Report No. 49177-YE

Republic of Yemen
Air Transport Sector
Strategy Note

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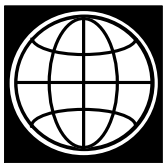
Middle East and North Africa Region
Energy and Transport Unit



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CURRENCY EQUIVALENTS

(Exchange rate effective on March 8, 2010)

Currency Unit	=	Yemeni Rial (YER)
1 YER	=	0.0049 USD
1 USD	=	205 YER

Fiscal Year: January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ACAC	Arab Civil Aviation Commission
ADE	Aden International Airport
AOC	Air Operator Certificate
ATC	Air Traffic Control
ATIS	Automated Terminal Information System
BASA	Bilateral Air Service Agreements
CAMA	Civil Aviation and Meteorological Authority of Yemen
FIR	Fligths Information Region
GNSS	Global Navigation Satellite Systems
GoY	Government of Yemen
GPS	Global Positioning System
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ILS	Instrument Landing Approach
MoT	Ministry of Transport
RIY	Al-Mukalla Airport
SAH	Sana'a International Airport
SARP	Standards and Recommended Practices
UAE	United Arab Emirates
USOAP	Universal Safety Oversight Audit Programme
VOR - DME	VHF Omni-Directional Radio Range - Distance Measuring Equipment

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This report was prepared by Charles E. Schlumberger, Principal Air Transport Specialist at the World Bank, under the guidance of Jean-Charles Crochet, Senior Transport Economist and Task Team Leader, following missions to Yemen in 2008 and 2009. Vincent Vesin, Transport Specialist, participated in the finalization of the report.

EXECUTIVE SUMMARY – GENERAL CONCLUSIONS AND RECOMMENDATIONS

A. General Presentation

The Yemeni air transport sector is relatively small compared to that of other countries of similar size, population, and GDP. In 2007, the total air traffic was 1.8 million passengers, 76% of them being international travelers and 24% of them being domestic travelers. Yemen counts three airports open to international services among a total of 18 civil airports; however, Sana'a is the only airport with significant traffic (80% of total passengers). The national legacy carrier, Yemenia, has operated all domestic and international routes since 1962. A second carrier, Felix, was established by private investors in 2008 with the objective to take over Yemenia's domestic network.

Despite its limited size, the sector has some significant strengths. The Government of Yemen (GoY) has clearly recognized that air transport is essential for the development of the country. It has created the Civil Aviation and Meteorological Authority of Yemen (CAMA) whose regulations and operations comply with international standards. It also has supported Yemenia to become an airline respected for its safety performance, which links Yemen well with most of its economic partners. In addition, the GoY has endorsed the Arab League Open-Skies Agreement and supported the creation of the private domestic carrier Felix: both have been positive steps towards more competition in the sector. Finally, air transport infrastructure has been continuously developed in the recent years and can generally be considered adequate for existing and near future air traffic.

As a result, international air traffic to and from Yemen has been growing steadily over the past years, particularly within the Persian Gulf region. Nevertheless, the sector faces several major issues that are bound to reduce its efficiency and contribution to the country's economic development if no actions are taken. These issues and proposed solutions are briefly described below.

B. Main Sector Issues

1. Financial Policy

• *The financial situation of the sector is unclear and there is insufficient available information regarding the overall use of funds.* The annual revenue of CAMA was estimated by the Bank to be around US $67 million. However, there is no publicly available statement detailing the sources and the allocations of this income. This lack of information makes effective decision making by the Government difficult and it weakens accountability mechanisms. In this context, also, it is possible that some activities end up being subsidized although there is no official policy to that effect. For instance, Yemenia has large sums of unpaid airport fees, which may in fact represent an indirect compensation for the airline's recent losses.

• *The Government's involvement in investment funding is heavy*. The Treasury directly funded 40% (US $25 million) of the total investments planned in the sector in 2008, while most of the rest was financed by loans from third parties like the Arab Fund for Economic and Social Development. Thus, the sector relies heavily on financing from public sources

while most of the funding could come from the sector itself. However, there is no explicit tariff policy aimed at cost recovery and making the sector financially self-sufficient.

2. Infrastructure Development

• *There is no overall strategy for infrastructure development in the air transport sector and the existing evaluation of future passenger traffic is not well grounded*. Nationwide passengers are expected to double by 2017 for all airports but these projections have not been supported by detailed future demand analysis. These projected figures still represent a relatively small market, for which most of the existing airport infrastructure would be adequate or need relatively minor investments for enhancement. It is also unclear whether development should concentrate on the three main airports and the ongoing investment program for secondary airports does not appear to be based on a precise plan.

• *As a consequence, many investment projects seem premature or unsuited to the country's needs and resources.* The GoY has started the construction of a second airport in Sana'a for an estimated total of US $460 million to accommodate more aircrafts and passengers than the existing terminal. A similar situation in Guatemala actually suggests that the same objective could have been achieved by enhancing the existing terminal for a much smaller investment (US $80 million in that example). Furthermore, substantial investments have been planned in 2008 for five airports with no scheduled traffic. Several airports with low traffic have also been recently equipped with costly VOR/DME approach installations, while cheaper alternative technologies might have provided just the same service.

3. Airline Development

• *Yemenia's development strategy is risky and mobilizes public funds.* Despite its current financial difficulties, Yemenia has embarked on an aggressive move to gain market share in international services and to transform Sana'a into a major hub between Europe, Africa and Asia. This involves important investments on the long-run, such as the replacement of half of the fleet with the purchase of six new Airbus A350, and the construction of hotels for anticipated new sixth freedom traffic. Shareholders have apparently agreed to increase Yemenia's capital from US $80 to $400 million with public involvement to finance these investments and to absorb past losses. This strategy is high risk because of the high degree of competition by regional airlines and the limited size and possible volatility of some of the targeted markets.

• *Felix's successful development is uncertain.* Several operational and administrative challenges need to be solved, such as setting-up a performing reservation system. Moreover, the current fare structure requires that some seats be sold at the highest price for flights to be profitable: this might be a major challenge as domestically purchased tickets are traditionally on lower tariffs. In the long term, the foreign majority ownership may also prevent Felix from obtaining international traffic rights.

4. Competition Policy

• *The competition policy on the domestic market is ambiguous*[1]. Yemenia's investment of 25% in Felix's capital was done by ceding all its domestic traffic rights to Felix. Shareholders

[1] The Government has also given special attention to attracting new airlines and investors to Aden airport but these efforts have not been met with success so far.

of Felix can therefore lay claim to the exclusiveness to operate domestically and prevent other potential operators from receiving domestic traffic rights.

5. Institutional Structure and Capacity

- *MoT's institutional capacity is limited and its role needs clarification.* Although MoT is responsible for defining the sector's policies and priorities and providing oversight, it does not have the capability to do so as its staffing and operating budget are extremely limited. It also seems that the delineation between MoT's and CAMA's responsibilities is often too ambiguous.

- *The dual function of CAMA makes oversight of the sector difficult.* CAMA assures the regulatory definition and supervision of the sector in terms of safety and security, operates all airports of the country, provides air traffic control services, and maintains the meteorological services in Yemen. Regulatory and operational responsibilities are therefore in the same hands, which potentially constrains the efficiency of policy making and supervision in the sector.

- *Adequate data are not available on almost every aspect of the sector.* The lack of sufficient, accurate and reliable data, for example in terms of traffic and finance, prevents any in-depth analysis of the sector and its development needs.

- *Private companies have not invested yet in air transport infrastructure nor are involved in airport operations*. As of the preparation of this report, there were no public-private partnerships yet in Yemen for the finance and operation of airport infrastructure, which deprived the sector of possible additional funding, capacity and expertise. The Government had taken steps, however, to contract out the management of Sana'a and Aden airports to a specialized international firm and it was expected that a contract would soon be in place

C. Recommended Strategies

Some weaknesses of the air transport sector in Yemen are structural, such as the relatively low volume of traffic, which is obviously related to the country's low GDP and is an obstacle to achieve economies of scale. Nonetheless, many of the issues described above can be addressed. For this purpose, the following stategies are recommended.

1. Financial Policy

- *Make transparency of the sector's finances a rule (<u>essential</u>, short-term).* CAMA's sources and allocations of income should be discussed under the authority of the MoT, audited, and made public. Two issues should be especially addressed: the possible cross-subsidy of unprofitable airports by the revenues of the air traffic control system (ATC), and the apparently low rate of effective recovery of airport fees as well as ATC charges. Transparency is an indispensable condition for the sector to be efficient and sustainable on the long-run.

- *Target self-financing for air transport infrastructure (long-term).* As a principle, the sector should generate enough revenue to finance its own infrastructure and other capital needs. This principle should be used to set the tariffs, fees and taxes in the sector. In

particular, an increase in airport tariffs for domestic flights should be investigated as such tariffs seem quite low.

2. Infrastructure Development

• *Establish a strategy and prepare a master plan for civil aviation (essential, short-term).* One of the top priorities in the sector is to define an overall long-term strategy associated with a comprehensive master plan. This work should review and assess infrastructure needs and outline the financial requirements for development, based on realistic passenger and cargo forecasts and economic criteria. This master plan, which should also address the sector's governance structure, legal framework, and potential for private investment should become the basis for discussions among all stakeholders before its implementation is approved.

• *Build on already existing infrastructure and consider less costly technological alternatives (short-term).* Even if air traffic doubles within ten years, given its current low level, future air traffic demand can be managed by enhancing and enlarging current facilities. This is especially valid for the three main airports of Sana'a, Aden and Al-Mukhalla. For ATC improvement, GPS technology should be seriously considered since it is very much (possibly eight times) cheaper than the currently preferred VOR/DME.

3. Airline Development

• *Revise Yemenia's network and fleet development plan (essential, short-term).* The current global economic downturn calls for an urgent fresh look at Yemenia's strategy. The national carrier's current strategic directions, its profitability and cash flow, as well as its financial commitments for fleet renewal need to be revisited in detail, discussed, and agreed upon with all shareholders. Yemenia should consider developing its medium-haul network rather than its long-haul network, since the competition on long-haul routes is already very tough between the big sixth freedom carriers of the Persian Gulf (Emirates, Etihad, Qatar Airways, Gulf Air). Moreover, Yemenia will need profitable regional routes to redeploy its four medium-range B737 after Felix takes over all domestic flights, and to pay for the high ownership cost of the new A350s.

• *Continue to support Felix after its launch. (short-term).* To ensure profitability on its domestic network by selling high fares to passengers in connection with international flights, Felix needs to become an IATA member or to enter into an operational agreement with Yemenia quickly. Then, Felix's possibility to obtain international traffic rights despite its foreign majority ownership should be clarified, as Felix's aircrafts will be more fuel efficient on regional routes.

4. Competition Policy

• *Clarify competition policy on domestic market to allow entrance of new carriers (long-term).* The move towards a liberalized air transport should go on. Felix, therefore, should not have exclusive domestic traffic rights.

5. Institutional Structure and Capacity

• *Strengthen the role of MoT (long-term).* The priority for MoT should be to develop a long-term strategy for the sector and to prepare a civil aviation master plan. Therefore, it

needs reinforced human and material resources, as well as a clear definition of its mission. In other countries, MoT usually performs the following role for the sector: prepare a long-term strategy, develop and supervise master plans, prepare legislation, direct the civil aviation authority, the airports, and the ATC, support the Ministry of Foreign Affairs in international negotiations, and foster private sector investment.

- *Separate regulatory and operational functions in the institutional organization. (long-term).* International experience suggests having separate organizations, to define air transport regulations and to supervise airports on one hand, and to apply these regulations and to manage airports on the other hand. The way CAMA works should therefore be revised to avoid possible conflicts of interest.

- *Develop statistical capacity (short-term).* Collecting and analyzing adequate data on the sector is important to understand and manage its issues; this will request training and funding of staff, equipment, and studies.

- *Consider public-private partnerships to enhance private involvement in air transport sector (long-term).* Given the limited public resources of the country, the use of public-private partnerships could strengthen the sector's attractiveness for private investors, and bring more financing, capacity and expertise to the development of the sector. The Government has rightly initiated PPP arrangements for the management of Sana'a and Aden airports.

Republic of Yemen
Air Transport Sector
Review Note

I. THE AIR TRANSPORT SECTOR AT A GLANCE

1. The air transport sector of the Republic of Yemen is relatively small. With the size of the country (528,000 km2) and its population of 23 million, it has 18 airports, of which 12 with runways of at least 2,500 meters (for comparison, Morocco, with about 1.4 times the population of Yemen, has 44 airports of which 13 with runways of at least 2,500 meters).

2. Yemenia - Yemen Airways is the national airline of Yemen, which has established an international network serving over 20 destinations. Until recently, it was also the only domestic air service provider. However, a new domestic carrier called Felix Airways started operations on 26 October 2008, taking over Yemenia's domestic network. While the carrier is focusing at becoming a successful intercontinental sixth freedom carrier, its most profitable current market is within the Gulf region. Nevertheless, it has embarked on a substantial fleet renewal program, which includes modern Airbus A350 aircraft, to meet the expected demand.

3. The Government of Yemen (GoY) has endorsed an open skies policy for international air transport. To meet anticipated future traffic, the national airport infrastructure is being enhanced and upgraded. However, various airport projects, as well as the planned expansion of the national carrier's fleet, may prove to be a rather costly strategy which may compete with other sectors that require financing for their development. Nevertheless, the role of a well functioning air transport sector is recognized by the GoY to be an important factor for its economic development, by fostering trade, tourism, and facilitating foreign direct investments.

4. The sector policy is defined by the Ministry of Transport, and coordinated with the Ministry of Planning. The policy is executed by the Civil Aviation and Meteorological Authority of Yemen (CAMA), which also assures the regulatory supervision of the sector in terms of safety and security. In addition, CAMA operates all airports of the country, provides air traffic control services, and maintains the meteorological services in Yemen.

II. AIR TRANSPORT SERVICES AND COMPETITION POLICY

A. Domestic Air Transport

5. Domestic air transport in Yemen was dominated in the past by the national flag carrier Yemenia. However, the domestic network is very small, only serving about seven domestic destinations[2]. The total air travel passengers of Yemen in 2007 are estimated to be about 1.8 million. Of these, 24% percent were domestic traveler, or 440,000, and 76%, about 1,360,000 were international passengers (see passenger data at Annex 4).

6. Given the size of the country and its population, the domestic air service market and its infrastructure is quite small. This can be explained, on the one hand, by the fact that the country is one of the poorest in the region, where the income per capita of USD 880 does not provide any disposable income for many permitting travel by air. On the other hand, the domestic road sector is relatively well established, and travel of cargo and passengers by road is a suitable mode of transportation for many. Nevertheless, business related domestic air travel to a few key destinations such as Aden has recently gained of importance[3].

7. Despite the fact that Yemenia dominated the domestic air transport sector for many years, there is no evidence that formal policy prevented any other operator to establish and compete in the sector. However, there seems to be a potential local operator that was requesting unsuccessfully an air operator certificate for several years[4]. Nevertheless, after years of running a loss making operation, Yemenia agreed to leave domestic air transportation to Felix Airways, a new operator which started operations on 26 October 2008.

8. Felix Airways plans at acquire a total of eight new Bombardier CRJ700/CRJ900 aircraft to serve a high frequency domestic air transport network[5]. The CRJ is a small regional yet, which is suited for high frequency operations. However, the most fuel efficient and profitable operations typically are on flights in excess of 500 km, while most domestic destinations are below this

[2] These include (ranked by number of passengers): (i) Sana'a, (ii) Aden, (iii) Al-Mukulla, (iv) Seioyun, (v) Taiz, (vi) Hodeidah, and (vii) Al-Ghaydah. (See Annex 2).

[3] Interview by the mission with local politicians and businessmen in Aden and Al-Mukalla on 21 and 22 October 2008.

[4] The operator to be set-up is an initiative from a local bank, Sheba Bank. The Bank recently renewed its request given the fact that a now operator was initiating domestic air services. Several interviews held during the mission confirmed this fact.

[5] The first CJR700 of Felix at Sana'a Airport started scheduled services on 26 October 2008:

threshold. Felix initially will be concentrating its operations on domestic destinations, but its management also plans to expand the network to regional destinations such as Dubai, Jeddah, and Djibouti[6].

9. While the entrance of a private operator in the domestic air transport sector clearly must be recognized as a positive step towards liberalization of the sector, the venture bears several risks and problems. There are two policy related issues, and several operational challenges Felix Airways will need to cope with. First is the fact that Felix is a joint-venture between a Saudi Bank[7], holding 75% of the capital, and the national carrier Yemenia with 25%. Yemenia's investment of 25% was done by ceding their domestic traffic rights to Felix Airways. This could become an issue if it prevented other potential domestic operators from receiving domestic traffic rights, as the shareholders of Felix might argue that what Yemenia has ceded was the exclusive right to operate domestically.

10. The second issue, given the majority Saudi ownership, is the fact that Felix could have difficulties obtaining international traffic rights. Both, the bilateral air service agreements as well as the traffic rights based on the Open Skies Policy of the Arab League require majority ownership of Yemeni shareholders[8]. Finally, Felix will depend heavily on high yield air fares to be profitable[9]. High yield air fares are typically sold in connection with international flights, or as last minute tickets. However, for interlining with other carriers, Felix must become an IATA member. As this is initially not planned, Felix will need to find an operational solution with its shareholder Yemenia to interline with some international passengers, which, on the other hand, will severely limit its freedom of starting any international operation that might conflict with Yemenia's network or strategy.

