

Sustainability Report 2021

"Making People Feel At Home"



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About Abu Dhabi Aviation

Abu Dhabi Aviation (ADA) is the largest helicopter operator in the Middle East and currently operating a fleet of Leonardo AW139, Bell 412 and Bell 212, Eurocopter EC135 and Bombardier DHC-8 aircraft. ADA has a main base in Abu Dhabi with international operating locations in the Middle East, Europe and Africa.

The Company has established in 1976 by virtue of an Amiri Decree and started operations and added fixed-wing aircraft in 1991. A third-party maintenance facility was opened in 1994. ADA is owned by Government of the Emirate of Abu Dhabi (30%) and UAE Nationals and Foreign Shareholders (70%). ADA currently has approximately 1,100 employees.

The ADA Group continues to expand its business into other markets, including a 50% equity holder of Royal Jet, an international VIP Charter Airline and 100% ownership of Maximus Air. In 2016, ADA opened Abu Dhabi Aviation Training Centre LLC (ADATC), a state-of-the-art helicopter and training simulator facility.

The Company exceeded a million helicopter flight hours with an enviable safety-record especially given the extremely high number of offshore takeoffs and landings – many of the company offshore helicopters averaging six to seven cycles per hour. This level of activity demand the highest caliber of flight and maintenance crews supported by noteworthy safety and compliance program.

Abu Dhabi Aviation is a public joint – stock registered in Abu Dhabi Securities Exchange. The Company’s registered office is located at Abu Dhabi International Airport next to Terminal 2, Abu Dhabi Aviation Terminal PO Box 2723, Abu Dhabi, UAE.

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MISSION

To provide innovative solutions globally, while exceeding shareholder, customer and employee expectations.

VISION

One team, propelling ADA safely and profitably into the future.

VALUES

- Safety
- Teamwork
- Quality
- Integrity and Ethics
- Customer Focus

GOALS

- Safety is ADA’s top priority & fundamental core value and is never compromised.
- We value innovative, timely, efficient, cost-effective, reliable and best quality services.
- We are committed to achieving the highest levels of customer satisfaction.
- We value the contribution that our team makes in achieving our mission and we support and encourage teamwork to ensure a high level of competence, expertise and competitiveness.
- Trust, responsibility, transparency, commitment and accountability, are the pillars of our existence.

Message from the Chairman

We are proud of what the aviation industry has become in the United Arab Emirates and this was attributed to the huge political, economic and infrastructure development in the country. Since 1976, Abu Dhabi Aviation has grown from a single client operation into the largest commercial helicopter operator in the Middle East and North Africa, providing highly specialized aviation services in the most challenging environments around the world.

The core of our success has been attributable to an ongoing investment in employing and retaining highly qualified, skilled and dedicated employees, allowing us to approach One Million helicopter flight hours, while maintaining an enviable safety record.

What has been important to our success is ever increasing engagement with our strategic partners in the Oil and Gas industry, and in the formation of established Joint Ventures, both domestically and internationally. As we expand further, Abu Dhabi Aviation will continue to strive to provide aviation services that set the standard, both regionally and globally, utilizing approved aviation solutions that take the client's interests as a priority.

I would like to take this opportunity to thank Abu Dhabi Aviation for their team effort, our clients for their trust, and our shareholders for their dedication and support, all of which has contributed to the success we have attained, and I am confident that we will continue to excel in the years to come.

H.E. Nader Ahmed Al Hammadi
Chairman of the Board



ADA Group Review

Abu Dhabi Aviation (ADA) is the largest commercial helicopter operator in the Middle East, operating fifty five (55) helicopters (19 Augusta Westland AW139s, 2 Augusta Westland AW169s, 22 Bell 412s, 12 Bell 212s) and 4 fixed-wing aircraft (DHC-8).

ADA's strategic view is to diversify its activities within the aviation and non-aviation sectors. ADA provides services to the following aviation sectors:

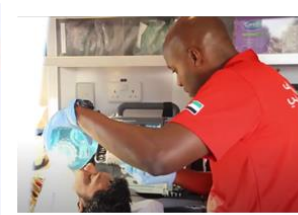
- Flight Operations (Dry and Wet Lease).



- Flight Charter (Oil & Gas Support, Firefighting, Photography, Aerial Application, Pipeline Patrols, Long Line Missions and VVIP Flights for Heads of States).



- Medical Evacuation (24/7 HEMS and MEDEVAC – Offshore and Desert Evacuations).

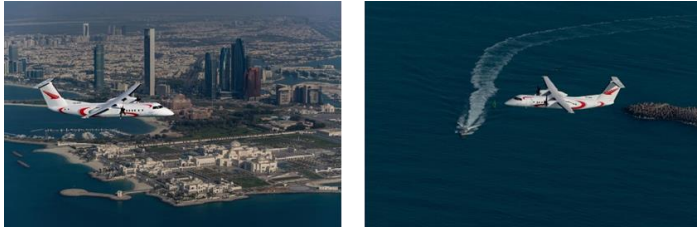


- Search and Rescue support to the Armed Forces of the UAE.



ADA Group Review

- Fixed Wing passenger transport.



ADA provides state-of-the-art technical support through its 612 m² MRO facility at Abu Dhabi Airport: - (GCAA, FAA, EASA, CARC and GACA)

- Heavy Maintenance (Rotary and Fixed Wing)
- Overhaul and Component Workshop
- Engine Support (change, inspection and build up)
- Avionics Support
- Structures Workshop
- Wheels and Brakes
- Refurbishment and Paintshop



Floats and Rafts Inspection and Overhaul



Battery Workshop



Continuing Airworthiness Management Organization (CAMO)

Approved CAMO under GCAA, CAR M, CARC and JCAR-Part M for a number of RW and FW aircraft types.

