase 1	35,000,000	0	0	0	35,000,000
Chileka expansion of concourse check in areas	25,000,000	0	0	0	25,000,000
Chileka ATS and fire station	0	30,000,000	30,000,000	0	60,000,000
Chileka runway rehabilitation	25,000,000	0	0	0	25,000,000
Chileka runway extension	0	35,000,000	0	0	35,000,000
Chileka wayfinding and advertising	500,000	0	0	0	500,000
Chileka cargo centres, cross wind runway apron	40,000,000	30,000,000	30,000,000	0	100,000,000
Chileka car parking	10,000,000	0	0	0	10,000,000
Chileka back-up power supply	50,000,000	0	0	0	50,000,000
Chileka AGL	1,350,000	0	0	0	1,350,000
Chileka renaming	1,000,000	0	0	0	1,000,000
KIA terminal phase 1 and radar	23,500,000	0	0	0	23,500,000
KiA terminal phase 2	0	0	0	30,000,000	30,000,000
KIA fire vehicle replacement	4,500,000	4,500,000		4,500,000	13,500,000
KIA ADB-S	800,000	0	0	0	800,000
KIA wayfinding and advertising	500,000	0	0	0	500,000
KIA car parking	3,000,000	0	0	0	3,000,000
KIA cargo aprons and warehousing	4,000,000	0	6,000,000	4,000,000	14,000,000
KIA runway widening	0	9,000,000	0	0	9,000,000
KIA new apron	0	7,500,000	7,500,000	0	15,000,000
KIA taxiway strengthening	0	4,000,000	0	0	4,000,000
KIA terminal expansion	0	0	25,000,000	20,000,000	45,000,000
KIA renaming	1,000,000	0	0	0	1,000,000

Item	2017-2022	2022-2027	2027-2032	2032-2037	Total
Minor capital works and programmes					
tatistical system for passenger records	1,000,000	1,000,000	500,000	500,000	3,000,000
Fence minor airfields	3,000,000	0	0	0	3,000,000
Dispose of airfields	0	4,000,000	0	0	4,000,000
Nkhata Bay Airport	0	95,000,000	65,000,000	0	160,000,000
Upper air observation station	5,000,000	0	0	0	5,000,000
Weather radar	0	8,000,000	0	0	8,000,000
Automation of meteorological reporting	0	6,000,000	0	0	6,000,000
External airport security	2,500,000	3,000,000	3,000,000	4,000,000	12,500,000
Institutional and regulatory					
Establish Civil Aviation Authority (CAA)	10,000,000	0	0	0	10,000,000
CAA running costs	0	0	0	0	0
Digitization	0	2,500,000	0	0	2,500,000
AIS	850,000	0	0	0	850,000
ADS-B	0	800,000	0	0	800,000
Adopt UTM	0	150,000	0	0	150,000
Total	**247,500,000**	**240,450,000**	**167,000,000**	**63,000,000**	**717,950,000**

The enabling actions are listed in Table 15-2

Table 15.2 Civil Aviation sub-sector enabling actions

Action	Lead	Remarks
Extend ADL mandate	DCA	
Prepare market analysis and equipment acquisition plan for next 5 years	Malawi Airlines	
Fence and secure designated airfields	DCA	
Prepare disposal plan for designated airfields to local authorities, private sector, police and military	DCA	
Prepare plan for enhancing facilities at designated tourism airfields	DCA	Consult with Department of Tourism
Prepare concession for second ground handling company	DCA	Consult with PPPC
Draft regulations for licensing UAS pilots and craft	DCA	Consult with ICAO
Draft regulations for Unmanned Traffic Management Systems	DCA	Consult with ICAO
Examine potential for SEZ's near airports	DCA	Consult with Ministries of Trade and Agriculture