B. International Air Transport

11. The Republic of Yemen is a Contracting State of the Chicago Convention of 1944. As such, it negotiates and establishes its international air service network by signing bilateral air service agreements (BASA). Yemen currently has 50 BASA with countries in the Middle East, Europe, Africa, and Asia. The government seems to have embarked in negotiating liberal air service agreements, aiming at establishing an open skies network[10].

12. Of the 50 BASA, currently only 14 are served by international air service (see Annex 5 for a list of the current international air services based on bilateral air service agreements). Eight of these BASA are with States of the Arab League, three are with Africa, and two with Europe.

13. Interesting to note is the fact that two of the BASA signed with States of the Arab League that signed and ratified the Arab League Open-Skies Agreement (UAE, and Syria) contain certain limitations of frequencies, despite the fact that the agreement of the Arab League provides for full liberalization up to seventh freedom.

[6] Interview with management of Felix Airways on 20 October 2008.
[7] Apparently, the Saudi prime investor has sold part of his shares to other Saudi investors.
[8] See Annex 1
[9] The initial fare structure of Felix Airways includes six types of economy class fares. For example, a round trip fare between Sana'a and Aden can cost $170, 150, 130, 110, 90, or 70.
[10] An open skies air service policy aims at opening up bilateral air services by eliminating any capacity or frequency limitsbetween two States. In addition, fifth freedom traffic (services to a point beyond and outside the counterpart's destination) is often included in open skies agreements.

C. The Arab League Open-Skies Agreement

14. Yemen is a member of the Arab League since 1945. On 19 December 2004, under leadership of ACAC, several Arab League countries signed a multi-lateral agreement on the liberalization of air transport between the Arab States[11]. The agreement, which aims at liberalizing regional air services, has its fundament in the Agreement on Facilitating and Developing Trade between the Arab Countries ("The Agreement of Arab Free Trade"), which was adopted by the Economic and Social Council on 27 February 1981[12].

15. Article 18 of this agreement provides for the cooperation between the State parties of the Arab League to facilitate all means of transport and communication between them on a preferential basis. In Article 4, the agreement provides concrete traffic rights for any air transport company, which was designated in accordance to the agreement:

- the right to transit through any of the territories of the other State parties;
- the right to land in any in any of the territories of the other State parties for non-commercial purposes; and
- the right to embark and disembark passengers, cargo and mail, whether separately or combined, to and from any of the territories of the State parties, which translates into seventh freedom traffic rights (see Annex 1 for details on the Arab League Open-Skies Agreement).

16. However, so far the agreement has only been ratified by Jordan (30 June 2005), the United Arab Emirates (28 November 2006), Syria (24 May 2005), Palestine (23 October 2005), Lebanon (14 June 2006), and Yemen (24 October 2005)[13]. Nevertheless, the agreement is in force since 18 February 2007, when according to Article 38 the necessary quorum of five countries has been reached by deposition of their ratification instruments. In addition, several other countries have announced that their ratification process is underway[14].

17. The Arab League Open-Skies Agreement provides a framework for Yemen to develop air services with Arab States. Despite the fact that only a few Member States have ratified the agreement, its serves well as a political platform to motivate other States to agree on more liberal open skies agreements or even to join and/or ratify the agreement. Nevertheless, Yemen currently has regular scheduled air services with three of the Arab League Open-Skies Agreement (Syria, the UAE, and Jordan).

[11] These countries included Bahrain, Egypt, Iraq, Jordan, Lebanon, Oman, Palestine, Somalia, Sudan, Syria, Tunisia, and Yemen. Arab Civil Aviation Commission. Agreement on the Liberalisation of Air Transport between the Arab States. Damascus; 2004. [hereinafter referred to as Arab League Open-Skies Agreement].
[12] Arab League. Agreement of Arab Free Trade Area. Tunis; 1981.
[13] *Liste des pays ayant ratifié la Convention sur la Libéralisation du Transport Aérien* by Mohamed El Alj: Arab Civil Aviation Commission, 10 October 2007) .
[14] These are Bahrain, Oman, Qatar, and Egypt. *Ibid.*

III. CURRENT TRAFFIC AND TRAFFIC FORECAST

18. The current air service market data were analyzed using the offered seats method, rather than actual passenger data which are often difficult to obtain (see Annex 2 – Analysis Current Air Services based on Scheduled Seats for details on the method)[15]. In addition, the passenger data received from CAMA were compared with the offered seats method by applying reported seat factors and estimating current passenger data[16].

19. International air traffic with Yemen has been growing over the past seven years. However, the growth was primarily in the Gulf region with two dominating destinations: Saudi Arabia and the United Arab Emirates. All other destinations have remained relatively stable with little growth (see Figure 1 below).

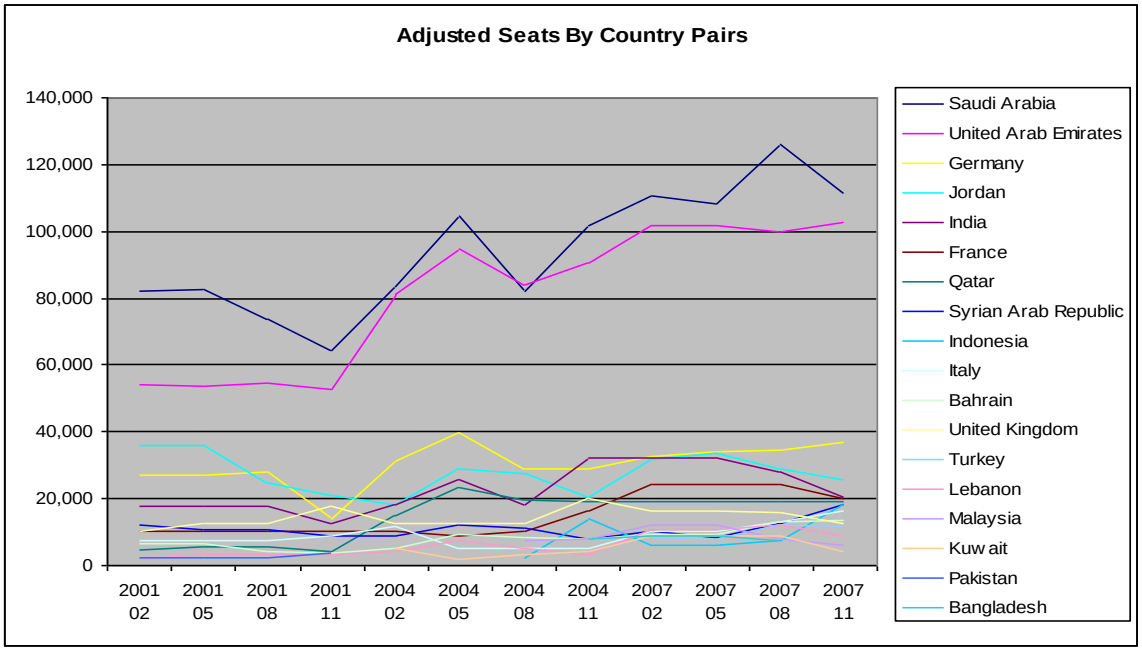


Figure 1: Overall adjusted seat capacity by country pairs

[15] The standard source for air traffic data collected by airlines and airports is ICAO. ICAO has developed statistics and forecasting programs that are based on data it collects from its Contracting States, which are then compiled into multiple data series. These data include information on commercial air carriers (traffic, on-flight origin and destination, traffic by flight stage, fleet-personnel and financial data), on airports (airport traffic by passengers and aircraft movements of international airports, and financial data), on air navigation service providers (financial and traffic data), as well as data from civil aircraft registry. The data, however, are based on the reporting of States. Very often these data are not sufficiently complete, accurate, or reliable, especially in developing countries where statistical capacity is limited often due to lack of training and funding for adequate staff. In addition, many Contracting States view their reporting duty to ICAO to concern only international traffic, given the fact that the mandate of ICAO is mainly focused on international air services.

[16] The applied load factors are 75 percent for international, and 50 percent for domestic air services.

20. The estimated passenger figures for 2007 result in overall 1.8 million passengers for the country. Of these, 1,360,000 (76%) were international, and 440,000 (24%) were domestic passengers (see **Error! Reference source not found.**).

Airport	City	Est. Dom Adjusted PAX 2007	Est. Intl Adjusted PAX 2007	Total PAX 2007	Percent of Total	Percent International
SAH	Sana'a	193,551	1,251,042	1,444,593	80%	87%
ADE	Aden	100,659	76,869	177,528	10%	43%
RIY	Riyan Mukalla	51,929	24,638	76,567	4%	32%
GXF	Seiyun	25,506	9,760	35,266	2%	28%
TAI	Taiz	28,613	1,502	30,115	2%	5%
HOD	Hodeidah	25,487	1,911	27,398	2%	7%
AAY	Al Ghaydah	16,985	0	16,985	1%	0%
	Total	442,728	1,365,722	1,808,450	100%	76%

Table 1: Estimated Passengers per airport in 2007

21. Overall, 80 percent of all passengers originate in Sana'a. The next airport, Aden, only accounts for 10 percent, and the remaining airports of the country have less than 5 percent passengers. In terms of international traffic, 87 percent of international passengers origin in Sana'a. However, smaller airports (Aden and Mukalla) still do have a significant part of international passengers, even though that the overall figures remain small. Traffic growth forecast have been done by consultants in 2006. These forecast were primarily based on past growth rates. Annex 2 includes the table of the passenger forecast from 2007 (forecasted) to 2017.

22. Nationwide passengers are expected to double by 2017 for all airports. Nevertheless, these projected numbers still represent a relatively small market, for which much of the existing airport infrastructure would be adequate or only need minor investments for enhancement. However, the authorities indicated that the expected growth seemed to be underestimated in these projections. Especially the fact that there were currently major investments done in the tourist sector in Aden suggests, according to CAMA, that Aden would quickly reach passenger figures close to 1 million passengers per year[17]. Nevertheless, the traffic projections and required infrastructure improvements need to be reviewed in the context of a sector development plan.

[17] According to the Bulletin of the Board of the Aden Free Zone (Volume 81, August 2008) there are currently 19 tourist projects under implementation in Aden with an overall value of over US$ 82 million.

IV. INSTITUTIONAL FRAMEWORK AND SECTOR FINANCING

A. The Ministry of Transport

23. Although the Ministry of Transport (MoT) is responsible for defining the sector's policies and priorities and providing oversight, it does not have the capability to do so as its staffing and operating budget are extremely limited. MoT in Yemen has one very small office, which deals with sector issues of civil aviation. The office is headed by the Deputy Assistant for Air Transport, and is focused on developing sector policies and planning.

24. It also seems that the delineation between MoT's and CAMA's responsibilities is often too ambiguous. In most countries, there is no centralization of functions as is the case in Yemen. Operational and regulatory functions are typically allocated to the following separate entities: Civil Aviation Authority, an airports corporation, an air navigation service provider, and a Meteorological service agency

25. The following traditional tasks that a MoT typically does perform should be considered for the MoT of Yemen:

- Preparation of an overall long-term strategy for the sector, which includes the formulation of sector policies, such as domestic and international air services policy, and competition regulation
- Development and supervision of a long-term sector plan (e.g. five year Civil Aviation Masterplan), including financial planning of the sector, with revenue and investment projections
- Preparation of legislation to implement policies, including regulatory legislation in accordance with Standards and Recommended Practices of ICAO (SARP)
- General surveillance of the sector, by examining the regulatory supervision and the implementation of certain assigned tasks by the CAA (e.g. construction of infrastructure)
- Support to Ministry of Foreign Affairs for negotiation of Bilateral Air Service, in accordance with the defined and approved sector policy (e.g. open skies)
- Supporting and fostering private sector investment in air transport infrastructure and equipment (e.g. privatization of air carriers, concessions of airports, the establishment of trade free zone)

However, given the limited staff at the MoT the priority should be on developing a long-term strategy for the sector and preparing a Civil Aviation Masterplan.

B. The Civil Aviation and Meteorological Authority of Yemen (CAMA)

26. The Civil Aviation and Meteorological Authority of Yemen (CAMA) is both, the regulator and operator of airports, air navigation service provider, and meteorological services[18]. To fulfill its mission, CAMA is subdivided in four entities: (i) Flight Safety Department (ii) Airport Operations, (iii) Air Navigation Services, and (iv) Metrological Services.

[18] Its mission statement is: "Execute the government's policy at all the fields related to civil Aviation & Meteorological Affairs, construct, operate, run, organize and maintain the airports and grand services. Run, Support, develop and invest all civil Aviation & Meteorological Utilities. Run, organize & develop all air transport affairs in Yemen. Run and organize air traffic according to the dominant rights for the Republic of Yemen on the international Agreements and treaties."

27. **Regulatory oversight** is performed by the Flight Safety Department, which traditionally was subdivided into six divisions[19]: (i) Personnel Licensing, (ii) Flight Operations, (iii) airworthiness, (iv) Aden Airport Safety, (v) Sana'a Airport Safety, and (vi) Documents. The 52 staff of CAMA seems well trained, and their numbers are, according to ICAO, adequate.

28. The personnel licensing department provides several types of licenses. There are about 300 pilots, 700 mechanics, 200 air traffic controllers, 350 cabin personnel, and 120 dispatcher licensed by CAMA[20]. These are very substantial numbers for a country the size of Yemen. The licensing system is currently on a manual basis, but a computerized system at an investment of about US$80,000 is under evaluation. The airworthiness department supervises the 25 aircraft registered in Yemen, and the two foreign registered aircraft operating under Yemeni air operators certificate (AOC). While staff seem to be on the low side, there are unmet training needs, which could be financed by operational income of CAMA. CAMA recently also issued the second AOC of the country to Felix Airways. The documentation of the carrier (Flight Operation Manuals) seems to comply with international standards. The airports subdivisions of CAMA is initiating and implementing several operational improvements at the nine main airports of Yemen. These range from runway lightings, navigation aids (mainly VOR/DME), fencing, to bird strike avoidance measures. In addition, several airports are currently in preparation for certification, and some have received temporary certificates by CAMA.

29. Overall, the regulatory oversight of the sector by CAMA, as well as its organizational structure, technical guidance material, and regulatory framework seem to comply with international standards[21]. According to ICAO's Universal Safety Oversight Audit of 2000, and its follow-up audit of 2004, Yemen has a 91.75% compliance rate with ICAO's Standards and Recommended Practices (SARP), which is far better than the world average. Nevertheless, ICAO will perform a new audit in Yemen in 2009, where all Annexes of the Chicago Convention will be assessed. Typically there are far more findings than in the former Universal Safety Oversight Audit Programme (USOAP).

30. **The Airport Operations Department** operates the country's airports. At the same time, it is supported and supervised by the airports subdivisions of the Flight Safety Department. The separation of the two entities is not entirely clear, and it seems that there is a quite flawless integration between the two

[19] This structure is according to the 2000 ICAO audit. However, management of CAMA summarized the organizational subdivisions as (i) Safety, (ii) Flight Operations, (iii) Licensing, (iv) aerodromes, and (v) airworthiness.

[20] Types of pilot licenses issued by CAMA

Air Operator Certificate of Felix Airways

[21] The mission has not received a copy of the current aviation code despite requesting it. Nevertheless, according to the 2004 ICAO USOAP Audit Report, the aviation law and the regulatory framework are adequate and comply with ICAO's Standards and Recommended Practices.

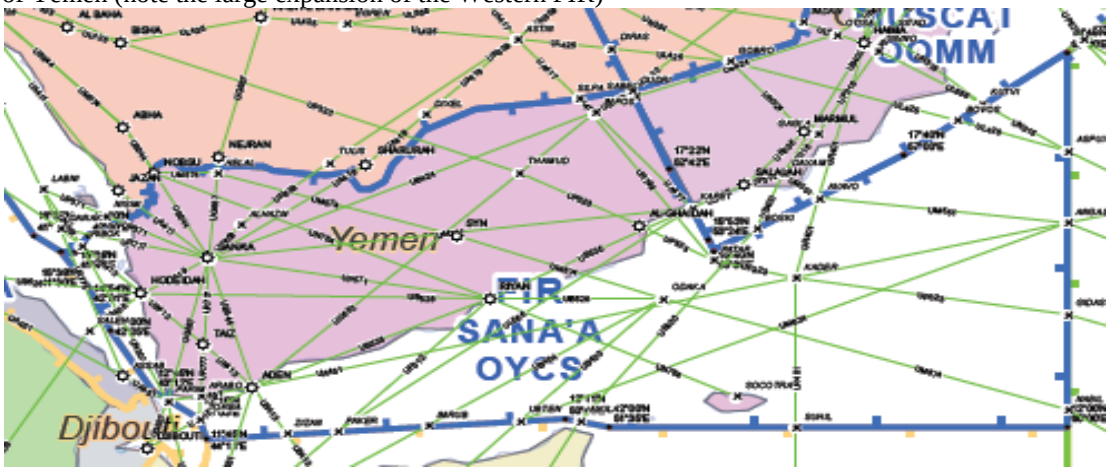
units. This might provide certain synergies. However, the disadvantage is that regulatory supervision of airport operations cannot be entirely independent, which could be considered a safety issue. Nevertheless, the main airport Sana'a seems to be well managed, and operations observed (including firefighters response to a minor incident) seem well organized. The only issue, which should be further evaluated, concerns the ongoing investment program in secondary airports[22]. The investments do not appear to be coordinated on the basis of a defined investment program, which is hinged on long-term development plan of the sector.

31. **Air navigation services** in Yemen are provided by the air traffic control unit, which is based at Sana'a airport. The country is divided into two Flight Information Regions (FIR). The Western FIR has full radar coverage over Yemen's land territory, and provides radar based enroute air traffic control. The Western FIR is quite large as it stretching far into the Indian Ocean. In the Eastern FIR only procedural air traffic control can be provided[23]. Nevertheless, ATC in Yemen appears operating well. All communications are done in English, which complies with an ICAO recommendation[24]. In addition, ATC services account for an estimated potential annual income of US$ 24 million (see Annex 4 – Financing of the Sector).