ADA Group Review

ADA has 100% ownership in Abu Dhabi Aviation Training Centre LLC (ADATC) for simulator training. The facility has nine bays scalable to eighteen bays at phase two. ADATC holds the following FFS simulators:

- AW139
- Bell 412
- King Air 350
- Embraer ERJ 145

ADATC provides also the following courses:

- Pilot Initial and Type Rating (Ground and Flight)
- Recurrent and Refresher (Ground and Flight)
- LOFT
- Airframe and Avionics
- GCAA EASA and GACA approved courses
- GCAA EASA and GACA Examiners
- NVG Training
- CRM, First Aid, Fire Fighting, Dangerous Goods and others



ADA has established ADA International Real Estate LLC (ADAIRE) to manage the Group's land and properties in the UAE and overseas.

The scope of work of ADAIRE includes:

- Asset Management
- Property Management
- Leasing Services
- Joint Ventures
- Private Equity
- Facilities Management Services
- Development Management Services
- Investments

Jumeirah Garden City



Rawdhat



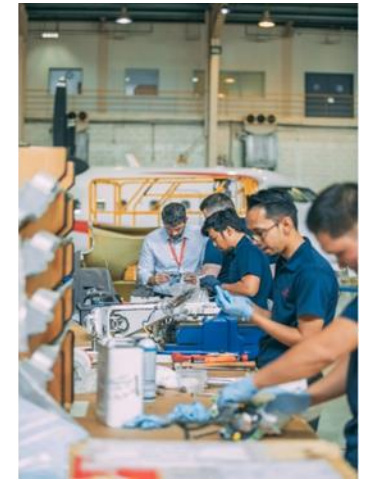
Muneera



ADA Group Review

AgustaWestland Aviation Services LLC is a joint venture between ADA (70%) and the aircraft manufacturer Leonardo Helicopter (30%) to provide the following services:

- Helicopter MRO and Logistics
- Spare Parts Distribution Centre
- Component Repair and Overhaul
- Floats and Rafts Inspection, Repair and Overhaul



ADA has 100% ownership in Maximus Air L.L.C. (MAX), the largest air cargo operator in the UAE and among the largest in the Middle East. It has a fleet of Antonov AN-124-100 and Ilyushin IL-76TD. The company provides end to end outsized cargo solutions including dangerous goods, equestrian and live animals.



ADA Group Review

Royal Jet L.L.C. (RJ) is jointly owned by Abu Dhabi Aviation PJSC (50%) and Presidential Flight Authority (50%).

The fleet includes eleven (8) aircraft:

- (6) Boing Business Jets BBJ
- (2) Global 5000



The company's core offerings are:

- Luxury VIP Aircraft Charter
- Medical Evacuation Services
- Charter Brokerage
- Aircraft Management and Acquisition Consultancy
- Fixed Base Operations (FBO)/VIP Terminal at Abu Dhabi International Airport and Seychelles

Other subsidiaries include ADA Real Estate Management and General Maintenance LLC (REMCO) and ADA Millennium Consulting – Owned by Abu Dhabi Aviation Sole Proprietorship LLC (ADAME).