Immigration hall at Chileka International Airport

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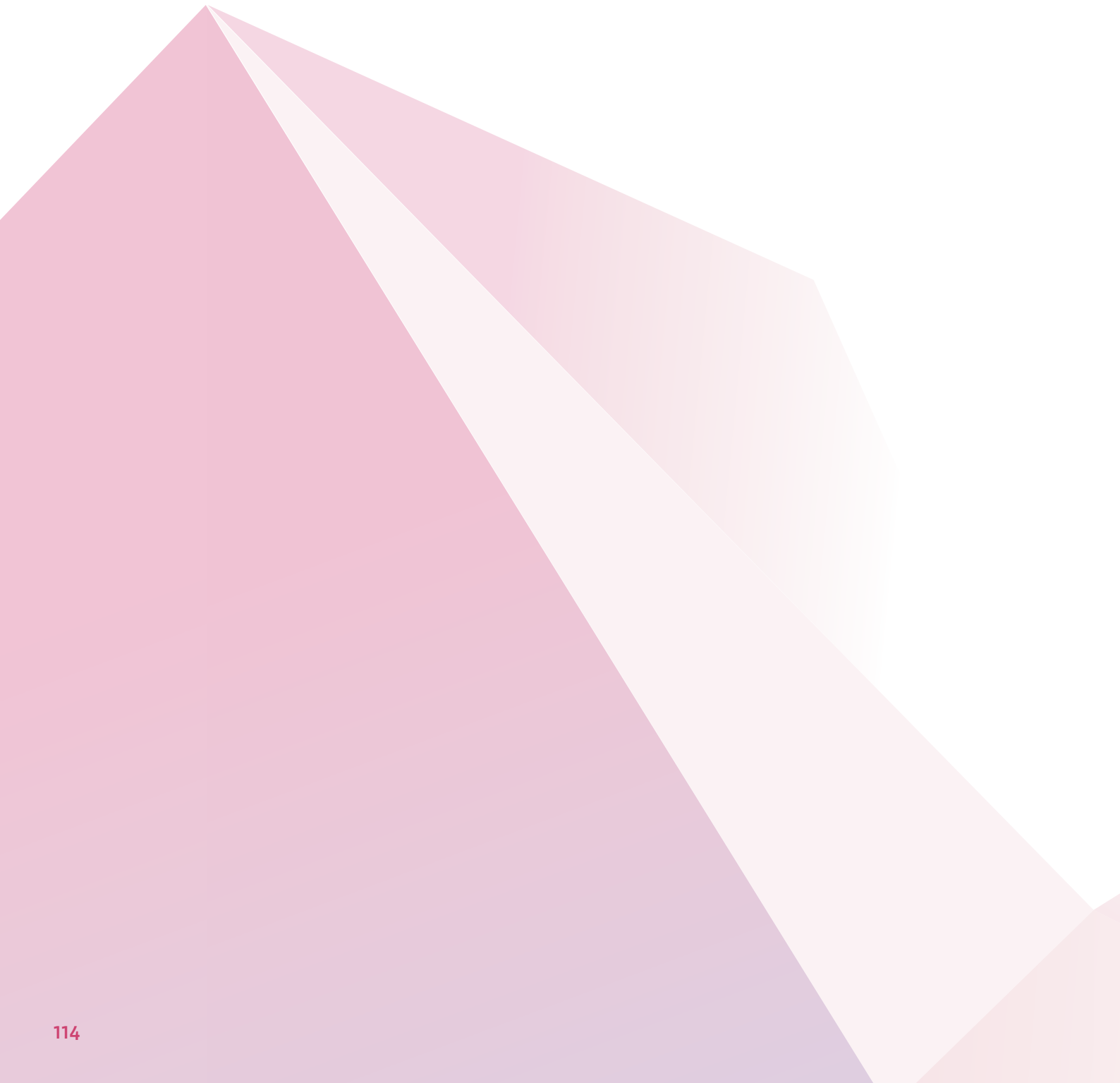
Malawi National Transport Master Plan