32. **Meteorological services** operate at several stations on or near airports, as well as at remote (e.g. city center, coastline) locations around the country. These services also appear to comply with international standards, and their equipment provides a state of the art weather briefing service for airmen. Nevertheless, the absence of weather radars limits the information available to recent hazardous weather

[22] There are investments in navigation aids (VOR/DME) and expensive surrounding walls at several airports with very little traffic, and no scheduled air services. See Annex 3 – Domestic Airport Infrastructure.

[23] FIR of Yemen (note the large expansion of the Western FIR)



[24] Air Traffic Control Center in Sana'a

developments based on ground observations, pilot reports, or data obtained via remote services (e.g. internet based services)[25]. The meteorological services also provide weather information to various clients outside the aviation sector (e.g. media, agriculture). However, their overall income contribution to CAMA through fees is relatively small (estimated to be 5% of CAMA's overall operational income).

33. In terms of **financing of the sector**, CAMA has several sources of income: (i) airport passenger fees, (ii) airport approach, landing, and parking fees, (iii) air traffic control fees, and (iv) fees for meteorological services. Given the passenger, aircraft, and overflight data provided to the World Bank mission, as well as various tariffs, the annual income potential (excluding meteorological services) was calculated by the mission to be US$ 67.43 million[26] as summarized below.

Total Income Potential in 2008		**Total Potential Funds of CAMA 2008**	
Passenger Taxes	$21,592,643	Potential Income	$67,433,120
Landing, ATC & Parking	$17,808,477	Treasury Funding	$25,350,000
ATC Overflight	$28,032,000	Third Party Financing	$36,000,000
		Total Funds Available	**$128,783,120**
Total	**$67,433,120**	**Planned Investments**	**$62,150,000**
		Available for CAMA	**$66,633,120**

Table 2: Funds Flow for the Sector

34. Given the fact that the treasury was planning to support investments in the sector in 2008 by US$ 25.35 million, the overall amount for funding of operations and investments available to CAMA is estimated at US$ 92.78 million. In addition, third party financing was planned to provide about US$ 36 million, bringing the overall available funds for 2008 to US$ 128.78 million (see Annex 3 – Domestic Airport Infrastructure). According to the Ministry of Planning, earmarked investments in infrastructure in 2008 are US$ 62.15 million, which leaves a potential residual amount in 2008 of US$ 66.63 million to cover operational cost of CAMA. The lack of clarity in the sector's finance is a major issue.

[25] The mission visited the meteorological station at Al-Mukalla airport (see picture below, next page) the day before the devastating floods of 23 October 2008. When inquiring about the weather outlook that day, no information about the approaching storm was received. Nevertheless, later explanations stated the fact that the storm was headed for Somalia, but did a sudden and unexpected turn towards Yemen.

[26] See Annex 4 – Financing of the Sector

35. In summary, CAMA is a well structured entity and its operations give satisfactory results. However, CAMA is both regulator and supervisor of the sector. This lack of operational and regulatory separation makes policy making and oversight of the sector difficult. International models clearly call for separating airport operations (e.g. public or private corporation), and air traffic control from the regulator. In addition, in most countries, the meteorological services typically are part of the ministries of interior or commerce.

V. AIR TRANSPORT INFRASTRUCTURE

A. Airports

36. There are 18 internationally registered airports, airfields, and airstrips in Yemen[27]. However, only six airports have regular scheduled air service, and accommodate international traffic. Nevertheless, the only airport with significant traffic is Sana'a, which handled about 1.7 million passengers in 2008 (see below

37. Table 2: The main airports in Yemen with schedules air service). The next airport, Aden, has only about 14 percent of Sana'a's traffic, which is also estimated to double within ten years. Al-Mukalla accounts for less than ten percent of Sana'a, and all other airports have very little traffic[28].

A/P Rank	Airport Name	IATA/ICAO Identifier	Elevat. (mtrs.)	Rwy (mtrs.)	Rwy Type	Actual PAX 2008	Estim. PAX 2017	Actual Aircft. Move. 2008	Estim. Aircft. Move. 2017
1	Sana'a Intl.	SAH / OYSN	2199	3,252	Asphalt	1,734,000	3,260,000	17,740	24,631
2	Aden Intl.	ADE / OYAA	2	3,100	Asphalt	247,000	467,000	3,350	4,726[29]
3	Al-Mukalla Intl.	RIY / OYRN	15	3,000	Asphalt	143,000	265,000	1,891	2,555
4	Taiz Intl.	TAI / OYTZ	1,475	3,000	Asphalt	38,000	90,000	710	966
5	Al-Hodeidah Intl.	HOD / OYHD	12	3,000	Asphalt	28,000	52,000	446	746
6	Sayon Intl.	GXF / OYSY	639	3,000	Asphalt	50,000	91,000	636	925

Table 2: The main airports in Yemen with schedules air service
Sources: Central Statistical Organization (CSO) for actual 2008 figures and CAMA for other data

38. **Sana'a International Airport** (SAH) is the country's main airport, serving the capital as airport of entry. It has one runway of 3,200 meters, an apron with 27 parking positions, and a passenger terminal (see diagram in Annex 7 – Airport Charts as published in the AIP (Reproduced by Jeppesen). There is a total staff of CAMA of 470 at SAH, of which 250 are engaged in airport operations, 190 in Fire and Rescue, and 30 in air traffic control.

39. SAH currently handles about 1.7 million passengers, of which 87 percent are international. The passenger terminal has a limited capacity, and could be considered too small

[27] Internationally registered refers to the Aeronautical Information Publication (AIP) of Yemen. For a full list with operational details see Annex 3 – Domestic Airport Infrastructure.
[28] In average, there are about 100 passengers a day and one to two aircraft movements in these airports.
[29] The Ministry of Transport considers this estimate as overly cautious.

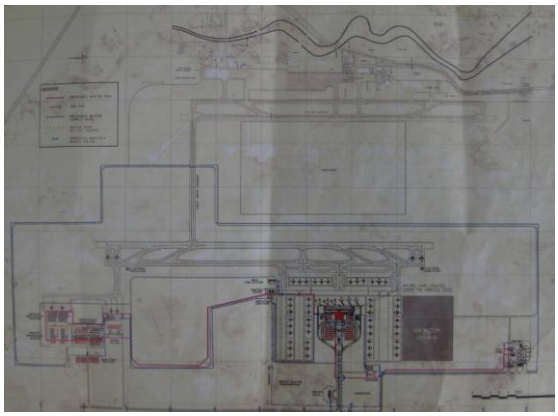
when several aircraft have to be handled[30]. Nevertheless, given the average aircraft movement of 38 scheduled flights per day, which represent a little more than two flights per hour in a 16 hour operation, the current traffic can still be handled with the existing infrastructure.

40. The GoY has embarked in the construction of a new airport in Sana'a, which will be located on the West side of the current airport[31]. The new airport will be constructed in three phases. The first phase, which was already implemented to a certain degree, involves the acquisition of law and preparatory work. It is estimated to cost about US$ 115 million, but not all funds have been spent. The second phase, also quoted at US$ 115 million is the construction of the new terminal, which begun and is 60 percent completed. The third phase of US$ 230 million will include the construction of an apron, a new parallel runway of 3,500 meters, and new taxiways, including one for connecting the new with the old airport. The overall cost of the new airport is expected to be about US$ 460 million, of which 90 percent are expected to be financed by loans of the Arab Fund for Economic and Social Development. The construction of the airport was delayed, and scheduled to be completed in 2010. The contractor, an international construction firm, has experienced problems, however, and further delays are possible. It is planned that the existing airport will continue to serve as a Military and State Airport.

41. Nevertheless, the construction of a new airport for Sana'a must be considered to be out of proportion, given the current and projected passenger data and aircraft movements. For international comparison, Guatemala's International Airport La Aurora provides a good reference, as it is an airport similar to Sana'a International Airport. At an elevation of 5,000 feet and a runway of 3,000 meters it serves various international and intercontinental airlines. When its passenger figures reached two million in 2004, the Government of Guatemala examined the construction of a new international airport, which would cost about $400 million. However, given the cost involved, the government chose to enhance to existing terminal building for $80 million, which will serve the country for many years to come with an estimated maximum capacity of five million passengers. The airport also handles military traffic, which is covered by civilian air traffic control. In application of the experience of Guatemala, the Government could have decided to limit investment to the construction of a new terminal on the existing Sana'a International Airport. Because the new terminal would have been close to the existing runway, the construction of a new runway, including connecting taxiways, would not have been necessary, thus reducing substantially the overall expenditure.

[30] According to authorities, the terminal was initially designed for a maximum of 150,000 passengers. However, several additions and extensions were made in the past.

[31] Location of the new airport in Sana'a (existing airport on top) New Terminal Building



42. **Aden International Airport** (ADE) is the second most important airport in Yemen. The number of passengers in 2008 was about 250,000, with 3,350 aircraft movements. About two third were domestic passengers, and one third international passengers. The main international destinations from Aden are mostly within the Gulf region, with a few flights to Cairo and London. The main challenge of the airport is its relatively low traffic. Current projections suggest a doubling of passengers to about 500,000 in 2017. However, according to airport officials, these figures are to be considered low given that fact that the local government has been very active in promoting Aden for investment and development[32]. The promotion has resulted in various investments projects, including 19 tourism projects valued at US$ 82 million[33]. According to airport officials, overall new investments in the City of Aden are now valued at YER 72 billion (about US$ 360 million), and passenger numbers are aircraft movements therefore should increase sharply in the coming years. They expect to reach 1 million passengers within the next two years, and over 3 million after 2011. These projections, however, have not yet been outlined by any detailed future demand analysis.

43. One of the strategic opportunities for Aden concerns cargo operations under the Aden Free Zone, a concept that builds on the strategic vision to promote an economy based on sea and air services, with international trade and tourism. The vision has already resulted in the operations of the seaport of Aden being handed to a foreign operator, Dubai World, who will invest US$ 200 million in seaport infrastructure. The airport cargo operations have yet to be developed, and a study was done that resulted in suggesting the establishment of an air cargo village at Aden airport. The investments in infrastructure should be done by a private operator, given the fact that the same concept is used for the seaport. The installations on the former military apron would be an ideal platform the build the necessary cargo infrastructure for the proposed cargo village.

44. The airport infrastructure can currently be considered adequate. The airside includes a large apron, a runway of 3,100 meters, and a parallel taxiway (see Annex 7 – Airport Charts as published in the AIP (Reproduced by Jeppesen)). The approach installations include an Instrument Landing System (ILS) approach, with required precision runway lightning. The airport operates 24 hours a day, and has the required lightning system for night operations. It also complies with international requirements concerning crash and rescue equipment. The landside includes a relatively modern terminal with a declared capacity of 1 million passengers per year. Airport operations are operating without any significant problems, which is to be expected given the low traffic of less than ten scheduled flights a day.

45. Nevertheless, during peak hours when several flights are handled at the same time, the terminal capacity may experience some constraints as the waiting halls are rather small. Good sequencing of flights is the short-term solution. However, on a longer term basis the airport can expand current terminal infrastructure by reconstructing a partially unused building that is located

[32] Since a few years, the local government is promoting the Aden Development Strategy Vision: "A modern city with an economy based on sea and air services, with international trade and tourism building on its competitive advantage to become an attractive hub for local and international investment."
[33] *Supra* note 17.

next to the main terminal[34]. In fact, airport officials stated that a new terminal building was planned, which would include four finger docks. The runway and taxiway infrastructure can also be considered generally adequate for cargo operations, given the length of 3,100 meter at sea level. However, according to local airport officials, the runway would need an extension of 500 meters in the future in order to accommodate flights performed by the Antonov-225 cargo aircraft[35]. In addition, on hot days some aircraft may have weight limitations for take-off on the present runway, which will limit range or payload for certain flights.

46. **Al-Mukalla Airport** (RIY) is the third airport in Yemen in terms of traffic. Passenger traffic in 2008 was about 143,000 passengers, and 1,900 aircraft movements. Like in the other airports, traffic is also expected to double in the next ten years. However, since 2001 both passenger and cargo traffic has been declining steadily by overall close to 30 percent. Nevertheless, airport authorities are optimistic that this trend was reversed, as there was a recent increase in private and corporate traffic for oil companies. Practically all international flights serve destinations in the Gulf region. In addition, the global messenger operator DHL had established its regional hub at RIY. Finally, RIY also has a certain strategic significance as it is the main airport in the Eastern region of the country. Its development has both economic and political significance.

47. The airport infrastructure is to be considered sufficient for the current traffic. The airside includes an adequate apron, and a runway of 3,000 meters. According to airport officials, it lacks of a parallel taxiway, which would increase efficiency when there are several aircraft movements (see Annex 7 – Airport Charts as published in the AIP (Reproduced by Jeppesen)). The airport is equipped with s lighting system for night operations, and has one VOR DME non-precision approach with a relatively high minimum of 949 feet above ground level[36]. The communication equipment and the automated terminal information system (ATIS) have been upgraded in 2008, and fully comply with SARP. The meteorological station is well equipped and provides weather data and information to operators. The firefighter services comply with ICAO SARP for a category 8 airport. Finally, the airport also domiciles a privately held and operated fish processing

[34] Unused old terminal building at Aden Airport

Former military infrastructure can be used for cargo

[35] The An-225 is a strategic airlift transport aircraft which was built by the Antonov Design Bureau, and it is the largest airplane ever built. The Antonov An-225 is commercially available for flying any over-sized payload due to the unique size of its cargo deck. Currently there is only one aircraft operating but a second mothballed airframe is being reconditioned and is scheduled for completion around late 2008.

[36] The high minimum decision altitude is due to the fact that there is a 634 feet tower east of the field. Nevertheless, according to airport officials there are very few occasions per year when this minimum results in flight diversion. The current VOR DME system was upgraded in 2006.

operation, which does export local fish products by air. It has a processing capacity of 10 tons per day, and storage capacity of 60 ton frozen and 280 cold[37]. Overall the airside is in fairly good condition, and the 28 year old runway surface is regularly repaired. According to airport authorities, the most important enhancement at the airside would include the construction of an additional taxiway and an enhancement of the apron. However, the current traffic volume can cope with the existing airside infrastructure, even if this may occasionally delay a few flights.

48. The infrastructure at the landside at RIY is defined by a terminal building, which at times reaches its capacity and would have difficulties to cope with a doubling of traffic. Several options were discussed in the past, including the construction of a new airport. However, given the low traffic levels, an enhancement of the existing terminal should be considered the best alternative. An urban transport development project of the Bank is currently considering financing the terminal improvement, which should be supported as the currently best option for enhancement. The planned terminal improvements at RIY were evaluated in a recent feasibility study. The total cost is about US$ 3 million, and includes extension of ground and first floor, improvement of the parking, and airport lighting:

Description of Area		Area
(i)	Extension of the Ground Floor Area :	1872 sq.m
(ii)	Extension of the First Floor Area	1361 sq.m
	Total (theoretical estimate)	3233 sq.m

The costs of construction for the proposed extended portions of the Terminal Building have been estimated on the basis of per square meter rate. The cost involved shall be as under:

	Description of Area	Area	Rate in US$	Total in US$
(i)	Extension of the Ground Floor Area :	1872 sq.m	680	1,272,960
(ii)	Extension of the First Floor Area	1361 sq.m	680	925,480
(iii)	Parking Improvement		LS	500,000
(iv)	Airport Lighting			429,350
	Total			3,127,790

49. The **remaining airports** of Yemen are all very small in terms of traffic. Only three airports, Taiz Intl., Al-Hodeidah Intl., and Sayon Intl. have regular scheduled traffic, albeit under

[37] Fish processing operations at RIY

The airport terminal at RIY

50,000 passengers and less than 1,000 flights per year each (see Annex 3 – Domestic Airport Infrastructure). All remaining airports have no schedule air service, and no traffic data were available. Nevertheless, a remarkable investment program exists, where many airports received infrastructure upgrades. In Taiz, a new runway and a VOR DME system are under construction. However, the airport territory is entangled in some land dispute claims, which entails costly compensation schemes. In Al-Hodeidah and in Sayon new non-precision approaches and a new terminal building are under construction. Given the low traffic figures, these investments are to be considered quite substantial[38].

Airport Name	Actual Passengers 2008	Estimated Passengers 2017	Actual Aircraft Movt. 2008	Estimated Aircraft Movt. 2017	Instrument Approach	Investments 2008
Taiz Intl.	38,000	90,000	710	966	VOR/DME in constr.	$7,200,000
Al-Hodeidah Intl.	28,000	52,000	446	746	GNSS/VOR	$1,900,000
Sayon Intl.	50,000	91,000	636	925	VOR/DME in constr.	$1,750,000

Table 4: Key data for Taiz, Al-Hodeidah, and Sayon Airports
Sources: Central Statistical Organization (CSO) for actual 2008 figures and CAMA for other data

50. Investments in five more airports with no scheduled traffic at all were planned for 2008 to reach US$3,350,000 (see Annex 3 – Domestic Airport Infrastructure – Financial Facts). These investments include runway improvements, fencing, and non-precision approaches.

B. Air Traffic Control

51. Air traffic control infrastructure includes the primary and secondary radar system, which covers the Western FIR.[39] The radar system is owned, operated, and maintained by the armed forces, which can be considered a good set-up. The radar signal is fed to the civilian automation system at the main ATC center at SAH. The remaining infrastructure, which allows procedural air traffic control, includes VHS and HF voice communication and some V-Sat installations. According to controllers, the existing infrastructure allows to handle well the 100 to 120 daily overflights. Nevertheless, future enhancements by the low cost solution of ADS-B should be considered, especially in order to better survey the airspace for unreported traffic[40].