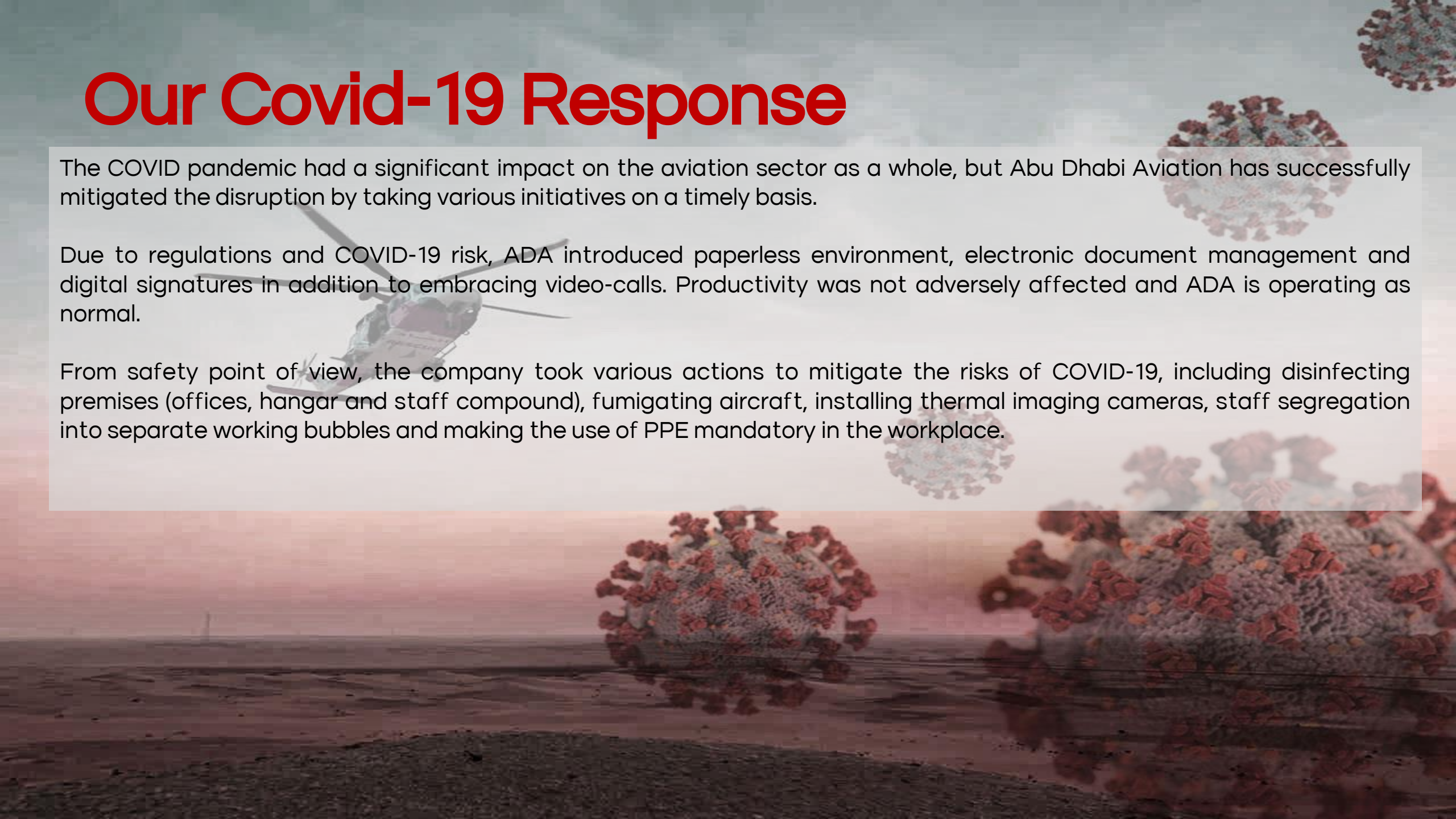
Sustainability Strategy and Framework

A white helicopter with red accents is flying over a lush green golf course. The helicopter is tilted, and its rotors are in motion. The background shows a clear blue sky and a line of trees in the distance. The overall scene is bright and sunny.

Sustainability is the fundamental of everything we do. We strive hard to operate responsibly and transparent by living our vision as one team, propelling ADA safety and profitably into the future. We are committed to provide positive impact on our communities, while at the same time maintaining sustainable success.

ADA framework has four key pillars: Economic, Human, Social, and Environmental. ADA believe that an effective framework will help achieve its strategic business objectives.

Our Covid-19 Response



The COVID pandemic had a significant impact on the aviation sector as a whole, but Abu Dhabi Aviation has successfully mitigated the disruption by taking various initiatives on a timely basis.

Due to regulations and COVID-19 risk, ADA introduced paperless environment, electronic document management and digital signatures in addition to embracing video-calls. Productivity was not adversely affected and ADA is operating as normal.

From safety point of view, the company took various actions to mitigate the risks of COVID-19, including disinfecting premises (offices, hangar and staff compound), fumigating aircraft, installing thermal imaging cameras, staff segregation into separate working bubbles and making the use of PPE mandatory in the workplace.

Our Covid-19 Response

EMPLOYEES



- Directed support staff to remotely work from home
- Give support for those stuck overseas
- No salary cuts or redundancies
- Directed virtual meetings as much as possible
- Staff segregation and making the use of PPE mandatory in the workplace
- Disinfecting premises (offices, hangar and staff compound)
- Providing a quarantine facility for covid positive employees

SHAREHOLDERS

- Maintain strong cash position and reserves
- ADA looked for other revenue streams such as investing in securities

COMMUNITIES

- Abu Dhabi Aviation launched helicopter messages to spread Covid-19 Awareness by having a helicopter fly across all the emirates displaying messages in Arabic and English urging community members to stay at home, maintain social distancing and avoid gatherings.
- Coordinated transport missions for covid patients

CUSTOMERS

- Installing thermal imaging cameras and sanitizers in all entry points
- Fumigating aircraft
- Keeping the customers informed in all forms of communications.

MAPPING OUT

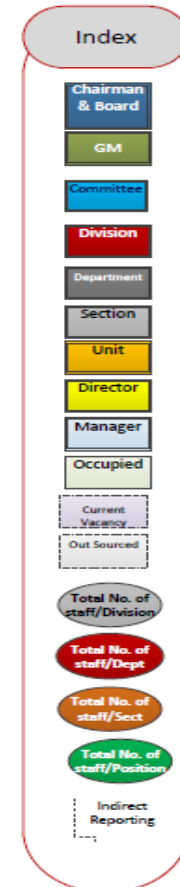
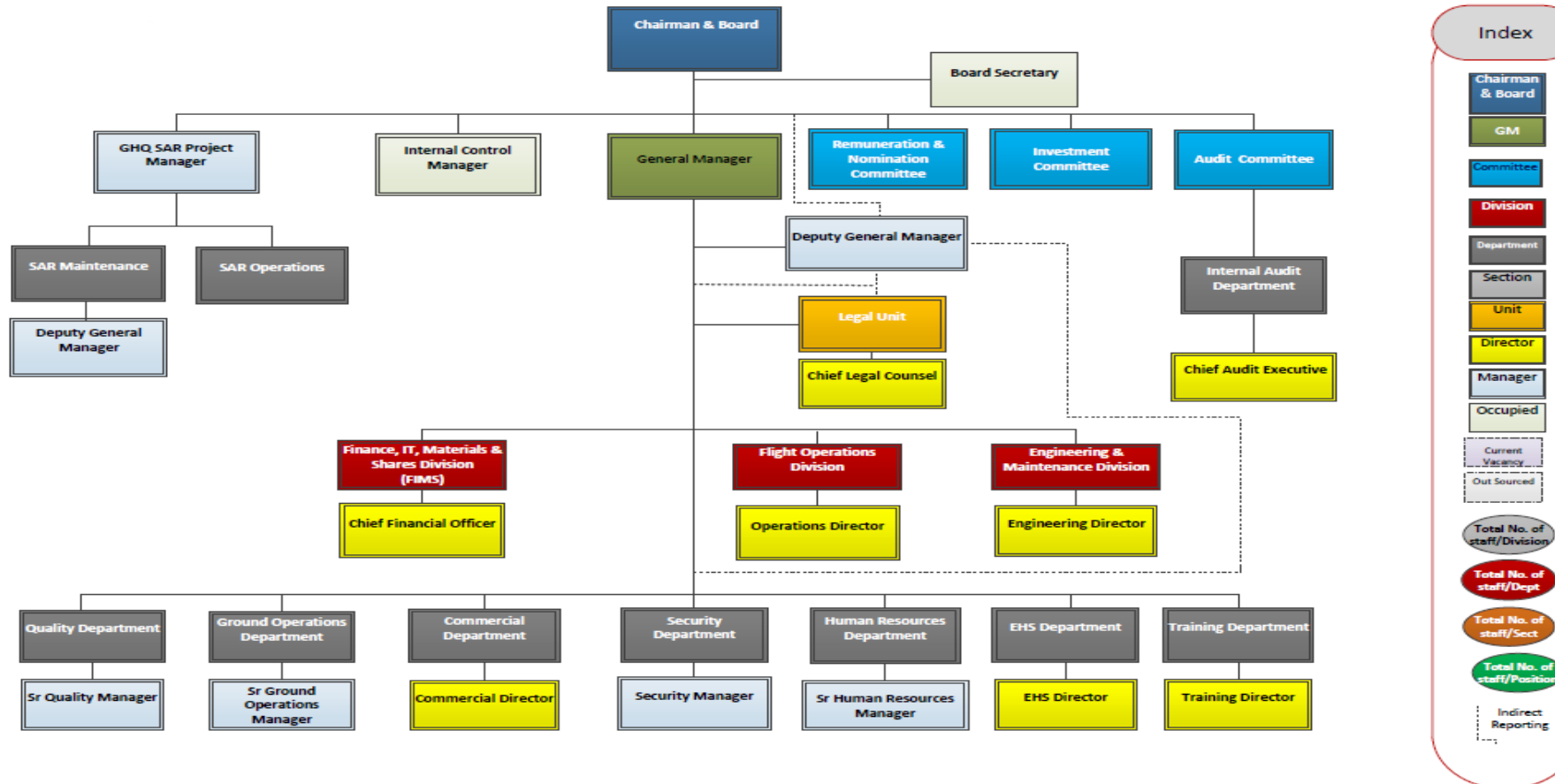
ADA employees needed more than ever to be motivated and engaged to perform well, however they also need to be mindful about their mental wellbeing. It is the time to demonstrate strong leadership, an inclusive and innovative workplace culture to enable a collective mindset shift. Our leaders will need to revisit and establish realistic goals and programs, update action plans, set accountability for results, and implement ongoing changes in the business processes.