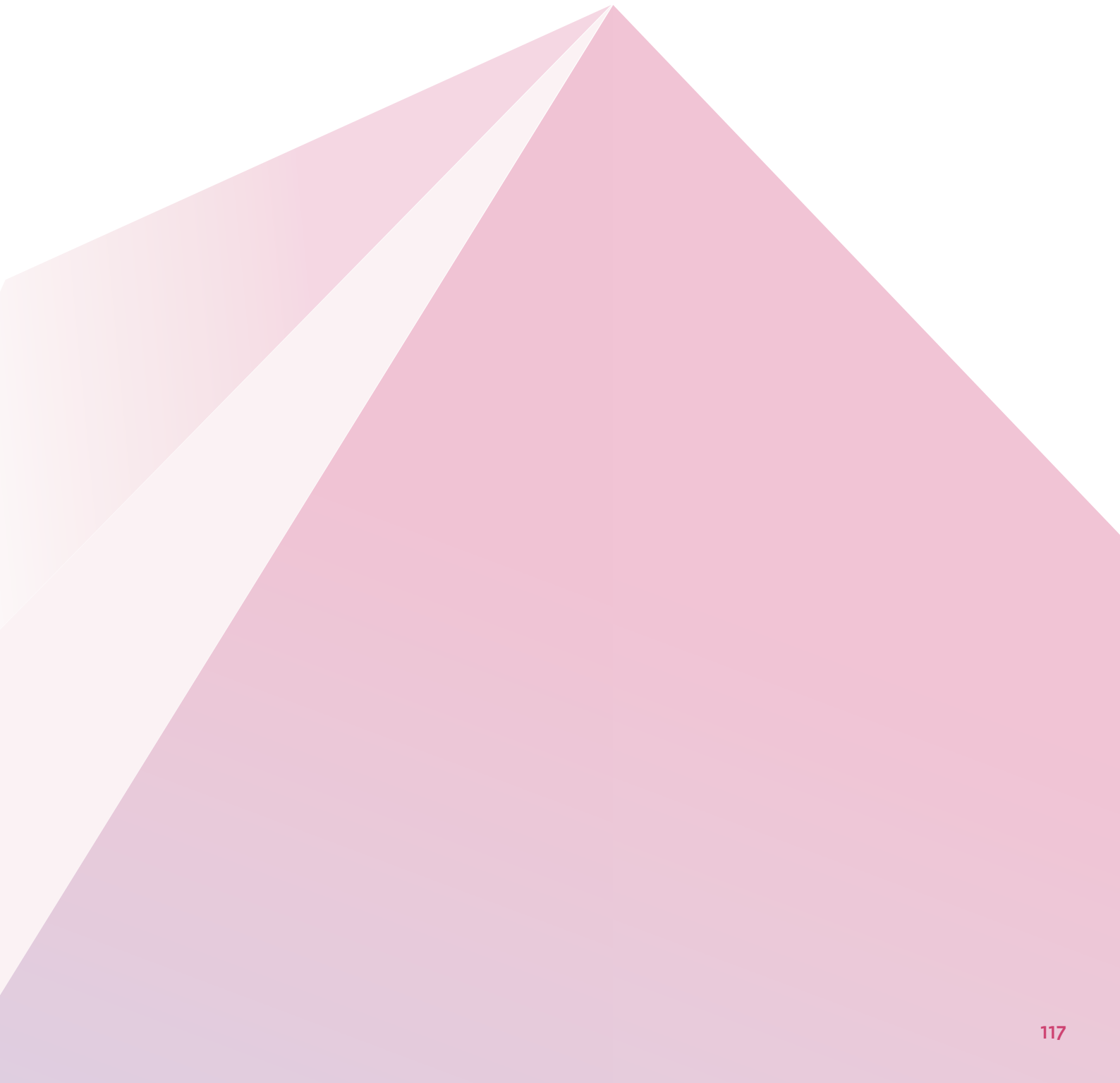
Appendix A Infrastructure inventory

Civil Aviation Sub-Sectoral Plan



Airport	ICAO Designator	Status	Location	Elevation	Rwy Bearing	Rwy Dims	Surface	Lighting	Ground Services	Operation Hrs	RFFS Cat	Navigations Aids	Type of traffic	Sch/Non-Sch/Pvt	Itnl/Ntl	Operator
Name		Port of entry / Secondary Intl/Minor	Lat Long Aerodrome Centre Point	FT	Magnetic	Lght-Wdth M	Material PCN or MAUW kg	Rwy	Y/N Name	UTC/GMT	One-Nine	Type	IFRVFR	S- NS- P		
Bangula	FWBG	M	1635 S 03507	300	17/35	790x30	MAUW 6,00kg Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Blantyre/ Chileka	FWCL	PE	154047 S0345803 E	2555	10/28 15/33	10-28 2325x30 13-33 15-33 1372x30	50/F/A/W/T A sphalt 15/F/A/Y/T Asphalt	Cat 1 App, Rwy, Txy	Yes Adl	400-1700	7	VOR/DME NDB ILS Rwy 10 Cat 1	IFRVFR	S/NS/P	intl/Ntl	DCA
Chelinda	FWCD	M	10330 S 03507 E	7760	r08-r26	1295x30	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	National parks & Wildlife
Chilumba	FWCB	M	1026 S 03348 E	1610	r08-r26	906x30	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Chipita	FWCT	M	0942 S03316 E	4270	r11-r29	1815x44	34,00 Grass/ gravel	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Club Makokola	FWCM	M	1418 S 03508 E	1589	r11-r29	1090x19	6000 Gravel	Nil	Nil	On request	Nil	Nil	VFR	NS/P	intl/Ntl	Club Makokola
Conforzi	none	M	1603 S 03508 E	3250	UNK	UNK	UNK	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	Conforz Ltd
Dwanga	FWDW	M	123054 S 0340752 E	1605	14/32	1200x30	6000 Gravel	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	Dwanga Sugar Corp