52. Several airports have recently been equipped with VOR DME non-precision approaches. Given the low traffic and relatively high cost involved these investments need to be evaluated. Many airports today choose GNSS approaches, instead of costly VOR DME installations[41]. There

[38] Investment program of 2008 in secondary airports with scheduled air service (see Annex 3)
[39] *Supra* note 23.
[40] There is little doubt that, despite surveillance with primary radar systems, some flights remain unreported and are neither captured for income nor for statistical purposes. This is a know factor over large parts in Africa. See a full description of ADS-B in
[41] GNSS – Global Navigation Satellite Systems or GPS approaches are designed for usage of the existing GPS system. The system is practically maintenance free, and the establishment can be done at relatively

are currently two GNSS approaches in Yemen, one at Al-Hodeidah and one at Sana'a. However, the latter is still not published in the AIP of Yemen.

low cost. The Bank has recently finance eight GNSS approaches in Mozambique for a total cost of US$600,000, the cost of one traditional VOR DEM approach.

VI. AIR CARRIERS

A. Yemenia - Yemen Airways

53. Yemenia - Yemen Airways is the national airline of Yemen, based in Sana'a. It operates scheduled domestic services as well as international services to more than 30 destinations in Africa, the Middle East, Europe, and Asia. Its main base is Sana'a International Airport, with a hub at Aden Airport.

54. The airline was established on 4 August 1961 as Yemen Airlines and started operations in 1962. It was reorganized and renamed Yemen Airways in 1972, following nationalization. The Yemenia name was adopted on 1 July 1978, following the joint establishment early in 1977 of a new airline by the governments of the Yemen Arab Republic, now Republic of Yemen, and Saudi Arabia. The operations of Aden-based Alyemda have been incorporated. The airline is owned by the Government of Yemen (51%) and the Government of Saudi Arabia (49%).

55. Yemenia has maintained a strong domestic and regional route network. In addition, certain destinations in Europe, Africa, and Asia were maintained, as they were traditionally served by the carrier, but eventually proved to be loss making (see Annex 10 – Existing and proposed New Route Network of Yemenia). Consequently, the carrier has struggled to become profitable, and losses have recently been substantial:

	2007	2006	Change	% Change
Passenger Revenue (000)	223,464	204,082	19,382	9%
Total Revenue (000)	258,200	235,582	22,618	10%
Variable Expense (000)	191,179	175,767	15,412	9%
Direct Profit (000)	67,021	59,815	7,207	12%
Fixed Costs (000)	78,297	77,472	825	1%
Fully-allocated Profit (000)	(11,275)	(17,657)	6,382	-36%
Passengers (000)	1,634	1,574	60	4%
RPKs (millions)	2,853	2,566	287	11%
ASKs (millions)	4,619	4,218	400	9%
Average Fare	137	130	7	5%
Passenger Yield (cents)	7.8	8.0	(0.1)	-2%
Passenger RASK (cents)	4.8	4.8	0.0	0%
Total RASK (cents)	5.6	5.6	0.0	0%
Variable CASK (cents)	4.1	4.2	(0.0)	-1%
Total CASK (cents)	5.8	6.0	(0.2)	-3%
Load Factor	61.8%	60.8%	0.9	na
Break-even Load Factor	64.9%	66.1%	(1.2)	na

Table 5: Key Financial and Operational Data of Yemenia in 2007 (financial data in US$ thousand)

56. In 2006, the carrier lost US$ 17.6 million (see above **Error! Reference source not ound.**) and experienced a negative cashflow of US$ 16.6 million from operating activities. The operating result of 2007 was projected at a loss of US$ 11.3 million, and the cashflow to reach a negative US$ 51.4 million (see Annex 9 – Key Financial Data of Yemenia). Overall, the carrier experienced low load factors, and low yields, while its cost structure was relatively high.

57. In September 2005 management of Yemenia initiated a consultancy with the specialized consulting firm SABRE Airlines Solutions. The objective was to analyze the operational and financial performance of the airlines in order to initiate and carry out a turnaround restructuring program. The shareholders and management seemed concerned that the carrier did not meet its financial objectives, and that losses and the negative cashflow are mounting. The consultants performed an indebt cost and operational analysis, and developed a new strategic focus for the carrier.

58. In January 2007, SABRE Airlines Solutions proposed a new operational business plan that included several key measures, which would lead the carrier to profitability. Especially the route network was analyzed in detail, and it was proposed to discontinue certain loss generating destinations on the short-term, which included Dar-Es-Salaam / Johannesburg, Khartoum, and Kuala Lumpur. At the same time, a new intercontinental network was proposed that would make full usage of the new Airbus 350, which would be introduced in 2014.[42] In addition, a new revenue management system, personnel restructuring measures, as well as the fleet strategy were discussed and optimized.

59. Especially the fleet development strategy became one of the cornerstones of the restructuring program. It was planned to gradually introduce the new Airbus A350 aircraft to replace the aging Airbus 330 fleet, for which Yemenia has done a downpayment of US$ 25 million at Airbus Industries[43].

	Year												
Aircraft Type	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**1H 2014**	**2H 2014**	**1H 2015**	**2H 2015**	**1H 2016**	**2H 2016**
A310-300	4	4	4	4/3	3	3	3	3	3	3	3	3	3
B737-800	3/4	4	4	4	4	4	4	4	4	4	4	4	4
A330-200	2	2	2	2	2	2	2	2	0	0	0	0	0
A350-900	0	0	0	0	0	0	0	0	2	3	4	5	6
Total Fleet	**9/10**	**10**	**10**	**10/9**	**9**	**9**	**9**	**9**	**9**	**10**	**11**	**12**	**13**

Table 6: Fleet planning as proposed in January 2007

60. The new strategy requires that Yemenia reaches profitability and a positive cashflow. Given the fact that the ownership cost of the A350 will be substantially higher, it is required that a strong and profitable network be in place when the new aircraft arrive[44]. Another important issue is the fact that Yemenia has handed over the domestic network to Felix Airways (see below). This can be judged positively, given the fact that Yemenia did not reach profitability on its domestic routes because of low load factors, and weak yields. Nevertheless, the freed capacity of the currently four Boeing 737-800 aircraft needs to be deployed on new or existing

[42] The following market expansion for Yemenia's international network was developed in 2006: Dammam (Saudi Arabia), Manila (Philippines) for 2008; Chennai (India) for 2009; New York (JFK), Delhi (India) for 2014; Nairobi (Kenya) for 2016.

[43] According to management of Yemenia, the A350 will now first replace the older A310.

[44] Operational data and ownership cost per aircraft of Yemenia's fleet

	Total Seats	Maximum Range (in KM)	Ownership Cost per Day
A310	198	9,654	7,877
A330	277	11,263	14,658
B738	154	4,827	10,969
A350	276	14,800	25,114

international routes. However, Yemenia had not yet reached a decision on a revised route network, and has focused on major investment programs, which also includes the construction of hotels for anticipated new sixth freedom traffic.

61. The consultancy of SABRA Airlines Solutions was terminated recently. In addition, it seems that the proposed restructuring program was, at least partially, put aside given the fact that certain loss making routes were reopened or not discontinued (e.g. SAH-DAR). The strategic focus now seems to be on quickly establishing a well performing sixth freedom network, where Sana'a would emerge to a major intercontinental hub between Europe, Africa, and Asia. To provide the necessary funding, the shareholders apparently have agreed to increase Yemenia's capital from currently US$ 80 million to US$400 million. The new funds are necessary to compensate for past losses, and to finance necessary investments.

62. From an operational standpoint Yemenia can be considered a carrier that complies well with international standards. It recently passed the IATA Operational Safety Audit, and received the IOSA certification which valid until June 2010[45].

63. In summary, Yemenia remains the main element of the air transport sector of the country. While it has operationally reached international safety levels, it also has embarked on an aggressive strategy forward which focuses primarily at gaining market share. This would present substantial additional risks because of the high degree of competition by regional airlines and the limited size and possible volatility of some of the targeted markets. It appears further that the carrier does not yet have a well defined operational strategy, which should include a fresh look at their fleet plan. Given the current global economic downturn, which already resulted in a significant reduction for air transportation services, Yemenia may be headed for major challenges

[45] Yemenia's flight crew operate according to international standards, which is confirmed by IATA

IATA IOSA Certification

Yemenia Yemen Airways

Yemenia اليمنية

Registration Expiry

Monday, June 07, 2010

Registration Comments:

No comments.
All information is contained in the IOSA Audit Report

Online: http://www.iata.org/ps/certification/iosa/operator?c=IYE

and continued losses. Yemenia also seems to benefit from direct or indirect subsidies which should be discontinued in the future. One example concerns the monopoly of handling operations that Yemenia enjoys at SAH. Another includes the fact that Yemenia apparently has large sums of unpaid airport fees.

B. Felix Airways

64. Felix Airways was created with the objective to take over Yemenia's domestic network, which was never profitable in the recent past[46]. For this, Yemenia has passed its domestic traffic rights to Felix Airways, where converted to a 25 percent equity stake. The major shareholder of 75 percent is a Saudi investor, which might create certain issues if Felix operates internationally in the future (see above, Domestic Air Transport Policy). The overall equity is US$ 80 million, of which US$ 60 million are provided by the Saudi investor.

65. Felix Airways has initiated its operations on 26 October 2008 with one CRJ700 aircraft. It is expecting the delivery of another CRJ700 in the near future, and will lease two used aircraft to bridge the delivery of additional aircraft. The objective is to quickly establish a fleet of eight aircraft, to serve all domestic and eventually some international destinations.

66. Felix Airways receives good support by its shareholder company Yemenia, which dispatched some highly qualified staff to start the carriers. However, certain operational and administrative challenges need to be solved, such as setting-up a performing reservation system with payment options[47]. Finally, its current fare structure requires that several seats are sold in the highest category, in order for the flight to be profitable. However, this might also prove to be a major challenge, as domestically purchased tickets traditionally were on lower tariffs. Nevertheless, the fact that a new, majority private held carriers is operating in Yemen has to be regarded as a positive result of the liberalization of air services.

[46] In fact, before the carrier was founded, the proposal by SABRA Airline Solutions was to acquire several Bombardier Regional Jets for Yemenia to operate the domestic network. This concept is now the business plan of the new carrier Felix Airways.

[47] Felix Airways is not a member of IATA, and it has difficulties to obtain a credit card payment registry. The short-term solution is to accept cash payments at agents, and soon payment by phone value cards.

Annex 1 - The League of Arab States and their Open-Skies Agreement

67. The League of Arab States, or Arab League, was founded in Cairo, Egypt, on 22 March 1945, by a treaty which was signed by the Heads of State of seven Arab nations[48]. The purpose, as defined in Article 2 of the treaty, is to strengthen the relations between the Member States, to coordinate their policies to achieve coordination among the Member States and to safeguard their independence and sovereignty, and to deal with issues of general concern which are in the interest of the Arab countries.[49] Subsequently, the Arab League extended its membership base continuously over the years to include a total of 22 Arab States and two observing nations[50].

68. The air transport sector was dealt with by the Civil Aviation Council of the Arab States, which was created in 1967. The original aim of this council was to study the "principles, techniques, and economics relating to air transport", and the council was to study international standards, practices and agreements, and to recommend adoption of such agreements, which were in the interest of Arab States[51]. It further anticipated the preparation and adoption of a uniform advanced air law for Arab States, an English-French-Arabic lexicon of civil aviation terminology, and the conclusion of various agreements on air transport, transit rights, and search and rescue[52]. It even established a dispute settlement mechanism in Article 10 of the agreement, which was set-up by the Civil Aviation Council[53]. Despite the strong initial momentum of the Arab States indeed wanting to unify and harmonize their air transport sectors, and eventually aiming at creating a common Arab aviation market, there is little evidence that the Civil Aviation Council achieved major progress towards that objective.

69. About thirty years after the creation of the council, a new initiative was launched when in 1995 the Arab League States created a new entity called "The Arab Organization for Civil Aviation". The main objective of the new organization was to provide the civil aviation authorities of the Arab League Member States a joint framework for the development of air transport services between the Arab countries and to ensure safety of the sector. It specifically aimed at promoting and developing cooperation and coordination between the Arab States[54]. The organization, which has its own General Assembly, Executive Board, and independent budget, enjoyed certain independence in pursuing the promotion of cooperation and integration of the air transport activities of the member Countries[55]. However, it remained bound to the rules approved

[48] These were Egypt, Iraq, Jordan, Lebanon, Saudi Arabia, Syria, and Yemen. See League of Arab States, "Pact of the League of Arab States" (1992) 7:No. 2 Arab Law Quarterly 148

[49] *Ibid.* Article 2

[50] The Member States are Arab Republic Of Egypt (since 1945), Republic Of Iraq (1945), The Hashemite Kingdom Of Jordan (1945), Republic Of Lebanon (1945), Kingdom Of Saudi Arabia (1945), Arab Republic Of Syria (1945), Republic Of Yemen (1945), Socialist People's Libyan Arab Jamahiriya (1953), Republic Of Sudan (1956), Kingdom Of Morocco (1958), Republic Of Tunisia (1958), State Of Kuwait (1961), Democratic And Popular Republic Of Algeria (1962), United Arab Emirates (1971), Kingdom Of Bahrain (1971), State Of Qatar (1971), Sultanate Of Oman (1971), Islamic Republic Of Mauritania (1973), Republic Of Somalia (1974), State Of Palestine (1976), Republic Of Djibouti (1977), and the Federal Islamic Republic Of Comoros (1993). The observer States are the State of Eritrea (since) and the Republic of India (2007). See About the Arab League – Member States.
Online: http://www.arableagueonline.org/las/english/level2_en.jsp?level_id=11.

[51] Dorothy Peaslee Xydis Amos Jenkins Peaslee, *International governmental organizations: constitutional documents.*, Revised third ed. (The Hague: M. Nijhoff, 1976) at 265.

[52] *Ibid.*

[53] *Ibid.*

[54] Hassan Radhi, "The Arab Organisation for Civil Aviation" (1996) 11:3 Arab Law Quarterly 285 at 285.

[55] For example, the Arab Organisation of Civil Aviation may promote the integration between Arab airline companies and consolidate arrangements between the member countries wherever they contribute to

by three councils, the Economic and Social Council, the Arab League Council, and the Arab Transportation Ministers Council, with respect to "Pan-Arab Action Organizations". It is also mandated with the implementation of resolutions and programs of these councils and must coordinate with the General Secretariat of the Arab League[56]. These restrictions clearly indicate that the Arab League, at the highest level, is deciding on policy issues of the air transport sector. However, the objectives and mandate of the Arab Organization for Civil Aviation are very similar to the ones of the Civil Aviation Council of the Arab States, which over the course of thirty years didn't achieve much progress.

The Arab League Open-Skies Agreement

70. The Arab Civil Aviation Commission (ACAC), which has emerged out of the Arab Organization for Civil Aviation, has continuously pushed for cooperation and liberalization of the civil aviation sector in the Arab world[57]. Its initiative was based on an agreement of the Council of Arab Transport Ministers, reached in 1999, to liberalize intra-Arab air services over a period of five years by gradually reducing restrictions for carriers of Member States of ACAC. This resulted the signing of seventeen "open skies" agreements among ACAC States, which included Bahrain, Jordan, Lebanon, Morocco, Oman, Qatar, Syria, and the United Arab Emirates[58]. In addition on 19 December 2004, under leadership of ACAC, several Arab League countries signed a multi-lateral agreement on the liberalization of air transport between the Arab States[59].

71. The agreement, which aims at liberalizing regional air services, has its fundament in the Agreement on Facilitating and Developing Trade between the Arab Countries ("The Agreement of Arab Free Trade"), which was adopted by the Economic and Social Council on 27 February 1981[60]. Article 18 of this agreement provides for the cooperation between the State parties of the Arab League to facilitate all means of transport and communication between them on a preferential basis[61]. The preamble of the Arab League Open-Skies Agreement specifically seeks at achieving greater liberalization of air transport services between the Arab countries, by "coordinating Arab air transport policies in order to eliminate any obstacles to the development of Arab air transport". The preamble encourages "the gradual liberalization of air transport within a regional and multilateral framework". In Article 4, the agreement provides concrete traffic rights for any air transport company, which was designated in accordance to the agreement:

- the right to transit through any of the territories of the other State parties;
- the right to land in any in any of the territories of the other State parties for non-commercial purposes; and
- the right to embark and disembark passengers, cargo and mail, whether separately or combined, to and from any of the territories of the State parties.

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implementing the regional plans issued by the International Civil Aviation Organisation relating to aerial navigation supplies and services. See *Ibid.* at 286.

[56] *Ibid.* at 292.

[57] ACAC serves similar objectives as the former council and is based in Rabat, Morocco. It acts as the specialized organization for of the Arab League and is based on a treaty.

[58] See Assad Kotaite. Address of the President of ICAO, Dr. Assad Kotaite., *Eight Session of the General Assembly of ACAC*. Marrakech, Morocco; 2006.

[59] These countries included Bahrain, Egypt, Iraq, Jordan, Lebanon, Oman, Palestine, Somalia, Sudan, Syria, Tunisia, and Yemen. Arab Civil Aviation Commission. Agreement on the Liberalisation of Air Transport between the Arab States. Damascus; 2004. [hereinafter referred to as Arab League Open-Skies Agreement].

[60] Arab League. Agreement of Arab Free Trade Area. Tunis; 1981.