Corporate Governance

Abu Dhabi Aviation has been developing and implementing an efficient and effective organizational structure at the level of the company's various departments and divisions, to ensure a high level of coordination and administrative interaction, as shown below the organizational structure of the company and approved by the company's board of directors, as follows:

ADA Strategic Organization Structure View

Version 9 Date: 01 January 2022



Board of Directors

The Board of Directors are all UAE Nationals. The BOD has been active in building a strong corporate governance culture that plays an important role in defining and implementing the standards of responsibility that enable the management to manage the Company to the best benefits of shareholders.



Corporate Governance

Audit, Nomination and Remuneration Committee Members

Name	Position
Sheikh Ahmed Mohamed Sultan Al Dhaheri	Chairman of the Committee
Mr. Ahmed Ali Khalfan Al Dhaheri	Member
Mr. Abdulla Seddiq Al Khoori	Member

Investment Committee Members

Name	Position
Mr. Khalifa Yousif Abdulla Al Khoori	Chairman of the Committee
Mr. Saif Saeed Mohammed Al Dhaheri	Member
Mr. Abdulmunim Saif Hamoud Al Kindi	Member
Mr. Mohamed Khalil Foulathi Al Khoori	Member

Ownership Structure




Share Capital	444,787,200
Listing Date	December 15, 2000
Company Type	Public Joint Stock Company (PJSC)
Auditor	Deloitte & Touche (M.E.)

The issued capital is distributed as follows:

- (30%) Government of the Emirate of Abu Dhabi
- (70%) Shareholders, the ownership of non-UAE nationals shall not exceed 30% of the Company's Share Capital

Group Financial Performance

	For the period ended 31 December 2021	For the period ended 31 December 2020	Increase/ (decrease)
Turnover	1,682,082	1,558,504	7.93%
Operating Profit	494,327	342,969	44.13%
Operating Profit - %	29.39%	22.01%	
Net profit	306,833	154,686	98.36%
Net profit - %	18.24%	9.93%	
EPS for the period	0.56	0.40	41.52%
	As at 31 December 2021	As at 31 December 2020	Increase/ (decrease)
Total Assets	5,525,386	4,977,148	11.02%
Total Liabilities	1,786,071	1,489,447	19.92%
Total Equity	3,739,315	3,487,701	7.21%

	ABU DHABI AVIATION (ADA, REMCO, ADATC, ADAIRE and ADAME)	ROYAL JET LLC	MAXIMUS AIR LLC
Revenue 2021	AED738.61 M	AED512.60 M	AED 430.87 M
Revenue 2020	AED 636.19 M	AED 320.08 M	AED 602.23 M
Difference %	16.10% 	60.15% 	28.45% 
Remarks	Additional Oil & Gas Offshore Flights as well as ad hoc flights	Due to high demand on charter flights	Due to less demand in logistics and charter sales

Dividend Payment:

2019 – 20%

2020 – 10%

Human Development

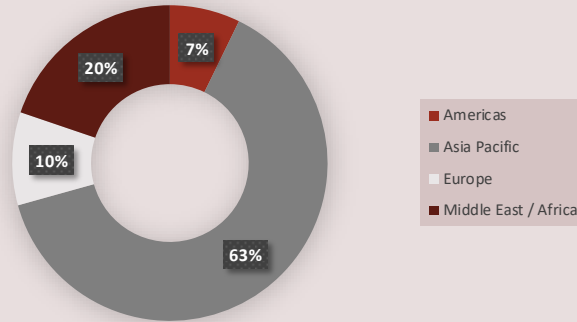
ADA Employee Nationalities by Region FY 2020

Americas	69
Asia Pacific	606
Europe	91
Middle East / Africa	189

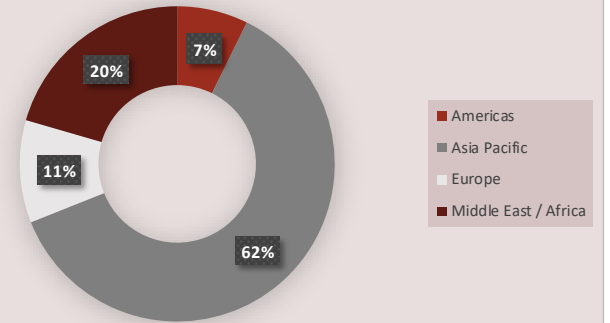
ADA Employee Nationalities by Region FY 2021