Kanongo	none	M	1359 S 3701 E	3701	r09-r27	700x20	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	Kanongo Estate
Karonga	FWKA	SI	095712.31 S 0335335 E	1743	14/32	1680x18	10/F/C/Y/T	Nil	Nil	0530-1500	2	VOR/DME NDB	IFR-VFR	S/NS/P	intl/Ntl	DCA
Kasungu	FWKG	M	1301 S 03328 E	3470	r08-r26	1200x18	16/R/C/T/T Slurry seal-bitumen	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Kasnungu Lifupa	FWLP	M	1303 S 033308 E	3330	r01-r19	1097x30	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	Kasungu National Park
Katumbi	FWKB	M	1049 S 03331 E	3986	18/36	1006x18	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Likoma	FWLK	M	120446.98 S 0344410.91 E	1632	r01/r19	1130x18	20/R/D/Y/T slurry seal - bitumen	Cat 1 App, Rwy, Txy	Y Liongwe Handling	0530-1500	Nil	Nil	VFR	NS/P	Ntl	DCA
Lilongwe KIA	FWKI	PE	134700 S 0334639 E	4029	14/32	3540x45	80/F/B/W/T A sphalt	Nil	Nil	0400-1700	9	VOR/DME NDB IL rwy 14 Cat 2	IFR-VFR	S/NS/P	Intl/Ntl	DCA
Liwonde	FWMK	M	1450 S 03518 E	UNK	UNK	UNK	Grass	Nil	Nil	On request		Nil	VFR	NS/P	Ntl	Liwonde National Park
Mangochi	FWMG	M	1429 S 03515 E	1580	r04-r22	640x30	600 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Matope	none	M	1523 S 03458 E	1655	17/35	640x30	Grass	Nil	Nil	Emergency	Nil	APP VDF	VFR	Emegerncy	Ntl	DCA

Airport	ICAO Designator	Status	Location	Elevation	Rwy Bearing	Rwy Dims	Surface	Lighting	Ground Services	Operation Hrs	RFFS Cat	Navigations Aids	Type of traffic	Sch/Non-Sch/Pvt	Itnl/Ntl	Operator
Mtakataka	FWTK	M	1413 S 03432 E	1725	r08-r26	700x30	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	Malawi Police