[61] *Ibid.* at preamble.

72. The first two traffic rights represent in fact the first two freedoms of the air as described in the International Air Services Transit Agreement of 1944, which was signed by 125 countries[62]. Most of the Arab League States have already signed the Transit Agreement and is bound to granting these first two freedoms. However, for eight Arab League States this will become a new obligation provided they sign and ratify the agreement[63]. The third right to be granted based on the agreement, to embark and disembark passengers, cargo and mail, whether separately or combined, to and from any of the territories of the State parties, is much broader.

73. While other international agreements, such like the African Yamoussoukro Decision[64], clearly define the granted rights as first, second, third, fourth and fifth freedoms, the Arab League Open-Skies Agreement is less clear on what freedoms beyond the first two are granted. "To and from" a point of a State party does clearly include third and fourth freedom, which is based on air traffic between two parties. However, the agreement seems to go beyond these freedoms, as it includes traffic "to and from any of the territories of the State parties". Clearly, fifth freedom rights are included, because any destination within State parties, beyond the initial destination, is included. The agreement even seems to grant seventh freedom rights, as it does not specify that traffic needed to route back over the initial States parties departure point. The only freedom, which is clearly excluded, is "cabotage", the eighth freedom, as passengers, cargo, or mail, needed to embark and disembark to and from "any of the territories of State parties".

74. The Arab League Open-Skies Agreement has other similar provisions as the African Yamoussoukro Decision. Article 5 entitles each State party to designate one or more air transport companies to benefit from the provisions of the agreement. In order to qualify, the company must have substantial ownership or effective control of one or more State parties or their citizens, and the main place of business must be in one of the State parties. Article 7 provides, similar to the Yamoussoukro Decision, the freedom of capacity by stating that each designated air transport company was entitled to operate the capacity and number of flights it considers adequate, and that no State party may unilaterally restrict capacity, number of flights, types of aircraft or air transport rights, except on a non-discriminatory basis for certain environmental or technical reasons when air safety or security was affected[65].

75. In terms of tariffs, the Arab League Open-Skies Agreement provides a more complete framework than the Yamoussoukro Decision. According to Article 8 of the agreement, the tariffs for air transport of passengers, cargo and mail, must be determined in accordance to Annex 1 of the agreement. Annex 1, titled "Criteria and Procedures for fixing tariffs", states that the designated air transport company should determine their tariffs for air transportation on the basis of commercial considerations. As criteria, it states that tariffs must be fixed at reasonable levels, "having regard to all the relevant factors and, in particular, operating costs and types of services, a reasonable profit and the competition in the market". The tariffs do not require approval by the Civil Aviation Authorities, but they must be filed thirty days prior to the date they come into force. However, the Civil Aviation Authority of any State party may intervene to prevent discriminatory practices and to protect the consumers, which includes particularly the provisions relating to guarantees and competitions. Discriminatory practices are further defined as the case,

[62] International Civil Aviation Organization. International Air Services Transit Agreement. Chicago; 1944. [hereinafter referred to as Transit Agreement]

[63] These are Comoros, Djibouti, Libya, Qatar, Saudi Arabia, Sudan, Yemen, and the State of Palestine, which is not a contracting State of ICAO.

[64] The Yamoussoukro Decision (YD) of 1999 aims at opening up intra-African air services up to the fifth freedoms. While it is legally in force, and most African States are bound, not all nations have begun air services under the new open skies regime. Nevertheless, there is growing evidence that liberalization of air services in Africa takes place thanks to the principles of the YD.

[65] Very similar text to the Yamoussoukro Decision, see Yamoussoukro Decision Article 5.

where tariffs are to be considered prejudicial to the air transport company of a State party, in which case the Civil Aviation Authority of the same country might object. The consumer protection provisions aim at ensuring fair competition, and are defined in Annex 2.

76. The fair competition provisions focus on air carriers belonging to a given State party, which should not benefit of special agreements between the concerned State parties, when they were concluded in order adversely affect competition. The consumer protection provisions of Annex 1 are also providing certain guarantees that should eliminate unfair practices, which would prevent a minimum of market participation. They are listed in Annex 3 and include practices of imposing excessively low tariffs, "price dumping", or providing excess capacity on the market, which are intended to drive the other participant out of the market.

77. Finally, Annex 1 refers to the dispute resolution mechanism of Article 30 of the agreement, which shall be invoked if an objection to a tariff for scheduled air transport was raised, and the matter could not be solved by consultations between the two State parties. The dispute settlement mechanism of the agreement shall be applied in the case that any disagreement between two or more States parties arises concerning the interpretation or application of the provisions of the agreement and its annexes. If the parties involved cannot resolve the matter through negotiation, the issue shall be submitted to the Director General of the Arab Civil Aviation Commission. If his efforts as intermediary fail, an arbitration tribunal would be established consisting of three arbitrators. The decision of this tribunal shall be final and does not provide for an appeal. The States parties are bound to the decision, and measures may be invoked to ensure compliance by the carrier concerned with the arbitral decision.

78. Overall, the Arab League Open-Skies Agreement provides the same or, in the case of granting potentially seventh freedom rights, even greater liberalization of air services than the African Yamoussoukro Decision. It defines well the competition rules and the conflict resolution procedure. However, so far the agreement has only been ratified by Jordan (30 June 2005), the United Arab Emirates (28 November 2006), Syria (24 May 2005), Palestine (23 October 2005), Lebanon (14 June 2006), and Yemen (24 October 2005)[66]. Nevertheless, the agreement is in force since 18 February 2007, when according to Article 38 the necessary quorum of five countries has been reached by deposition of their ratification instruments. In addition, several other countries have announced that their ratification process is underway[67].

[66] *Liste des pays ayant ratifié la Convention sur la Libéralisation du Transport Aérien* by Mohamed El Alj: Arab Civil Aviation Commission, 10 October 2007) .
[67] These are Bahrain, Oman, Qatar, and Egypt. *Ibid.*

Annex 2 – Analysis Current Air Services based on Scheduled Seats

79. The traditional source for airline data is the Official Airline Guide (OAG), a company with a more that 150 year history of publishing travel schedules[68]. For many years OAG was the only provider of such data, until the Airline Data Group (ADG) of the Seabury was created around the year 2000[69]. Both sources depend on airlines reporting their routes, and both have captured 99 percent of the scheduled airline data, with about 900 to 1,000 airlines participating. Though OAG is the more established data collector, both companies enjoy an excellent industry reputation, and are endorsed by IATA.

80. For the analysis of the air service market of Yemen, a defined set of data was procured from ADG and compiled in electronic form[70]. A total of twelve extractions in time where assembled, four each for the years 2001, 2004, and 2007. These extractions cover all scheduled flights within, and to and from the region. To assure the capture of seasonal trends, the four samples for each year consist of data for one week in the months of February, May, August, and November. For the annualization of these figures the total sum of the four observations for a given year were multiplied by 13[71].

81. The data consist of one record of each flight occurring during the sampled week, with relevant entries as to origin and destination airports, the changeover airport in the case of one-intermittent-stop flights, the number of miles of the flight, the duration of the flight, the number of seats available on the flight, the number of times the flight occurred during the week, the weekdays the flight was scheduled, the aircraft type used, and both an entry for the carrier as well as for the actual operator. Using the relational database management system "Microsoft Access", the data was normalized and linked to other relevant tables in order to develop a relational database for extensive summarization and querying.

82. In addition, one important adjustment had to be made: Flights from one airport to another final destination with an intermediate scheduled stop had their capacity allocated with even proportions to each leg. This implies that a flight from airport A to airport C via Airport B would only have half the capacity go from airport A to C, while the other half would deplane at airport B. This allocation was made for each leg, i.e. if a flight had four legs, each of the destination airports would only have on quarter of the overall capacity allocated. Despite the fact that the even distribution of the legs is just an assumption, this methodology prevents double-counting of capacity for multi-legged flights. The overall impact of these calculation resulted in about 10 percent adjustment of capacities.

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[68] OAG (Official Airline Guide) is a global flight information and data provider company for the passenger aviation, air cargo logistics and business travel markets. The firm, a merger of two companies, was founded in the United Kingdom in 1853 as ABC International, when it issued its first publication, the "ABC Alphabetical Railway Guide". Later, Official Airline Guides Inc. was created in 1929 in the US, and published the "Official Aviation Guide Of The Airways", listing 35 airlines offering a total of 300 flights. In 1993 the two firms merged, and today OAG operates in three business units: Aviation Solutions, Cargo Solutions and Travel Solutions. Its aviation solutions unit, OAGback Aviation Solutions, provides data on airlines, analytical services and asset valuation support.
Online: OAG - Corporate Profile, www.oag.com/oagcorporate/aboutOAG_corporateprofile.html,

[69] Founded in 1995, the US based Seabury Group provides investment banking, financial advisory, restructuring and consulting services primarily for transportation companies and those in related industries around the world. Online: Seabury Group - Investment Banking & Advisory Services, http://www.seaburygroup.com/company/index.html

[70] See generally *Detailed Analysis of African Air Services Schedules* by Douglas Abbey (Washington DC: The Velocity Group)

[71] Since this is weekly data, the multiplier 13 (4*13=52 weeks) is more precise than 12 (4*12=48).

Scheduled Seats per Airport

Country Name	Airport	City	Dom Adjusted Seats 2001	Intl Adjusted Seats 2001	All Adjusted Seats 2001	Dom Adjusted Seats 2004	Intl Adjusted Seats 2004	All Adjusted Seats 2004	Dom Adjusted Seats 2007	Intl Adjusted Seats 2007	All Adjusted Seats 2007
Yemen	SAH	Sana'a	408,161	840,528	1,248,689	365,274	1,235,416	1,600,690	387,101	1,668,056	2,055,157
Yemen	ADE	Aden	216,372	101,361	317,733	210,080	110,708	320,788	201,318	102,492	303,810
Yemen	RIY	Riyan Mukalla	109,642	44,928	154,570	113,737	37,128	150,865	103,857	32,851	136,708
Yemen	GXF	Seiyun	40,833	17,446	58,279	41,782	17,316	59,098	51,012	13,013	64,025
Yemen	TAI	Taiz	63,024	14,768	77,792	48,412	10,010	58,422	57,226	2,002	59,228
Yemen	HOD	Hodeidah	59,826	10,231	70,057	42,926	3,796	46,722	50,973	2,548	53,521
Yemen	AAY	Al Ghaydah	45,942		45,942	56,615		56,615	33,969		33,969
Yemen	AXK	Ataq	15,340	1,066	16,406						
			959,140	**1,030,328**	**1,989,468**	**878,826**	**1,414,374**	**2,293,200**	**885,456**	**1,820,962**	**2,706,418**
		Growth:						**5.09%**			**6.01%**

Passenger Forecast per Airport[72]

Airport	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sana'a	1570716	1693187	1828642	1974933	2132928	2303562	2487847	2686875	2901825	3075934	3260491
Aden	224879	242268	261649	282581	305188	329603	355971	384449	415205	440117	466524
Al-Mukalla	129168	137483	148482	180360	173189	187044	202008	218168	235622	249759	264745
Taiz	28198	36118	39007	42128	4598	49138	53069	57315	61900	65614	89551
Al-Hodeidah	23104	26745	28885	31195	33691	36386	39297	42441	45836	48586	51502
Sayon	45504	47402	51194	55290	59713	64490	69649	75221	81239	86113	91280
Total	2021569	2183203	2357859	2566487	2709307	2970223	3207841	3464469	3741627	3966123	4224093

[72] Passenger Forecast received from CAMA on 25 October 2008.

Domestic Air Services per Airport Pair

Origin	Destination	2001 02	2001 05	2001 08	2001 11	2004 02	2004 05	2004 08	2004 11	2007 02	2007 05	2007 08	2007 11
AAY	ADE	767	2,301	1,534		1,456	1,534	1,456	2,002	1,001	1,001	1,001	
ADE	AAY	1,534	3,835	1,534		1,456	4,602	1,456	2,002	1,001	1,001	1,001	
AAY Al Ghaydah	**ADE Aden**	**2,301**	**6,136**	**3,068**	**0**	**2,912**	**6,136**	**2,912**	**4,004**	**2,002**	**2,002**	**2,002**	**0**
AAY	GXF	767	767			663	663	663	663	663	663	663	
GXF	AAY	767	767										
AAY Al Ghaydah	**GFX Seiyun**	**1,534**	**1,534**	**0**	**0**	**663**	**663**	**663**	**663**	**663**	**663**	**663**	**0**
AAY	RIY	2,483	3,068	2,301		1,456	1,456	1,456	2,002	1,001	1,001	1,001	
RIY	AAY	1,716	2,301	2,301		1,456	1,456	1,456	2,002	1,001	1,001	1,664	663
AAY Al Ghaydah	**RIY Riyan Mukalla**	**4,199**	**5,369**	**4,602**	**0**	**2,912**	**2,912**	**2,912**	**4,004**	**2,002**	**2,002**	**2,665**	**663**
AAY	SAH	3,614	3,068	2,301		2,665	5,070	2,665	2,665	2,665	2,665	3,328	663
SAH	AAY	3,614	2,301	2,301		2,665	4,199	2,665	2,665	2,665	2,665	3,328	663
AAY Al Ghaydah	**SAH Sana'a**	**7,228**	**5,369**	**4,602**	**0**	**5,330**	**9,269**	**5,330**	**5,330**	**5,330**	**5,330**	**6,656**	**1,326**
ADE	GXF	767	1,716	949		663	663	663	663				3,003
GXF	ADE	637	637	637		663	663	663	663	1,001	1,001	1,001	2,002
ADE Aden	**GFX Seiyun**	**1,404**	**2,353**	**1,586**	**0**	**1,326**	**1,326**	**1,326**	**1,326**	**1,001**	**1,001**	**1,001**	**5,005**
ADE	HOD	2,847	949	949		728	728	728	1,001				
HOD	ADE	949	949	949									
ADE Aden	**HOD Hodeidah**	**3,796**	**1,898**	**1,898**	**0**	**728**	**728**	**728**	**1,001**	**0**	**0**	**0**	**0**
ADE	RIY	3,250	3,250	4,784	845	3,523	3,406	3,406	4,667	3,003	3,003	3,003	2,665
RIY	ADE	4,602	4,602	3,835		2,678	2,912	2,912	4,004	3,666	3,666	2,665	2,002
ADE Aden	**RIY Riyan Mukalla**	**7,852**	**7,852**	**8,619**	**845**	**6,201**	**6,318**	**6,318**	**8,671**	**6,669**	**6,669**	**5,668**	**4,667**
ADE	SAH	21,801	20,631	19,682	15,262	18,499	18,980	20,202	21,229	21,437	21,437	17,888	20,956
SAH	ADE	25,571	24,700	24,700	14,417	21,814	16,666	20,215	20,514	23,049	23,049	20,501	15,314
ADE Aden	**SAH Sana'a**	**47,372**	**45,331**	**44,382**	**29,679**	**40,313**	**35,646**	**40,417**	**41,743**	**44,486**	**44,486**	**38,389**	**36,270**

Origin	Destination	2001 02	2001 05	2001 08	2001 11	2004 02	2004 05	2004 08	2004 11	2007 02	2007 05	2007 08	2007 11
AXK	SAH	3,068	3,068	1,534									
SAH	AXK	3,068	3,068	1,534									
AXK Ataq	**SAH Sana'a**	**6,136**	**6,136**	**3,068**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
GFX Seiyun	**RIY Riyan Mukalla**					**663**	**663**	**663**	**663**				
GXF	SAH	3,887	6,370	5,603	1,690	4,992	4,563	3,991	2,990	5,668	5,668	4,667	5,005
SAH	GXF	3,250	4,966	4,966	1,690	4,992	2,665	3,991	2,990	5,668	5,668	4,667	4,004
GFX Seiyun	**SAH Sana'a**	**7,137**	**11,336**	**10,569**	**3,380**	**9,984**	**7,228**	**7,982**	**5,980**	**11,336**	**11,336**	**9,334**	**9,009**
SAH	HOD	4,004	7,592	6,058	3,380	3,965	5,070	2,496	5,200	4,654	4,654	5,928	5,941
HOD	SAH	7,293	8,749	7,215	3,380	4,693	4,758	3,224	6,201	4,654	4,654	4,654	7,215
HOD Hodeidah	**SAH Sana'a**	**11,297**	**16,341**	**13,273**	**6,760**	**8,658**	**9,828**	**5,720**	**11,401**	**9,308**	**9,308**	**10,582**	**13,156**
HOD	TAI	1,014	507	507		494			1,989	1,326	1,326	1,989	663
TAI	HOD	507	1,014	1,014			494	494	663	1,326	1,326	663	
HOD Hodeidah	**TAI Taiz**	**1,521**	**1,521**	**1,521**	**0**	**494**	**494**	**494**	**2,652**	**2,652**	**2,652**	**2,652**	**663**
RIY	SAH	9,594	9,555	9,373	4,667	9,217	8,177	8,905	11,921	8,216	8,216	9,880	9,607
SAH	RIY	10,543	11,778	9,698	5,096	8,788	6,019	7,904	9,906	8,554	8,554	9,217	10,608
SAH Sana'a	**RIY Riyan Mukalla**	**20,137**	**21,333**	**19,071**	**9,763**	**18,005**	**14,196**	**16,809**	**21,827**	**16,770**	**16,770**	**19,097**	**20,215**
SAH	TAI	8,385	6,851	6,851	7,371	2,496	6,500	6,968	5,655	4,654	4,654	5,993	8,671
TAI	SAH	8,385	8,177	6,643	5,798	4,498	7,540	4,966	5,655	5,655	5,655	4,654	8,671
TAI Taiz	**SAH Sana'a**	**16,770**	**15,028**	**13,494**	**13,169**	**6,994**	**14,040**	**11,934**	**11,310**	**10,309**	**10,309**	**10,647**	**17,342**
		138,684	**147,537**	**129,753**	**63,596**	**105,183**	**109,447**	**104,208**	**120,575**	**112,528**	**112,528**	**109,356**	**108,316**