Americas	70
Asia Pacific	592
Europe	101
Middle East / Africa	197

ADA EMPLOYEE NATIONALITIES BY REGION FY 2020



ADA EMPLOYEE NATIONALITIES BY REGION 2021



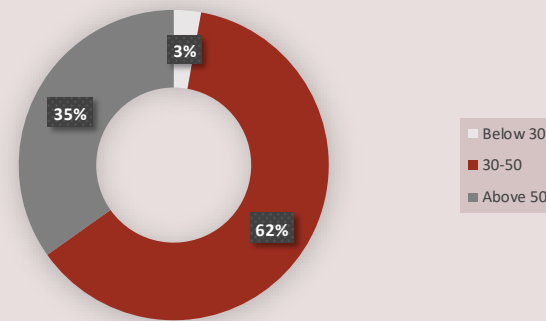
ADA Employees by Age FY 2020

Below 30	28
30-50	614
Above 50	343

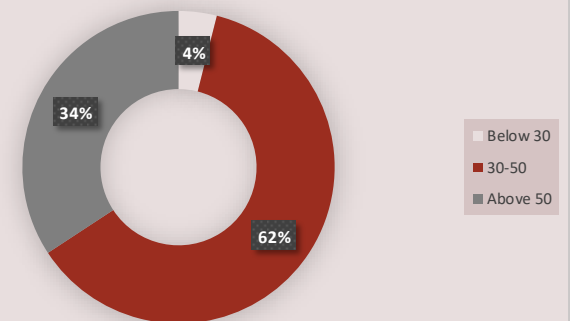
ADA Employees by Age FY 2021

Below 30	38
30-50	594
Above 50	329

ADA EMPLOYEES BY AGE FY 2020



ADA EMPLOYEES BY AGE FY 2021



Human Development

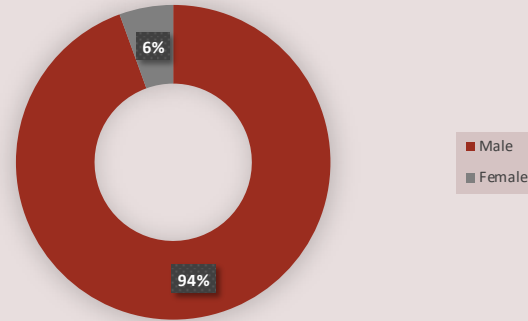
ADA Employees by Gender FY 2020

Male	904
Female	53

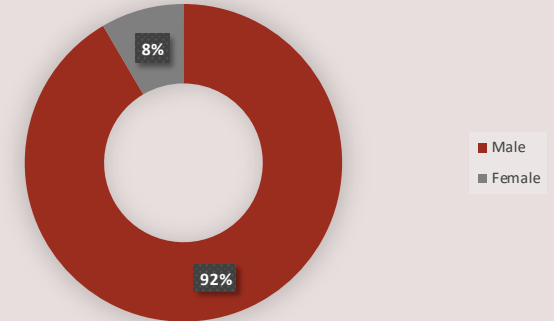
ADA Employees by Gender FY 2021

Male	904
Female	57

ADA EMPLOYEES
BY GENDER FY 2020



ADA EMPLOYEES
BY GENDER FY 2021



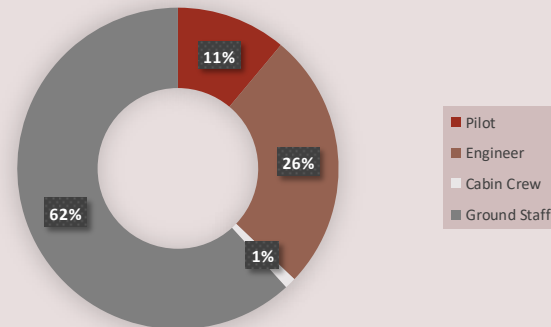
ADA Employee by Job Category FY 2020

Pilot	106
Engineer	249
Cabin Crew	11
Ground Staff	591

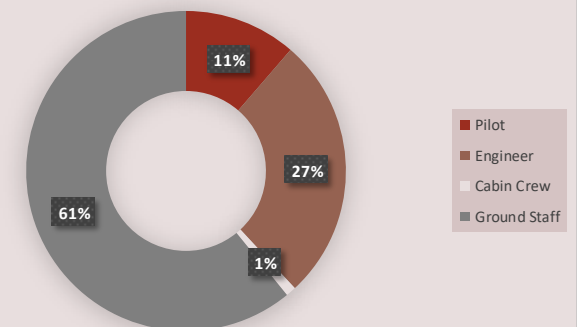
ADA Employee by Job Category FY 2021

Pilot	109
Engineer	257
Cabin Crew	10
Ground Staff	585

ADA EMPLOYEES
BY JOB CATEGORY FY 2020



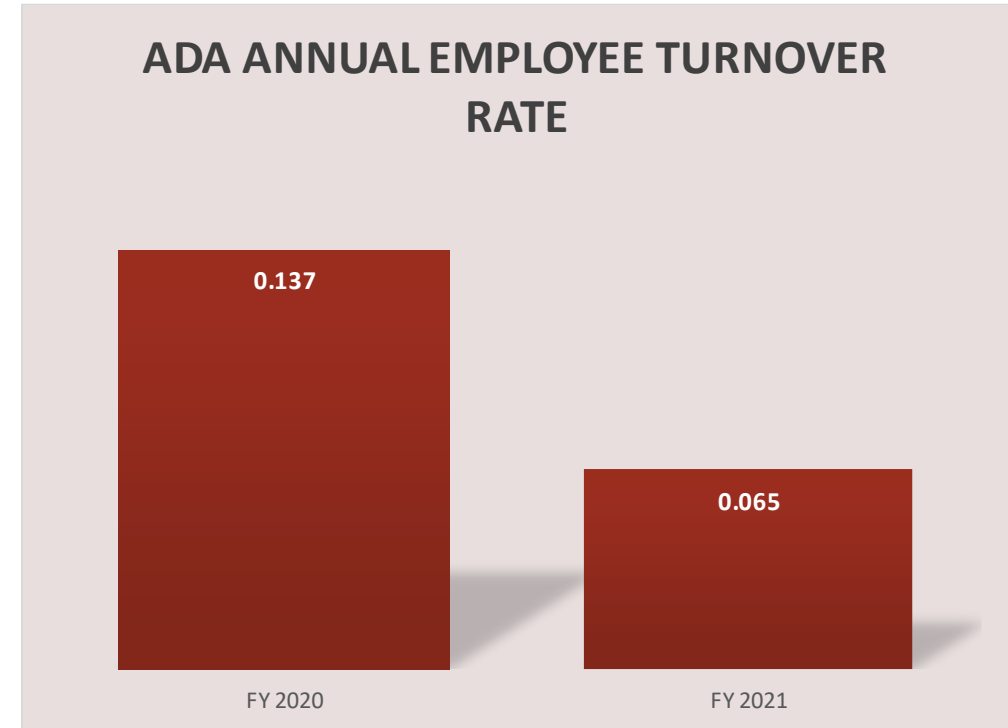
ADA EMPLOYEES
BY JOB CATEGORY FY 2021



Human Development

ADA Annual Employee Turnover Rate

FY 2020	13.7%
FY 2021	6.5%



Social Development

Abu Dhabi Aviation is keen to carry out its corporate social duties by supporting and sponsoring major sporting events that contribute to the progress and advancement of society. At the same time, it is keen to support government institutions in promoting sports activities and events hosted by the capital, Abu Dhabi, as an official sponsor. In addition to cooperating in the development of sports events and activities in line with Abu Dhabi Vision 2030.

- Official sponsor of the ADNOC Marathon, ADNOC's strategic partner in Abu Dhabi Aviation (26 November 2021)
- Participation in the commemoration of Martyr's Day (30 November 2021)
- Participation and sponsorship of the fiftieth (50th) National Day of the United Arab Emirates (2 December 2021)
- Signing a memorandum of understanding with the Zayed Higher Organization for People of Determination to enhance cooperation between the two sides regarding empowering people of determination by providing the Foundation with special fenders for aircraft wheels designed and developed by employees of the Zayed Higher Organization for People of Determination. Abu Dhabi Aviation has already received and tested 40 pieces of aircraft wheel fenders, which have been subjected to international safety standards and have proven their effectiveness and efficiency (21 December 2021)

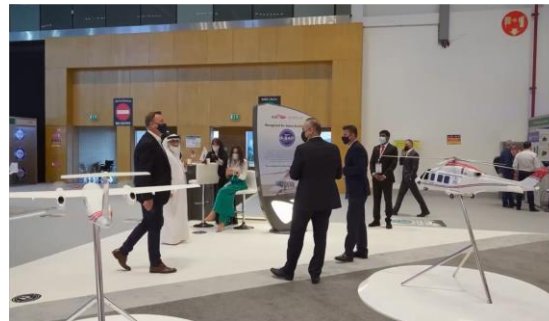
Social Development

INDEX AND NADEX 2021 (21 TO 25 FEBRUARY 2021)

Abu Dhabi Aviation is the official sponsor at IDEX and NADEX 2021 with the aim of supporting and developing the national defense industries sector, which constitutes an important sector for advancing economic development in the UAE.



Abu Dhabi Aviation pavilion