Mchinji	FWMC	M	1348 S 03254 E	3900	15/33	1000x30	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Monkey Bay	FWMY	M	1406 S 03455 E	5180	r10-r19	980x30	20,000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	Money Notyonol Ayrm
Mzimba	FWMZ	M	1154 s 033335 E	4440	14/32	871x32	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Mzuzu	FWUU	SI	1123638.98 S 0340044.12 E	4117	17/35	1300x18	20/R/D/Y/T slurry seal	Nil	N	0530-1500	4	VOR/DME NDB	VFR	S/NS/P	Ntl	DCA
Napolo	none	M	1559.326 S 03531.733 E	6600	r10-r28	681x30	Grass	Nil	Nil	On request	Nil	Nil	VFR	P	Ntl	Nyasa Tours
Nkhotakota	FWKK	M	1255 S 03417 E	1720	r01-r19	796x30	6000 Grass	Nil	Nil	On request	Nil	nil	VFR	NS/P	Ntl	DCA
Nchalo	FWSU	M	1616 S 03455 E	225	16/34	732x30	6000 Compacted soil	Nil	Nil	On request	Nil	nil	VFR	NS/P	Ntl	Sugar Corp of Malawi
Nsanje	FWSJ	M	1655 S 03515 E	200	r01-r19	987x30	6000 Grass	Nil	Nil	On request	Nil	nil	VFR	NS/P	Ntl	DCA
Ntchisi	FWCS	M	1322 S 03351 E	4300	15/33	922x30	6000 Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA
Salima	FWSM	SI	1345 S 03435 E	1688	17/35	1384x45	MAUW 20,000gr Grass	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Intl/Ntl	DCA
Satemwa	none	M	1601 S 03506 E	3200	UNK	UNK	UNK	Nil	Nil	On request	Nil	Nil	VFR	p	Ntl	Satemwa Tea Estate
Thunga	none	M	1601 S 03503 E	3925	UNK	UNK	UNK	Nil	Nil	On request	Nil	Nil	VFR	p	Ntl	Central African Co Ltd
Vwaza	none	M	1108S 3338 E	3750	14/32	UNK	Grass	Nil	Nil	On request	Nil	Nil	VFR	p	Ntl	National parks & Wildlife
Zomba	FWZA	M	152307 S 352304 E	2650	r09-r27	1250x17	Asphalt	Nil	Nil	On request	Nil	Nil	VFR	NS/P	Ntl	DCA/ Military