International Air Services per Country Pair

Label Country Name 2	Label Country Name 1	2001 02	2001 05	2001 08	2001 11	2004 02	2004 05	2004 08	2004 11	2007 02	2007 05	2007 08	2007 11
Yemen	Saudi Arabia	81,952	82,602	73,840	64,194	83,746	104,507	82,056	101,868	110,461	108,433	125,879	110,916
Yemen	United Arab Emirates	54,028	53,677	54,561	52,663	81,133	94,562	83,928	90,350	101,582	101,582	99,645	102,765
Yemen	Germany	26,910	26,910	27,976	14,014	31,382	39,650	28,912	28,912	32,526	33,878	34,554	36,634
Yemen	Jordan	36,010	35,880	24,700	20,904	18,356	28,964	27,690	20,748	31,642	33,410	29,068	25,844
Yemen	India	17,836	17,836	17,836	12,740	18,200	25,844	18,200	32,370	32,370	32,370	27,885	20,384
Yemen	France	10,192	10,192	10,192	10,192	10,192	8,918	10,192	16,185	24,271	24,271	24,271	20,215
Yemen	Qatar	4,615	5,564	5,564	4,264	14,898	23,426	19,422	18,980	18,980	18,980	18,980	18,980
Yemen	Syrian Arab Republic	12,220	10,920	10,920	8,814	8,814	12,025	11,128	7,722	10,426	8,398	12,506	18,304
Yemen	Indonesia					2,548		2,548	14,157	6,071	6,071	7,423	18,200
Yemen	Italy	7,644	7,644	7,644	8,918	11,466	5,096	5,096	5,096	10,192	10,192	13,182	16,172
Yemen	Bahrain	6,734	6,474	4,056	3,692	5,096	9,178	8,554	7,774	9,399	9,399	12,935	13,624
Yemen	United Kingdom	10,192	12,740	12,740	17,836	12,740	12,740	12,740	20,228	16,172	16,172	15,730	12,740
Yemen	Turkey							5,096		7,748	8,060	11,934	11,622
Yemen	Lebanon	1,690	3,380	3,380	3,380	4,238	7,644	5,096	3,380	10,504	10,504	12,194	9,100
Yemen	Malaysia					7,644		7,644	8,086	12,129	12,129	8,099	6,071
Yemen	Kuwait					5,005	1,664	3,328	4,004	9,100	9,100	9,100	4,004
Yemen	Pakistan	2,548	2,548	2,548	3,822		5,096						
Yemen	Bangladesh								8,112	8,918	8,918	7,644	
		272,571	**276,367**	**255,957**	**225,433**	**315,458**	**379,314**	**331,630**	**387,972**	**452,491**	**451,867**	**471,029**	**445,575**

Offered Seat Capacity by Airline

Op Al	AIRLINE_NAME	2001 Dom Adjusted Seats	2001 Intl Adjusted Seats	2001 Total Adjusted Seats	2004 Dom Adjusted Seats	2004 Intl Adjusted Seats	2004 Total Adjusted Seats	2007 Dom Adjusted Seats	2007 Intl Adjusted Seats	2007 Total Adjusted Seats
IY	Yemenia	479,570	708,006	1,187,576	439,413	933,140	1,372,553	442,728	1,211,626	1,654,354
SV	Saudi Arabian Airlines		102,518	102,518		119,912	119,912		146,744	146,744
EK	Emirates		54,288	54,288		125,580	125,580		126,360	126,360
LH	Deutsche Lufthansa AG		57,798	57,798		74,074	74,074		73,008	73,008
LH	Lufthansa Cargo AG		57,798	57,798		74,074	74,074		73,008	73,008
RJ	Royal Jordanian (Alia		58,604	58,604		54,392	54,392		69,576	69,576
QR	Qatar Airways (W.L.L.)					53,508	53,508		59,904	59,904
TK	Turkish Airlines, Inc.								39,364	39,364
G9	Air Arabia								38,740	38,740
GF	Gulf Air Company G.S.C.		31,824	31,824		35,360	35,360		35,360	35,360
RB	Syrian Arab Airlines		16,224	16,224		18,408	18,408		20,280	20,280
9Y	Air Kazakstan		1,066.00	1,066.00						
		479,570	**1,088,126**	**1,567,696**	**439,413**	**1,488,448**	**1,927,861**	**442,728**	**1,893,970**	**2,336,698**

Offered Seat Capacity by Aircraft Type

IATA Equipment Code	Aircraft	2001 Adjusted Seats	2004 Adjusted Seats	2007 Adjusted Seats	2001 Average Stage length	2004 Average Stage length	2007 Average Stage length
310	Airbus A310 all pax models	449,618	341,185	472,186	1,191	1,177	965
313	Airbus A310-300 Pax		10,140			1,253	
319	Airbus A319		8,580			827	
320	Airbus A320-100/200	52,156	103,272	208,520	1,147	1,083	1,124
321	Airbus A321-100/200			13,104			1,316
330	Airbus A330 all models		121,394	383,630		1,436	1,687
332	Airbus A330-200		97,890	126,360		874	988
662	Unkown		30,810			988	
722	Boeing 727-200	6,084	6,084	2,028	531	531	531
727	Boeing 727 all pax models	74,633			478		
72S	Boeing 727-200 Advanced pax	235,222			499		
732	Boeing 737-200 Pax		79,131			231	
737	Boeing 737 All pax models	3,146			124		
738	Boeing 737-800 Pax		408,434	453,583		533	457
73S	Boeing 737-200 Advanced pax	203,905			257		
741	Boeing 747-100 Pax			80,496			531
AB3	Airbus A300 Pax	80,496	107,328	53,664	531	531	531
E95	Embrear EMB 195			5,200			1,443
M90	McDonnell Douglas MD90	22,022	12,584	12,584	675	675	675
TU5	Tupolev Tu154	1,066			3,343		

DOMESTIC ONLY							
IATA Equipment Code	Aircraft	2001 Adjusted Seats	2004 Adjusted Seats	2007 Adjusted Seats	2001 Average Stage length	2004 Average Stage length	2007 Average Stage length
310	Airbus A310 all pax models	89,180	79,404	121,030	246	242	220
330	Airbus A330 all models		18,226	12,168		235	191
727	Boeing 727 all pax models	38,025			177		
72S	Boeing 727-200 Advanced pax	119,600			222		
732	Boeing 737-200 Pax		79,131			231	
737	Boeing 737 All pax models	3,146			124		
738	Boeing 737-800 Pax		187,616	260,988		248	249
73S	Boeing 737-200 Advanced pax	192,400			236		

Technical Facts

A/P Rank	Airport Name	IATA/ICAO Identifier	Elevat. (mtrs.)	Rwy (mtrs.)	Rwy Type	PAX 2008	PAX 2017	Aircraft Movt. 2008	Aircraft Movt. 2017	Instrument Approach	Night Ops	Fenced	Terminal
1	Sana'a Intl.	SAH / OYSN	2,199	3,252	Asphalt	1,693,187	3,260,491	13,951	24,631	ILS/VOR	yes	yes	Adequate
2	Aden Intl.	ADE / OYAA	2	3,100	Asphalt	242,268	466,524	2,962	4,726	ILS/VOR	yes	yes	Adequate
3	Al-Mukalla Intl.	RIY / OYRN	15	3,000	Asphalt	137,483	264,745	1,578	2,555	VOR/DME	yes	yes	yes
4	Taiz Intl.	TAI / OYTZ	1,475	3,000	Asphalt	36,118	89,551	473	966	VOR/DME in construction	no	yes	Adequate
5	Al-Hodeidah Intl.	HOD / OYHD	12	3,000	Asphalt	26,745	51,502	400	746	GNSS/VOR	yes	yes	yes
6	Sayon Intl.	GXF / OYSY	639	3,000	Asphalt	47,402	91,280	613	925	VOR/DME in construction	yes	pending	yes
7	Al-Ghaidah Intl.	AAY / OYGD	41	2,700	Asphalt	n/a	n/a	n/a	n/a	VOR/DME	no	yes	Good
8	Socotra Intl	SCT / OYSQ	45	3,300	Asphalt	n/a	n/a	n/a	n/a	VOR/DME	yes	yes	yes
9	Saadah	SYE / OYSH	1,811	3,500	Asphalt	n/a	n/a	n/a	n/a	NDB	no	no	Small
10	Al-Bayda	n/a / OYBD	1,865	3,000	Gravel	n/a	n/a	n/a	n/a	no	no	no	no
11	Ataq	AXK / OYAT	1,138	2,890	Gravel	n/a	n/a	n/a	n/a	NDB	yes	no	Adequate
12	Beihan	BHN / OYBN	1,158	1,900	Gravel	n/a	n/a	n/a	n/a	no	no	yes	no

A/P Rank	Airport Name	IATA/ICAO Identifier	Elevat. (mtrs.)	Rwy (mtrs.)	Rwy Type	PAX 2008	PAX 2017	Aircraft Movt. 2008	Aircraft Movt. 2017	Instrument Approach	Night Ops	Fenced	Terminal
13	Marib	MYN / OYMB	1,006	3,000	Sand	n/a	n/a	n/a	n/a	NDB	no	yes	no
14	Abbs	EAB/OYBS	198	2,000	Sand	n/a	n/a	n/a	n/a	no	no	no	no
15	Al-Hazm	n/a / OYZM	975	2,495	Sand	n/a	n/a	n/a	n/a	no	no	no	no
16	Mukeiras	UKR / OYMS	2,042	1,280	Gravel	n/a	n/a	n/a	n/a	no	no	no	no
17	Kamaran	n/a / OYKM	16	1,800	Sand	n/a	n/a	n/a	n/a	no	no	no	no
18	Qishn	IHN / OYQN	30	1,000	Gravel	n/a	n/a	n/a	n/a	no	no	no	no

Financial Facts

Airport Name	Passengers 2008	Passengers 2017	Aircraft Movt. 2008	Aircraft Movt. 2017	Instrument Approach	Investments 2008
Sana'a Intl.	1,693,187	3,260,491	13,951	24,631	ILS/VOR	$45,000,000
Aden Intl.	242,268	466,524	2,962	4,726	ILS/VOR	$2,300,000
Al-Mukalla Intl.	137,483	264,745	1,578	2,555	VOR/DME	$650,000
Taiz Intl.	36,118	89,551	473	966	VOR/DME in constr.	$7,200,000
Al-Hodeidah Intl.	26,745	51,502	400	746	GNSS/VOR	$1,900,000
Sayon Intl.	47,402	91,280	613	925	VOR/DME in constr.	$1,750,000
Al-Ghaidah Intl.	n/a	n/a	n/a	n/a	VOR/DME	$250,000
Socotra Intl	n/a	n/a	n/a	n/a	VOR/DME	$300,000
Saadah	n/a	n/a	n/a	n/a	NDB	$1,500,000
Ataq	n/a	n/a	n/a	n/a	NDB	$650,000
Beihan	n/a	n/a	n/a	n/a	no	$650,000

ITEM	Total Amount (in USD)	Government (Treasury)	Third Party Financing	Operational (CAMA)
Development Al-Ghaidah Intl. Airport	250,000	250,000	0	0
Development Socotra Intl Airport (Terminal)	300,000	250,000	0	50,000
Development Sayon Intl. Airport (Terminal)	1,750,000	1,750,000	0	0
Development Al-Mukalla Intl. Airport (Tower, ATC)	650,000	450,000	0	200,000
Development Al-Hodeidah Intl. Airport (Runway rep.)	1,900,000	1,750,000	0	150,000
Development Sana'a Intl. Airport (Phase 2&3)	45,000,000	15,000,000	30,000,000	0
Development of Taiz Intl. Airport (new runway)	7,200,000	1,200,000	6,000,000	0
Development of Aden Intl. Airport (taxiway)	2,300,000	2,000,000	0	300,000
Development of Ataq & Beihan Airports (fencing)	1,300,000	1,200,000	0	100,000
Development Saadah Airport (runway repair)	1,500,000	1,500,000	0	0
TOTAL	**62,150,000**	**25,350,000**	**36,000,000**	**800,000**

Annex 4 – Financing of the Sector

Passenger Taxes

Airport	City	Dom Adj. Seats 2007	Est. Dom Adjusted PAX 2007[73]	Intl Adj. Seats 2007	Est. Intl Adjusted PAX 2007	Est. dom. Passenger Tax 2007	Est. intl. Pax Tax 2007	Percent. Dom. PAX
SAH	Sana'a	387,101	193,551	1,668,056	1,251,042	$483,876	$18,765,630	13%
ADE	Aden	201,318	100,659	102,492	76,869	$251,648	$1,153,035	57%
RIY	Riyan Mukalla	103,857	51,929	32,851	24,638	$129,821	$369,574	68%
GXF	Seiyun	51,012	25,506	13,013	9,760	$63,765	$146,396	72%
TAI	Taiz	57,226	28,613	2,002	1,502	$71,533	$22,523	95%
HOD	Hodeidah	50,973	25,487	2,548	1,911	$63,716	$28,665	93%
AAY	Al Ghaydah	33,969	16,985		0	$42,461	$0	100%
					Total	**$1,106,820**	**$20,485,823**	

Aircraft Fees

Model	% Flights	Ldg Income	ATC Income	Night L 20%	Night T 10%	Parking 20%
A300	2%	$273,624	$136,957	$21,890	$4,378	$9,323
A310	22%	$2,662,695	$1,333,471	$213,185	$42,637	$113,812
A320	12%	$627,743	$315,030	$50,034	$10,007	$40,305
A330	23%	$4,488,592	$2,246,516	$358,732	$71,746	$147,400
B727	0%	$3,426	$1,718	$274	$55	$208
B737	37%	$2,078,384	$1,042,763	$165,699	$33,140	$131,417
B747-100	2%	$663,647	$332,016	$53,123	$10,625	$17,373
EMB195	1%	$26,059	$13,126	$2,085	$417	$2,046
M90	1%	$37,641	$18,917	$3,011	$602	$2,625
		$10,861,812	$5,440,514	$868,034	$173,607	$464,510
		TOTAL	$17,808,477			

[73] 50% Load factor assumed on domestic offered seats and 75% on international offered seats.

Air Traffic Control Income

Daily overflights	120
Annual overflights	43800
Average ATC Tax	$800
Total Annual Income	$35,040,000
Recovery discount	20%
Estimated income	**$28,032,000**

Total Sector Income Potential

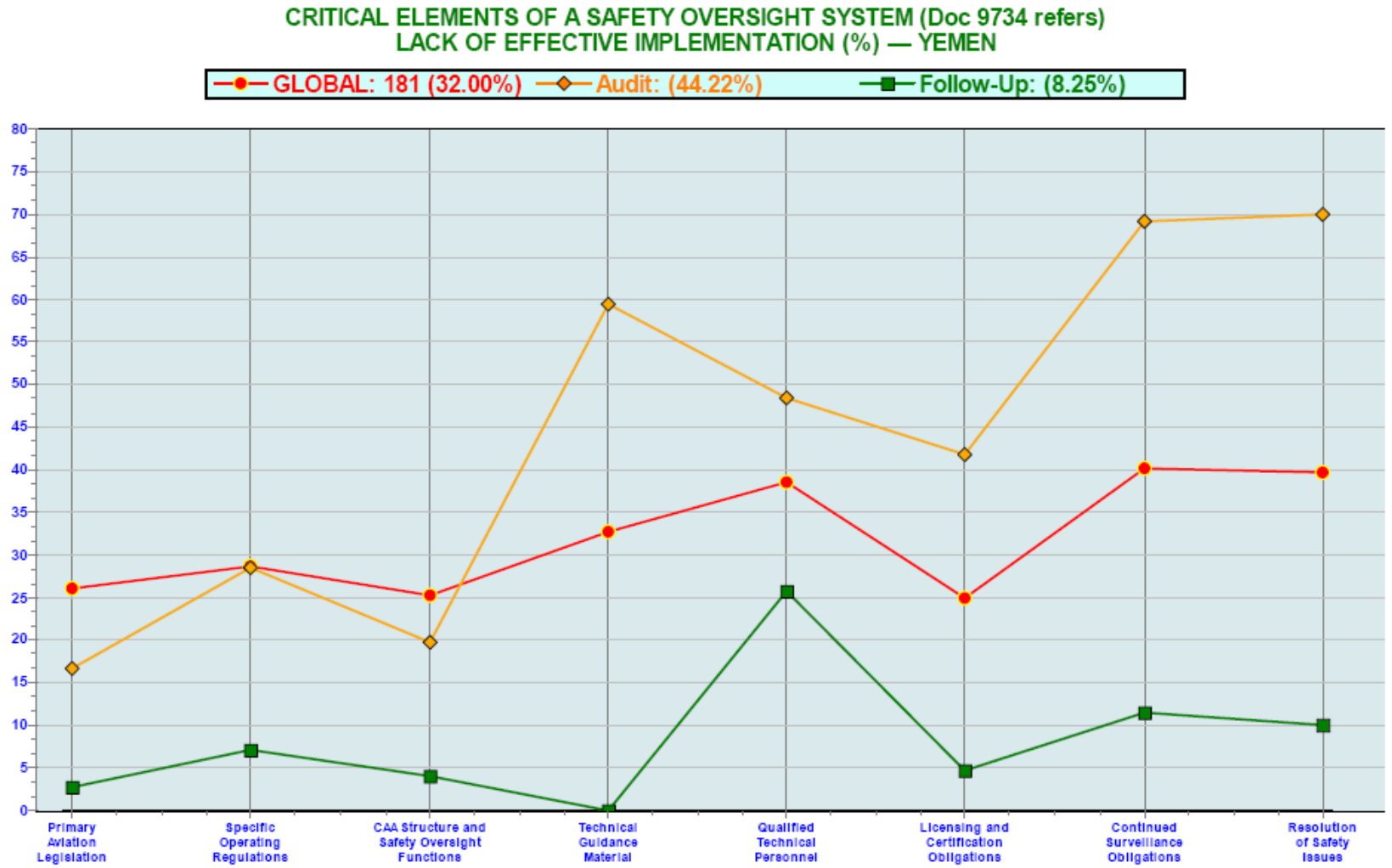
Total Income Potential	
Passenger Taxes	$21,592,643
Landing, ATC & Parking	$17,808,477
ATC Overflight	$28,032,000
Total	**$67,433,120**

Annex 5 - Current International Air Services based on Bilateral Air Service Agreements[74]

No	Carrier	Country	Destination	Frequencies per week	Agreed Capacity	Agreed Frequencies	Agreed Fifth Freedom
1	Saudi Airways	Saudi Arabia	Sana'a & Aden	5 & 2	4000 seats per direction	open	reciprocal
2	Emirates	UAE	Sana'a	6	open	23 flights	open
3	Air Arabia	UAE	Sana'a	4	open	23 flights	open
4	Gulf Air	Bahrain	Sana'a	3	open	open	open
5	Aljazeera Air	Kuwait	Sana'a	2	open starting 2009, before 3 flights/week	open	2 destinations each
6	Qatar Airways	Qatar	Sana'a	4	open starting 2009, before 5 flights/week	open	open
7	Syrian Air	Syria	Sana'a	2	open	7 flights	open
8	Royal Jordanian	Jordan	Sana'a & Aden	3 & 2	open	open	commercial agreements
9	Egypt Air	Egypt	Sana'a	7	open	open	open
10	Turkish	Turkey	Sana'a	3	open	14 flights	-
11	Lufthansa	Germany	Sana'a	3	open	3	commercial agreements
12	Ethiopian Air	Ethiopia	Sana'a	4	-	-	-
13	Djibouti Air	Djibouti	Aden & Taiz	4 & 1	open	4 flights	-
14	African Express	Kenya	Sana'a	2	open	open	open

[74] Source: CAMA, received on 25 October 2008.