Commercial Director and CFO welcoming the visitors

Social Responsibility

UAE TOUR 2021 (21 TO 27 FEBRUARY 2021)

His Excellency Mr. Nader Ahmed Al Hammadi, Chairman of Abu Dhabi Aviation, said, "We are pleased to participate in the UAE Tour 2021. Abu Dhabi Aviation has set its sights on supporting sports and athletes and has not failed to participate in such events for years." Al Hammadi pointed out that Abu Dhabi is witnessing a quantum leap in international tournaments, stressing that this comes as a translation of the directives of His Highness Sheikh Khalifa bin Zayed and Crown Prince Sheikh Mohammed bin Zayed, may God protect them.

He added that Abu Dhabi Aviation's participation in the UAE Tour 2021 is in support of sporting activities and events hosted by the capital; in addition to cooperation in the development vision of sporting activities and activities in line with Abu Dhabi Vision 2030. Abu Dhabi Aviation is also keen to carry out its corporate social duties by supporting and sponsoring major sporting events that contributes to the progress and advancement of the community.

Through its fleet, capabilities, and expertise, Abu Dhabi Aviation is going to provide two vertical planes for local and international TV channels to depict the entire tour, which is going to also depict UAE's heritage, historical and touristic landmarks. Abu Dhabi Aviation aircraft will accompany the competitors in all stages of the tour.

Abu Dhabi Aviation's Chairman praised the great role played by the Abu Dhabi Sports Council headed by His Highness Sheikh Nahyan bin Zayed Al Nahyan, in hosting the most prominent global sporting events that have great impact in spreading the culture of sport and inspiring individuals, especially young people to practice sports to reach a healthier and happier society.



Social Responsibility

ABU DHABI TRIATHLON CHAMPIONSHIP 2021 (5 – 6 NOVEMBER 2021)

Abu Dhabi Aviation announced its sponsorship of the Abu Dhabi World Triathlon Championship, hosted by the Abu Dhabi Sports Council, under the sponsorship of the National Health Insurance Company.

His Excellency Nader Ahmed Al Hammadi, Chairman of the Abu Dhabi Aviation, stated that Abu Dhabi Aviation, with its fleet, capabilities and expertises, offers to make the event a success through filming the entire tour by its two Bell 412 helicopters. “Local and international TV channels will rely on the footage filmed on our fleet, through which it will highlight the heritage, historical and tourist landmarks of the Emirates. In addition, our fleet will accompany participants in all stages of the global race, especially that the championship occupies a high place in the global sporting events calendar due to the great turnout from the elite class of professionals, which confirms the capital’s position as a global destination that attracts the most important sporting events in the world.”