Rubber deposit built-up at Chileka International Airport

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Appendix B Chileka development proposals

Civil Aviation Sub-Sectoral Plan

Background map sourced from Google Earth .

1. Landside freight road access (external road to be upgraded for HGV traffic)
2. Landside lorry holding area
3. Cargo sheds (goods in/out)
4. Cargo apron - sized to B757F
5. Cross wind runway - 30m taxiway (ACN design aircraft B747) for cargo apron access
6. Taxiway fillet
7. West runway link hold point
8. Parallel taxiway linking to an existing apron taxi lane
9. Central existing link
10. Maintenance apron and remote parking (adjacent to the existing hangar)
11. Extended main apron
12. New fire station with elevated watch room
13. Airport administration and ancillary buildings
14. Redeveloped terminal (eastern boundary adjacent to existing VIP building)
15. Terminal forecourt drop off and taxi rank
16. Long term car park and car hire pool
17. New elevated ATC tower
18. Current fire station cleared - space to expand apron in future or for round handling equipment storage

International flight being prepared for departure at Kamuzu International Airport

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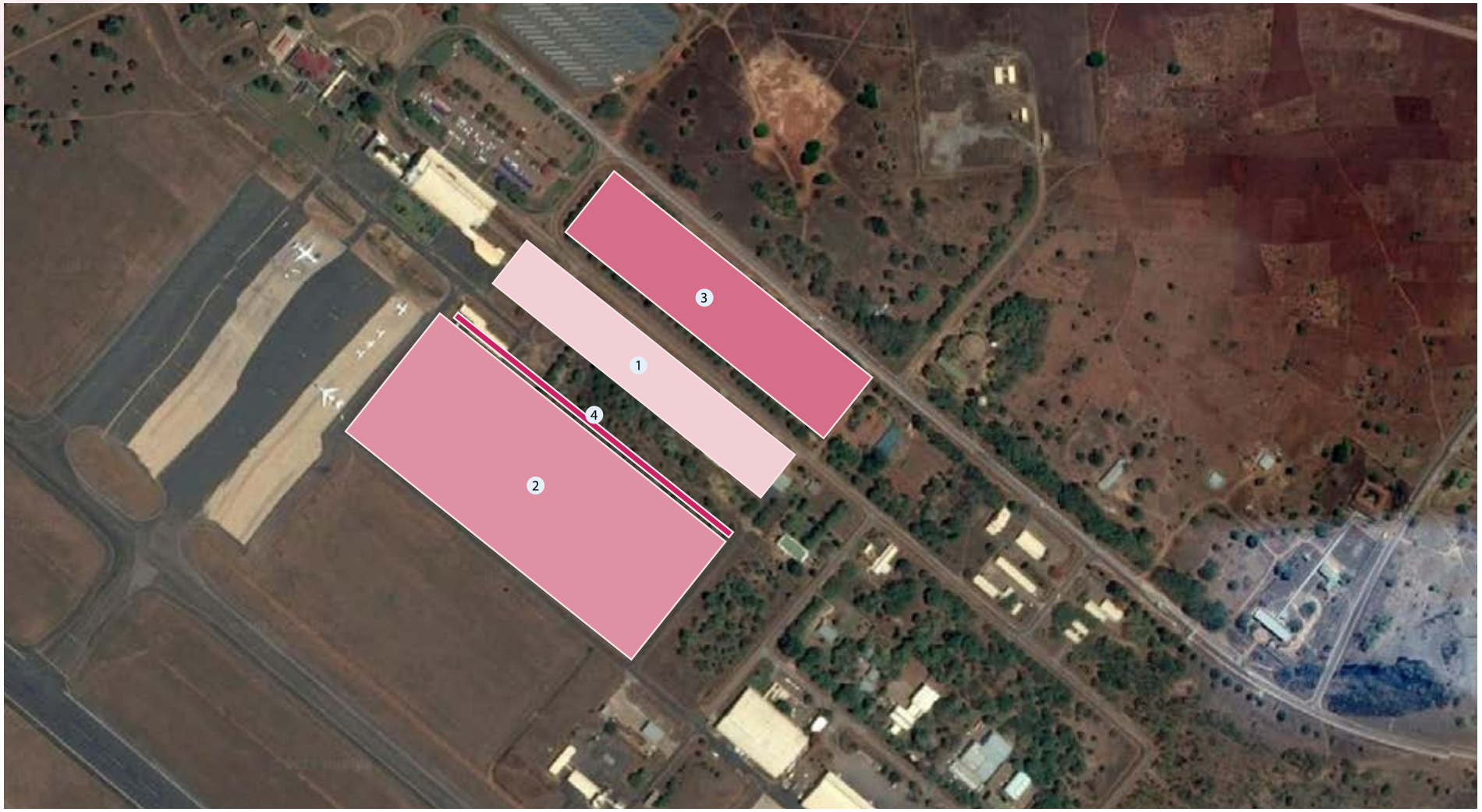
Appendix C KIA development proposals

Civil Aviation Sub-Sectoral Plan



Background map sourced from Google Earth .