Annex 6 - Summary of ICAO 2004 Universal Safety Oversight Audit of Yemen

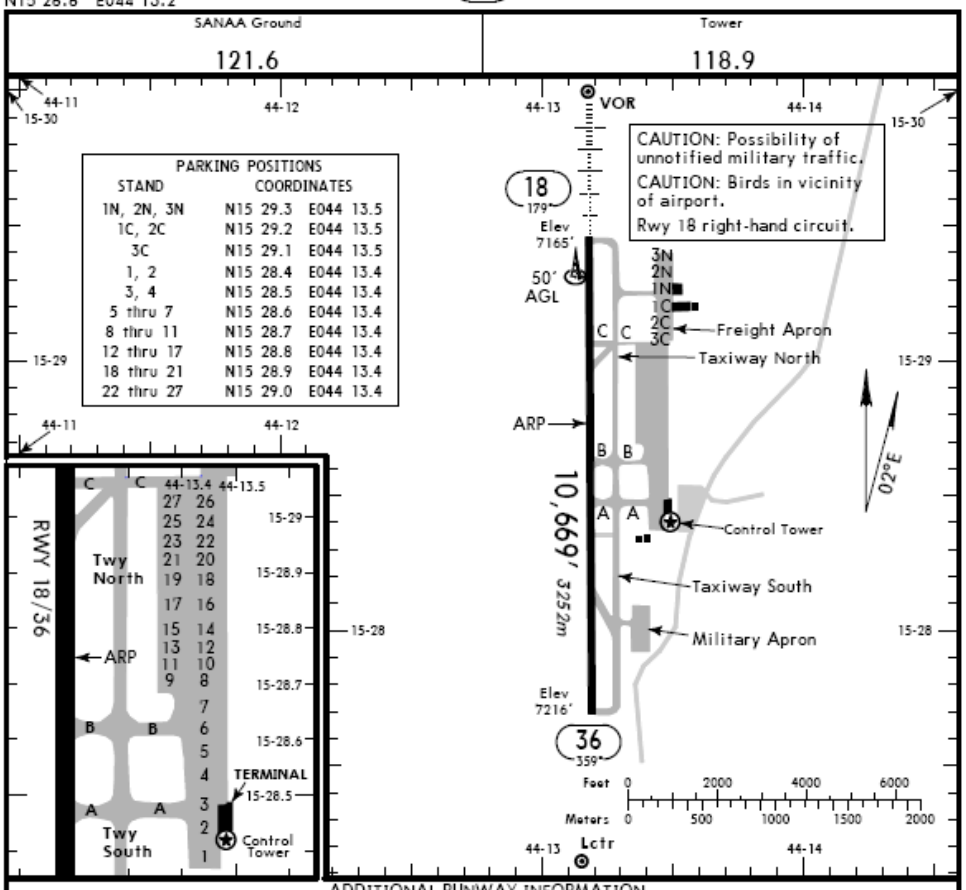


Note.- The above graphic representation of the situation in the State at the time of the audit follow-up mission is limited to reflecting the progress made in implementing the ICAO recommendations made during the initial audit.

OYSN/SAH
Apt Elev 7216′
N15 28.8 E044 13.2

JEPPESEN
4 AUG 06 (10-9)

SANAA, YEMEN
SANAA INTL



ADDITIONAL RUNWAY INFORMATION

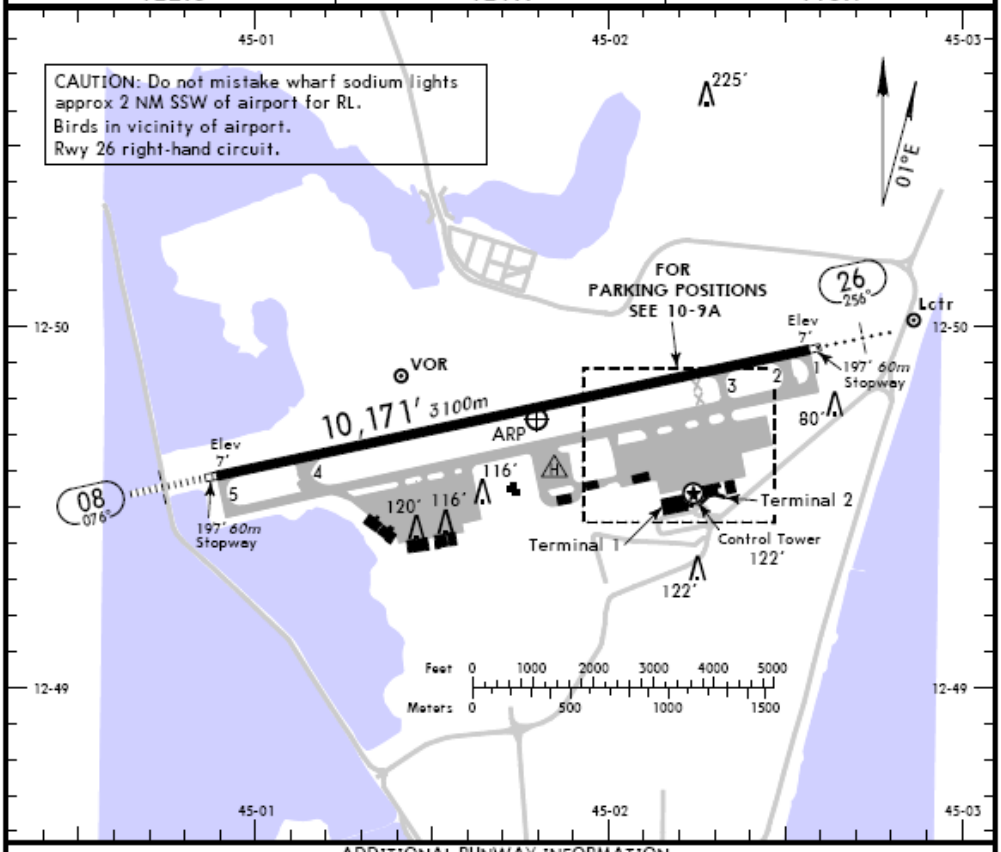
RWY		USABLE LENGTHS LANDING BEYOND Threshold	Glide Slope	TAKE-OFF	WIDTH
18	HIRL HIALS PAPI-L(angle 3.0°)		9767′ 2977m		148′ 45m
36	HIRL ❶HIALS PAPI-L(angle 3.0°)				

❶ Configuration unknown.

	TAKE-OFF: AIR CARRIER (JAA) All Rwys, LVP must be in force, RCLM (DAY only) or RL	TAKE-OFF: AIR CARRIER (JAA) All Rwys, RCLM (DAY only) or RL	TAKE-OFF: AIR CARRIER (FAR 121) All Rwys		FOR FILING AS ALTERNATE: Precision	FOR FILING AS ALTERNATE: Non-Precision
				Adequate Vis Ref		
A	250m	400m	2 Eng	VIS 400m		
B					600′- 4000m	❶ 800′- 4000m
C						
D	300m		3 & 4 Eng			

❶ VOR DME-A: CAT C & D: 900′-4000m
NDB-B: CAT A & B: 800′-3200m, CAT C & D: 900′-4000m

*ATIS	ADEN Ground	Tower
122.6	121.9	118.7



ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS — LANDING BEYOND — Threshold	Glide Slope	TAKE-OFF	WIDTH
08 26	HIRL HIALS PAPI-L (angle 3.00°) RVR		9138′ *2785m*		148′ *45m*

TAKE-OFF

	AIR CARRIER All Rwys	
	LVP must be in force RCLM (DAY only) or RL	RCLM (DAY only) or RL
A B C	*250m*	*400m*
D	*300m*	

OYRN

Apt Elev **54′**

241.0°/1.4 from RIN 116.0

JEPPESEN

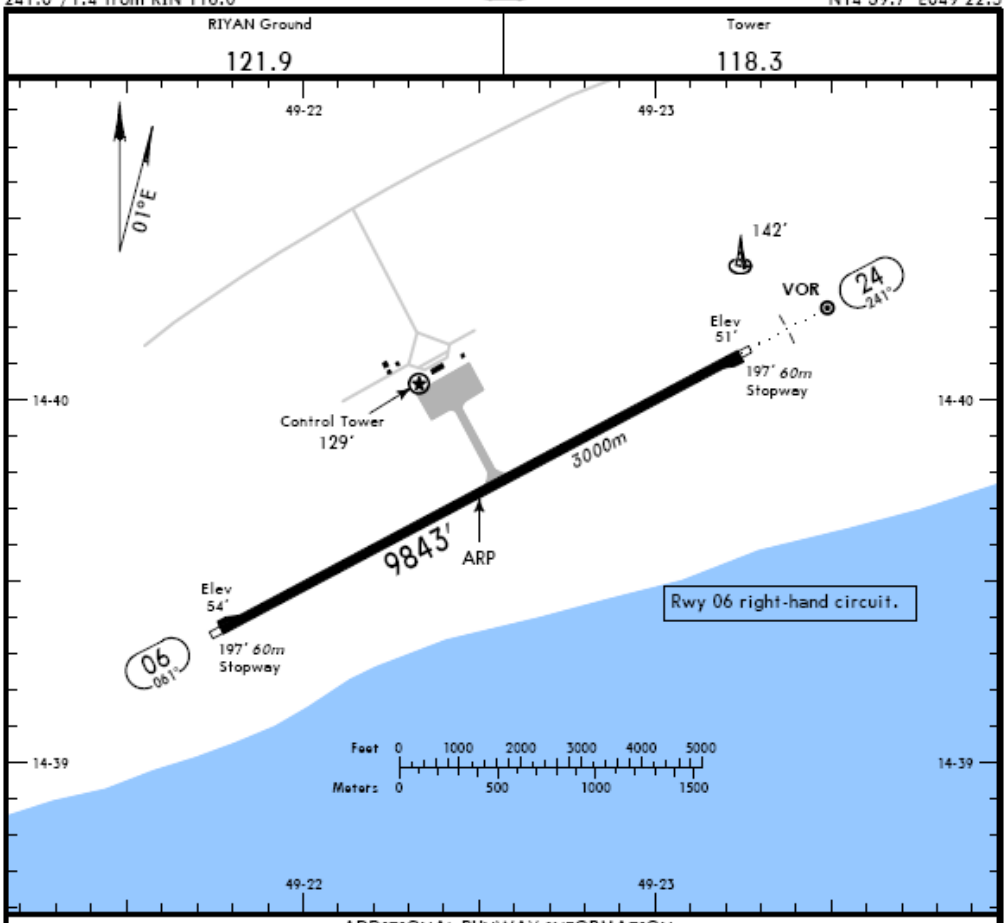
5 NOV 99

13-1

MUKALLA, YEMEN

RIYAN

N14 39.7 E049 22.5



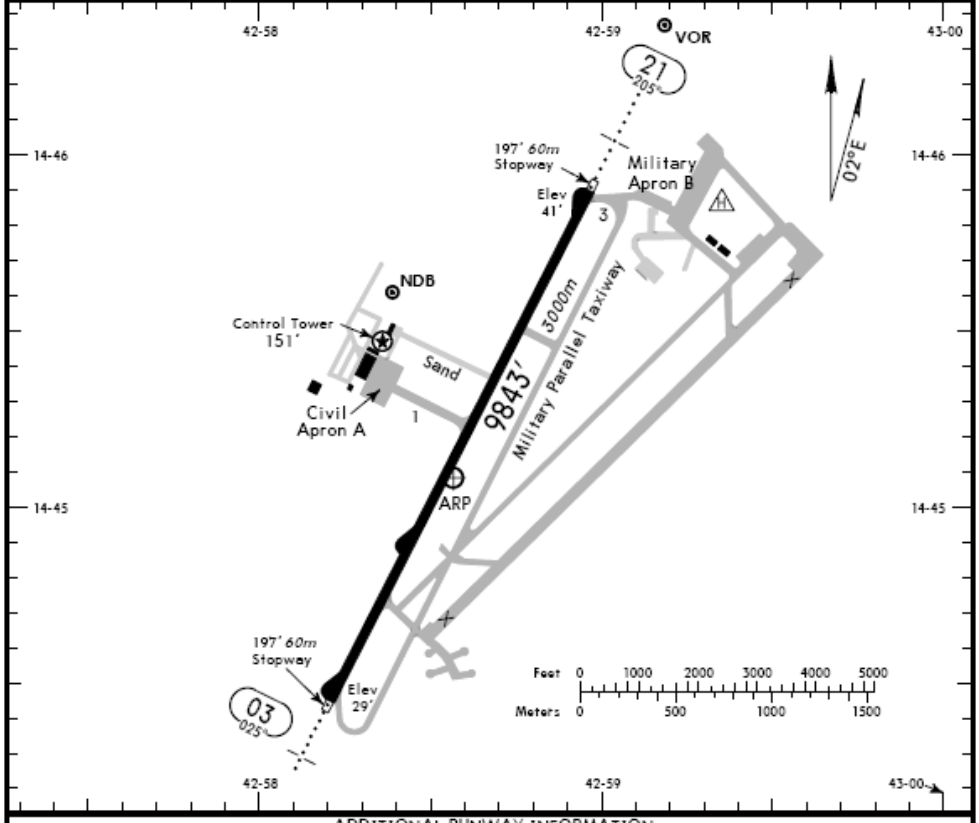
ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS — LANDING BEYOND — Threshold	Glide Slope	TAKE-OFF	WIDTH
06	HIRL VASI				148′ *45m*
24	HIRL HIALS VASI				

TAKE-OFF

	AIR CARRIER All Rwys HIRL	
A	RVR *250m*	
B	RVR *300m*	
C		
D	RVR *400m*	

*HODEIDAH Ground	*Tower
121.6	118.3



ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS — LANDING BEYOND — Threshold	Glide Slope	TAKE-OFF	WIDTH
03 21	HIRL HIALS APAPI-L				148′ 45m

TAKE-OFF

	AIR CARRIER (JAA) All Rwys — LVP must be in force: RCLM (DAY only) or RL	AIR CARRIER (JAA) All Rwys: RCLM (DAY only) or RL	AIR CARRIER (FAR 121) All Rwys		Adequate Vis Ref	1 FOR FILING AS ALTERNATE
A	250m	400m	2 Eng	400m		800′ - 3600m
B						
C			3 & 4 Eng			
D	300m					

1 NA when Hodeidah altimeter setting not available.

[redacted]

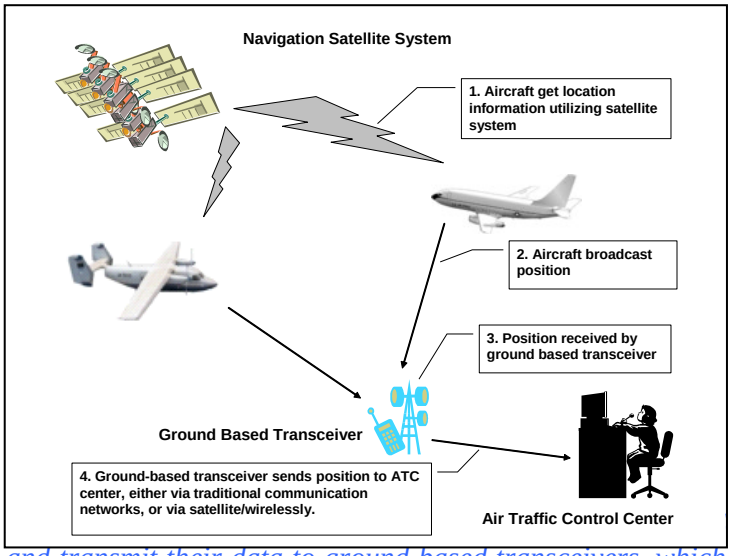
Annex 8 – Automatic Dependence Surveillance System (ADS-B)

The acronym "ADS-B" stands for:

- **A**utomatic: As soon as the electric system of the aircraft is turned on, the reporting mechanism for the aircraft is activated, and the aircraft is visible to the control network, and to other aircraft if so equipped
- **D**ependent: The system depends on GPS satellites to determine each aircraft's position.
- **S**urveillance: The system provides radar-like position awareness to ground controllers and, depending on the system type, other aircraft.
- **B**roadcast: The aircraft, instead of being "interrogated" by radar, broadcasts its position continuously.