He adds, “Abu Dhabi Aviation's participation in this championship is in support of the sports activities and events hosted by the capital Abu Dhabi, in addition to cooperation in the development vision of sports events and activities in line with Abu Dhabi Vision 2030.” Emphasizing that Abu Dhabi is witnessing a quantum leap in world championships it hosts, which comes as a translation of the directives of the higher leadership.

The Chairman of the Board of Directors of Abu Dhabi Aviation stressed that the contribution to supporting and sponsoring sporting events is within the company’s important social corporate responsibility strategy which contributes to the community, the emirate, and the country.

HE Al Hammadi praised the great role played by the Abu Dhabi Sports Council by hosting and participating in the most prominent international sporting events that have great impact, and added that the country was able to occupy a prominent position in the world of sport of all kinds.

Social Responsibility

ABU DHABI DESERT CHALLENGE 2021

Abu Dhabi Aviation is the sponsor of the Abu Dhabi Desert Rally, a strategic partner in the global sports event's support, alongside the government and private companies held on 5 to 11 November 2021.

As the rally sweep across the spectacular Al Dhafra dunes, Abu Dhabi Aviation helicopters provided potentially life-saving aerial Search And Rescue support for the medical crews on permanent standby to be taken to the aid of competitors in trouble.

His Excellency Nader Ahmed Al Hammadi, Chairman of Abu Dhabi Aviation stated: "Abu Dhabi Aviation seeks to secure elements of strength and safety for the success of this year's Abu Dhabi Desert Challenge by providing air support for the global event by participating in three advanced helicopters (Bell 412 and 212) that will be used for logistical support and air ambulance purposes, in addition to search and rescue operations. This makes the participation of the Abu Dhabi Aviation's aircraft vital in giving contestants and observers a sense of safety. Our presence is considered a key element of the rally's success given the harsh environmental conditions represented by the Emirates desert, especially that the Abu Dhabi Desert Challenge is the longest desert rally in the Middle East. The company has set its sights on supporting sports and athletes and has not failed to participate in this event for years. We offer our expertise over 47 years to make this major global sporting event a success, through our modern aircraft, and highly experienced pilots and engineers."



Social Responsibility

DUBAI AIRSHOW 2021

Abu Dhabi Aviation participated in Dubai Airshow 2021 that took place from 14th to 18th November 2021.

During the exhibition, Abu Dhabi Aviation displayed its wide range of aviation services that it provides to the leading local and international entities in the aviation sector. It aims to drive growth in commercial and luxury helicopters, freight and maintenance sectors.



Senior Commercial & Marketing Executive welcoming the visitors



MEET US AT DUBAI AIRSHOW: ABU DHABI AVIATION- STAND 1120



Business conversation with the CFO.

Environmental Development

1. Introduction

Abu Dhabi Aviation (ADA) as a commercial entity must manage waste in an efficient and cost-effective manner contingent upon the UAE Federal Environmental Law and Abu Dhabi Emirate Waste Management Regulation. The Company implements various sustainable practices that make the management of waste more economically sound, compliant with applicable legislations, and better for the environment.

Waste management in the UAE is coordinated through local the authorities. The Government of Abu Dhabi established the Centre of Waste Management (Tadweer) in 2008. It is responsible for the policy, strategy and contractual systems of waste management across the emirate.

The UAE aims to reduce the adverse per capita environmental impact of cities and industries, by paying special attention to air quality, general and other waste management concerns.

The UAE issued Cabinet Resolution No. (39) regarding the executive regulations of Federal Resolution No. (12) of 2018 on the integrated waste management that seeks to regulate the waste management process and standardize the mechanisms and methods of proper waste disposal in line with best practices with the aim of protecting the environment and reducing risks to human health.

In practice, ADA generates various types of waste, including: general solid waste, construction and debris, waste from aircraft flights (deplaned waste), compostable waste, hazardous and industrial waste, and lavatory waste.

This report focuses on the management practices implemented by the Company for the collection, storage, treatment and disposal of wastewater generated from its aircraft paint stripping and cleaning activities. Wastewater generated by these activities are categorized as hazardous industrial wastewater.

Environmental Development

ADA Waste Management Policy Statement

This Waste Management Policy forms part of Abu Dhabi Aviation's Environment, Health and Safety Management System (EHSMS) and underpins the Company's EHS Policy. The Policy aims to reduce the adverse environmental impacts of our waste, to reduce landfill waste and to ensure disposal of waste materials is done in an environmentally responsible manner.

The Company is committed to the implementation of an effective Waste Management Programme that meets or exceeds all legislative and regulatory requirements, particularly, the UAE Federal Law (24), Abu Dhabi Law (21) and Abu Dhabi Occupational Health and Safety Management System Framework (OSHAD SF). This Waste Management Policy is based on following priority order of action:

- **Reduce:** Through purchasing policy, operational activity and by raising awareness, reduce the waste that will be created for disposal.
- **Re-use:** Before discarding items, take action to re-use in the first instance within the Company and if this is not applicable, with external nominated organizations and contractors. Every opportunity to reuse items must be explored before being discarded as waste.
- **Recycle:** Where opportunities exist and where regulations apply, waste recycling must be encouraged and implemented to minimize the amounts of waste destined for landfill.
- **Treatment:** Where waste are sent for treatment to render safe or reduce hazardous properties prior to recycling or disposal the Company shall ensure that segregation, storage, handling, transport and treatment processes comply with legislation.
- **Disposal:** Where the production of waste is unavoidable the Company shall ensure that segregation, storage, handling, transport and disposal processes comply with legislation.

All Company employees are responsible for the way their conduct impacts on this Policy and should ensure that the waste they create is dealt with in accordance with this Policy. This Policy will be reviewed annually in respect of changing regulations, legislation and new opportunities which present themselves to the Company.