1. New terminal
2. New apron sized for B767
3. Additional car park
4. Airside road extension

LIHACO handles passengers and baggage at KIA

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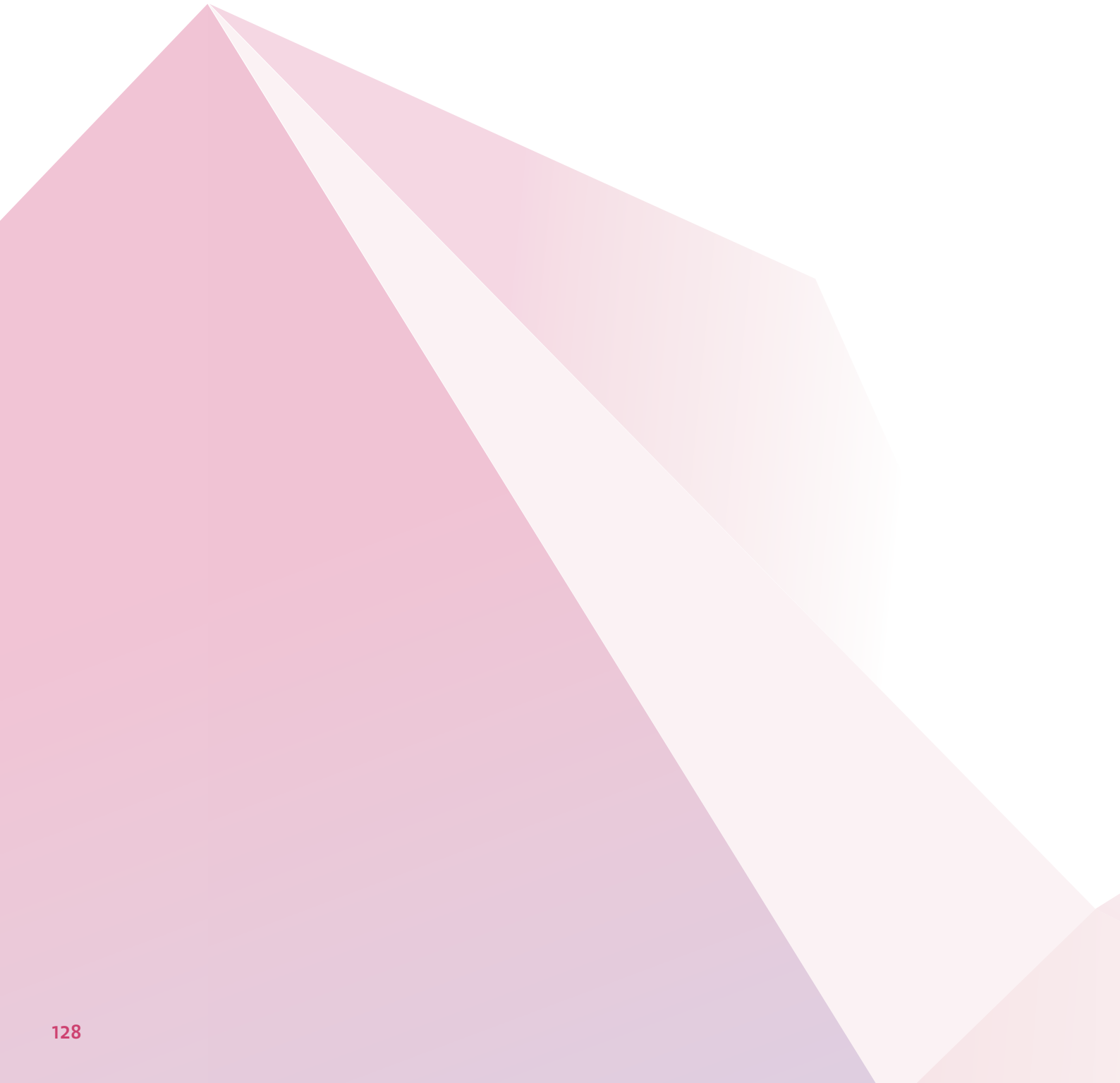
Appendix D Definitions of Freedoms of the Air

Civil Aviation Sub-Sectoral Plan



Definitions of Freedoms of the Air

First Freedom of the Air - the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to fly across its territory without landing (also known as a **First Freedom Right**).

Second Freedom of the Air - the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to land in its territory for non-traffic purposes (also known as a **Second Freedom Right**).

Third Freedom of The Air - the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down, in the territory of the first State, traffic coming from the home State of the carrier (also known as a **Third Freedom Right**).

Fourth Freedom of The Air - the right or privilege, in respect of scheduled international air services, granted by one State to another State to take on, in the territory of the first State, traffic destined for the home State of the carrier (also known as a **Fourth Freedom Right**).

Fifth Freedom of The Air - the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and to take on, in the territory of the first State, traffic coming from or destined to a third State (also known as a **Fifth Freedom Right**).

ICAO characterizes all "freedoms" beyond the Fifth as "so-called" because only the first five "freedoms" have been officially recognised as such by international treaty.

Sixth Freedom of The Air - the right or privilege, in respect of scheduled international air services, of transporting, via the home State of the carrier, traffic moving between two other States (also known as a **Sixth Freedom Right**). The so-called Sixth Freedom of the Air, unlike the first five freedoms, is not incorporated as such into any widely recognised air service agreements such as the "Five Freedoms Agreement".

Seventh Freedom of The Air - the right or privilege, in respect of scheduled international air services, granted by one State to another State, of transporting traffic between the territory of the granting State and any third State with no requirement to include on such operation any point in the territory of the recipient State, i.e the service need not connect to or be an extension of any service to/from the home State of the carrier.

Eighth Freedom of The Air - the right or privilege, in respect of scheduled international air services, of transporting cabotage traffic between two points in the territory of the granting State on a service which originates or terminates in the home country of the foreign carrier or (in connection with the so-called Seventh Freedom of the Air) outside the territory of the granting State (also known as a **Eighth Freedom Right** or **"consecutive cabotage"**).

Ninth Freedom of The Air - the right or privilege of transporting cabotage traffic of the granting State on a service performed entirely within the territory of the granting State (also known as a Ninth Freedom Right or **"stand alone" cabotage**).

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