Figure 1 shows the basic features of an ADS-B system. The system requires only six core components:

1. A satellite navigation system (typically GPS)
2. GPS equipment aboard the aircraft
3. Transmitter aboard the aircraft
4. Ground-based transceiver to receive data broadcast by aircraft
5. A data link to the air traffic control center
6. An air traffic control center, if not already in place



and transmit their data to ground based transceivers, which then relay the positions to either via traditional networks or wirelessly to air traffic control centers.

Two Flavors of ADS-B

Two approved standards of ADS-B have emerged. Their core difference lies in their ability to share information between the ground and aircraft in the air, and amongst aircraft themselves. Operationally, their difference lies in the equipment found aboard aircraft and in the ground-based transmitter.

Extended Squitter

Transport category aircraft are now equipped with a standard "Mode S" transponder, which, if equipped with an "extended squitter" box, is able to broadcast a digital message providing basic aircraft information, such as the longitude, latitude, airspeed, and barometric altitude, transmitted at 1090 MHz. Mode S does not require geographic information be derived from a satellite navigation system – data can come from anywhere in the flight management system, and in aircraft not equipped with satellite navigation the data may well come from inertia – based equipment.

However, the information transmitted via the Mode S transponder is highly limited, and the capacity of the 1090 MHz bandwidth is stretched. More importantly, the standards of Mode S extended squitter ADS-B only allow for digital data to be broadcast, but allow for no reception of digital data. Though the more common standard today in transport class aircraft, only 25% of aircraft now being equipped with Mode S transponders will also be equipped with the extended squitter capability.

UAT

The newer ADS-B standard operates on 978 MHz and is called "Universal Access Transceiver" (UAT). UAT operates with a different transceiver box in the aircraft than the Mode S transponder, and is able to not only send data but also to receive data from the ground and from other aircraft (see Figure 2). This has significant advantages – if equipped with a standard multi-function display (the Garmin MX-20 would be a good example), the pilot is be able to see all other traffic in the vicinity and perhaps up-to-date weather information, all super-imposed on a terrain map for the current location (see Figure 3). The safety implications of seeing other traffic, especially in uncontrolled environments, regardless of weather, are significant. In addition, because ADS-B Extended Squitter's bandwidth is somewhat limited in terms of bi-directional capability and growth, most experts agree that 978 MHz has better long range potential for growth and additional cooperation for uplink services.

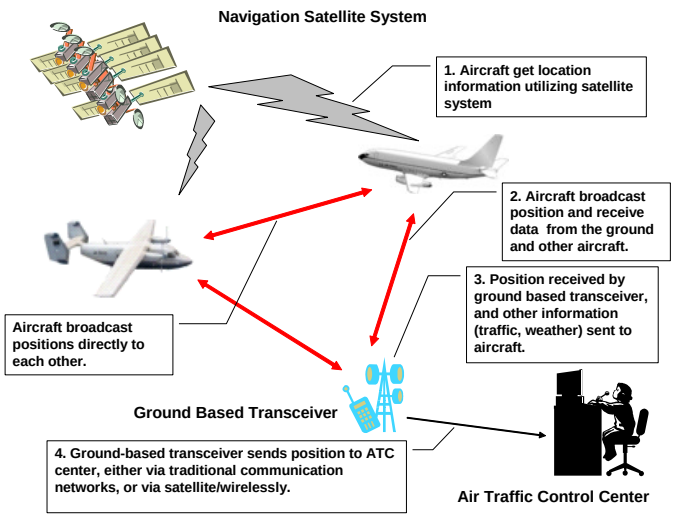


Figure 2: *In contrast to ADS-B following the extended squitter standard, ADS-B UAT allows for bi-directional communications, giving the aircraft the possibility to receive information from the ground (weather, other aircraft in the area) and from other traffic in the air.*

The Added Safety of UAT

The highest risk aircraft operations are those not involving large jets flying over the country in the upper airspace, but lighter commercial operations flying at lower altitudes, often in terrain that is hostile in bad weather or in case of serious technical malfunctions. These are the same operations that occur in airspace not having much, if any, surveillance, and where up-to-date weather information is not readily available.

Figure 3: In this display, traffic can be seen superimposed on the surrounding terrain. The information is received live from other transmitting aircraft and from the ground-based transceiver.

Having good surveillance capabilities on the ground is of obvious help in avoiding obstructions and other traffic. However, the capability of seeing, on one display in the cockpit, all surrounding terrain, the weather conditions en-route, and all other traffic, significantly lowers the risks that are most commonly leading to accidents with lighter aircraft. In the United State, the Federal Aviation Administration launched a test program in the state of Alaska where operators using the ADS-B UAT system reduced their fatal accident rate by over 50%. If one compares the cost of the system for an entire country such as Tanzania to the loss of one Cessna Caravan fully loaded with passengers, the benefits become apparent immediately.

ADS-B as the choice for developing countries

ADS-B today presents the best fit choice for bringing airspace control to countries lacking such infrastructure. The technology presents itself as optimal because of its low cost of introduction, its much lower maintenance cost, its accuracy compared to traditional radar, and its independence from most other infrastructure networks, such as the power grid.

Costs of Introduction

Complete coverage of a country such as, for example, Tanzania (945,087 km2) would require the installation of about ten ground based transceivers. With the cost per transceiver at about US$ 165,000, excellent coverage could be achieved for under US$ 2 million. By contrast, a single radar installation toady costs about US$ 6 million. A requirement is that aircraft be equipped with the transceivers and GPS equipment. Assuming no GPS devices previously installed, the basic cost per unit would be US$ 20,000. In Tanzania for example, with 210 aircraft registered, this would add US$ 4.2 million to the introduction. Even if half of the aircraft were registered for commercial use, and it would be deemed necessary to add the cost of multifunction displays, the cost would still only increase by about US$ 2.1 million, brining the total installation, including training, and interfacing with the current radar system, to about US$ 10 million.

2007 Profit and Loss

	Projected 2006	2007
REVENUE		
Operating Revenue		
Pax revenue	204.082	223.464
Cargo and Mail revenue	16.500	18.066
Other Revenue	15.000	16.670
TOTAL REVENUE	235.582	258.200
OPERATING EXPENDITURE		
Total Direct Operating Costs	175.767	191.179
Total Fixed Operating Expenses	51.111	51.111
Total Indirect Operating Costs	26.360	27.185
Profit / (Loss) before interest	(17.657)	(11.275)
Interest charges	(3.167)	(2.251)
Interest earned	1.824	661
Net profit after interest	(19.000)	(12.865)

2007 Balance Sheet

	Projected 2006	2007
Fixed assets		
Aircraft and equipment	32.565	34.000
Work in progress and advances/downpayments	6.468	7.468
Long term investments	10.854	10.854
Total Fixed Assets	49.887	52.322
Current assets		
Inventory/Stocks	30.063	31.634
Trade and other receivables	50.709	49.518
Maintenace Debtors	32.211	33.893
Cash and Treasury Bills - Bank overdraft	37.901	11.550
	150.884	126.594
Current Liabilities		
Credit Banks	23.000	0
Unclaimed Dividends	1.532	500
Trade and other payables	71.996	40.606
maintenance reserves creditors	38.843	40.871
Unearned revenues	16.774	21.222
	152.145	103.199
Net Current Assets / (Liabilities)	(1.260)	23.395
LONG TERM LIABILITIES		
Yemen Gvmt, Employee benefits and Legal dues	3.466	6.896
Long term loans	13.890	50.414
Balancing debt	0	0
	17.355	57.310
Net worth/ Capital employed	31.272	18.407
FINANCED BY		
Issues and paid up share capital	78.737	78.737
Legal Reserve	623	623
Profit and Loss reserve	(48.088)	(60.953)
Net worth/ Capital employed/shareholders equity	31.272	18.407

2007 Cash Flow

	Projected 2006	2007
Profit After interest	(19.000)	(12.865)
Depreciation	9.000	9.000
(Increase)/decrease in current assets (other than cash)	(10.921)	(2.061)
Increase/(decrease) in current liabilities	4.227	(48.945)
Increase/(decrease) in legal and employees long term dues	42	3.431
Net cash flow from operating activities	(16.651)	(51.440)
Investing activities	0	0
(Increase)/Disposal of fixed assets and LT investments	36.200	(11.435)
Total Investing activities	36.200	(11.435)
Financing Activities		
Increase / (decrease) in long term loans	(62.700)	36.524
Increase in share capital	0	0
Total Financing Activities	(62.700)	36.524
Net Increase / (decrease) in cash and cash equivalents	(43.151)	(26.351)
Cash and Cash equivalents at beginning of the year	58.052	37.901
Cash and cash equivants at the end of the year	14.901	11.550
Cash and cash equivalents		
Treasury bills +Cash at bank-bank overdrafts	14.901	11.550

2007 Financial indicators

	Projected 2006	2007
Profitability ratios		
Operating profit	(7,5%)	(4,4%)
Return on Capital Employed	(60,8%)	(69,9%)
Return on Equity	(24,1%)	(16,3%)
Return on Fixed Assets	(38,1%)	(24,6%)
Liquidity Ratios		
Current Ratio	1,0	1,2
Quick ratio	0,8	0,9
Receivables days	90,2	70,0
Creditors days	113,9	55,0
Gearing Ratios		
Net worth / Share Capital	0,4	0,2
Gearing ratio	1,2	2,7
Debt to Equity ratio	0,4	2,7

2008 Profit and Loss

	2007	2008
REVENUE		
Operating Revenue		
Pax revenue	223.464	276.633
Cargo and Mail revenue	18.066	21.111
Other Revenue	16.670	20.637
TOTAL REVENUE	258.200	318.381
OPERATING EXPENDITURE		
Total Direct Operating Costs	191.179	230.923
Total Fixed Operating Expenses	51.111	53.888
Total Indirect Operating Costs	27.185	31.400
Profit / (Loss) before interest	(11.275)	2.170
Interest charges	(2.251)	(3.702)
Interest earned	661	621
Net profit after interest	(12.865)	(911)

2008 Balance Sheet

	2007	2008
Fixed assets		
Aircraft and equipment	34.000	30.500
Work in progress and advances/downpayments	7.468	8.468
Long term investments	10.854	10.854
Total Fixed Assets	52.322	49.822
Current assets		
Inventory/Stocks	31.634	38.923
Trade and other receivables	49.518	52.337
Maintenace Debtors	33.893	41.704
Cash and Treasury Bills - Bank overdraft	11.550	13.298
	126.594	146.262
Current Liabilities		
Credit Banks	0	0
Unclaimed Dividends	500	0
Trade and other payables	40.606	38.985
maintenance reserves creditors	40.871	50.290
Unearned revenues	21.222	26.168
	103.199	115.443
Net Current Assets / (Liabilities)	23.395	30.818
LONG TERM LIABILITIES		
Yemen Gvmt, Employee benefits and Legal dues	6.896	7.776
Long term loans	50.414	55.369
Balancing debt	0	0
	57.310	63.145
Net worth/ Capital employed	18.407	17.496
FINANCED BY		
Issues and paid up share capital	78.737	78.737
Legal Reserve	623	623
Profit and Loss reserve	(60.953)	(61.864)
Net worth/ Capital employed/shareholders equity	18.407	17.496

2008 Cash Flow

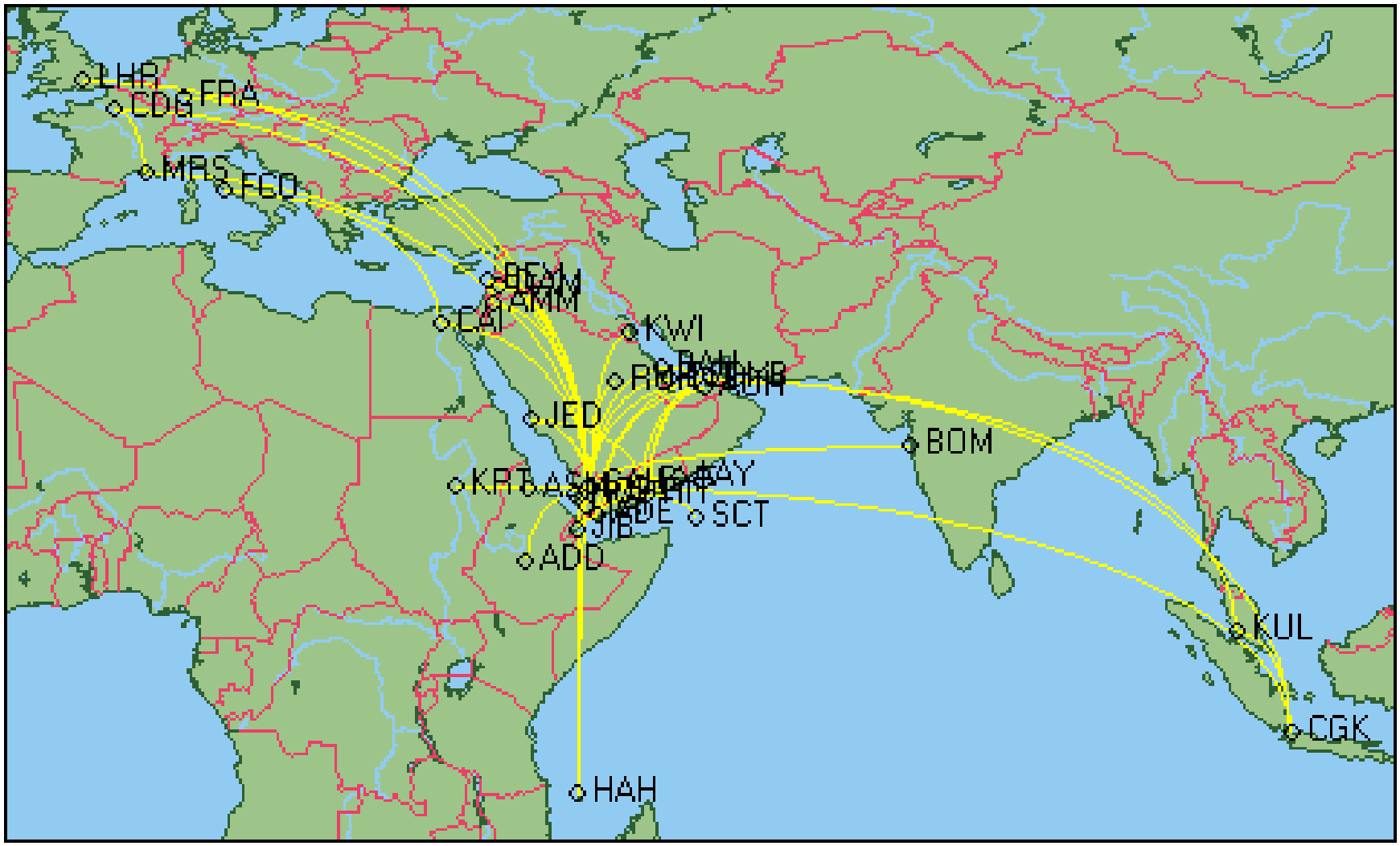
	2007	2008
Profit After interest	(12.865)	(911)
Depreciation	9.000	5.500
(Increase)/decrease in current assets (other than cash)	(2.061)	(17.919)
Increase/(decrease) in current liabilities	(48.945)	12.244
Increase/(decrease) in legal and employees long term dues	3.431	879
Net cash flow from operating activities	(51.440)	(207)
Investing activities	0	0
(Increase)/Disposal of fixed assets and LT investments	(11.435)	(3.000)
Total Investing activities	(11.435)	(3.000)
Financing Activities		
Increase / (decrease) in long term loans	36.524	4.955
Increase in share capital	0	0
Total Financing Activities	36.524	4.955
Net Increase / (decrease) in cash and cash equivalents	(26.351)	1.748
Cash and Cash equivalents at beginning of the year	37.901	11.550
Cash and cash equivants at the end of the year	11.550	13.298

2008 Financial indicators

	2007	2008
Profitability ratios		
Operating profit	(4,4%)	0,7%
Return on Capital Employed	(69,9%)	(5,2%)
Return on Equity	(16,3%)	(1,2%)
Return on Fixed Assets	(24,6%)	(1,8%)
Liquidity Ratios		
Current Ratio	1,2	1,3
Quick ratio	0,9	0,9
Receivables days	70,0	60,0
Creditors days	55,0	45,0
Gearing Ratios		
Net worth / Share Capital	0,2	0,2
Gearing ratio	2,7	3,2
Debt to Equity ratio	2,7	3,2

Annex 10 – Existing and proposed New Route Network of Yemenia

Route Network of Yemenia in 2007



Proposed new Intercontinental Route Network of Yemenia