Mohammed Ibrahim Al Mazrouei
General Manager

Environmental Development

2. Characteristics of hazardous industrial wastewater

Hazardous substances are defined by the following characteristics: **ignitability, corrosivity, reactivity, and toxicity**. Hazardous substances may interfere with the municipal wastewater treatment operation, contaminate groundwater or contaminate surface waters.

- **Ignitability.** Highly flammable liquids and vapors contained in some airport industrial wastes are fire and explosion hazards, particularly when discharged freely to sewers, natural bodies of water, or the ground. Vapors from volatile solvents, fuels, and oils may travel considerable distances in sewers and certain soils and form explosive concentrates in low, enclosed places. Wastes with a high solid content may cause deposits that form explosive gas during decomposition.
- **Corrosivity.** Corrosive wastes can dissolve metals and other materials or burn human skin. Wastes generated during rust removal and acid or alkaline cleaning, as well as waste lead acid, lithium, and nickel-cadmium batteries, are corrosive wastes.

■ **Reactivity.** Wastes which are reactive are unstable or undergo rapid or violent chemical reaction with water or other materials. Wastes generated from cyanide plating operations and from processes involving oxidizers, such as bleaches, are reactive wastes.

■ **Toxicity.** Certain aviation industrial wastes are toxic to human beings, livestock, and aquatic life, either by direct contact or through the contamination of water supplies. Pollutants contained in metal finishing wastes, such as cyanide and chromium, and certain organic compounds, such as degreasing solvents, are highly toxic at low concentrations in water. Mixed solutions of metal wastes can be much more toxic than simple solutions of corresponding or greater concentration. The formation of sludge deposits in streams by certain airport industrial wastes can create a potential health hazard to prospective users of the stream and restrict or prohibit its use for recreational or agricultural purposes.

Environmental Development



ADA Waste Management Supervisor conducting inspection

Project Information – Waste Management

Start of construction:	December 2018
Start of operation:	March 2019
Location:	ADA Maintenance Facility
Address:	Abu Dhabi International Airport, UAE
Total wastewater collected 2019:	172,000 kg
Total wastewater collected 2020:	159,153 kg
Total wastewater collected 2021:	114,880 kg (January to September 2021)
Maintenance and monitoring:	REMCO and Waste Management

Environmental Development



Paint stripping and cleaning facility



Process workflow – hazardous wastewater generation, storage and collection

Environmental Development

3. Environmental impacts of hazardous wastewater

■ **Interference with waterway purification or municipal wastewater operation.** The discharge of airport industrial wastes to surface waters or to a municipal drainage system may have numerous adverse consequences. There are measures and procedures to address situations where there would be adverse consequences due to the discharge of airport industrial wastes to such waters or facilities. This may include reviewing spill prevention and countermeasure plans and notifying facility authorities of potential problems.

■ **Waterway self-purification.** The self-purification of waterways depends largely on a sufficient supply of oxygen to support the life and activity of fish and other aquatic organisms. Oils and greases form mats and slicks that hinder re-oxygenation of streams. Wastes with heavy organic loads will result in the consumption of dissolved oxygen when they biodegrade, and may form sludge deposits that could interfere with stream self-purification processes.

■ **Municipal wastewater operation.** Increases in the organic loading to a municipal drainage system may cause the total loading to exceed its headwork loading capacity; thereby, decreasing the plant's efficiency or violating the discharge permit. Emulsified oil and grease may adversely impact receiving waters. Toxic metals and toxic organic compounds may interfere with biological activity and may complicate sludge disposal. Acids and alkalies may corrode pipes, pumps, and treatment units and may interfere with settling and biological activity. Flammable materials may cause fires and may lead to explosions.

■ **Contamination of ground water.** Disposal of airport industrial wastes by land application may be constrained where there is the potential for ground water contamination. Future stringent groundwater regulations may have an impact on airport deicing operations and industrial wastes. These practices are generally unacceptable in areas where affected ground water is used as a source of drinking water.

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4. Chemicals used in paint stripping and cleaning

■ Organic solvents and phenols

These wastes, generated during paint application and removal and the cleaning of aircraft, can create explosion and toxicity hazards, interfere with sewage treatment, and pollute potable water. Solvents also interfere with bacterial activity in sludge digestion. Solvents and phenols, in particular, produce objectionable tastes and odors in water supplies.

The concentration of phenol specified in the ambient water quality criteria for toxicity protection of human health is 3.5 ppm. The concentrations of several common industrial solvents, specified in ambient water quality criteria for carcinogenicity protection of human health, are 0.00019 ppm for methylene chloride, 0.00094 ppm for 1,2-dichloroethane, and 0.0027 ppm for trichloroethylene.

Chemical Information	
Paint stripping product:	Ardrox 2526
Recommended use:	Paint stripper
Classification:	Toxic, corrosive, harmful, carcinogenic (3), mutagenic (3)
Characterization:	Mixture of organic solvents
Environmental precaution:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
Other cleaning solvents used:	C28/15, CN13-GPRO, Alkaline Cleaner, Bondrite A-AK 5948-DPM, C-IC 33

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5. Collection system standards and requirements

■ **Tank collection system.** ADA implements the following environmental and safety standards pertaining to tank systems:

- a) Collection facility does not generate any extreme heat, explosions, fire, fumes, mists, dusts, or gases, damage the structural integrity of the tank, or threaten human health or the environment in any way;
- b) Hazardous wastes or reagents that may cause corrosion, erosion, or structural failure are not collected in a tank;
- c) The containment system has the capacity to contain 10% of the total volume capacity;
- d) Continuously fed tanks have a waste-feed cutoff or bypass system;
- e) Ignitable, reactive, or incompatible wastes are not collected into a tank.

■ **Environmental Service Provider (ESP).** The contracted ESP responsible for the collection, treatment and disposal holds a valid environmental and commercial permits from the Competent Authorities in UAE.

■ **Inspection Timetables.** The collection tank is inspected at least once each operating day. The construction materials and the surrounding area of the tank system are inspected for visible signs of corrosion or leakage at least weekly.

■ **Personnel awareness.** Employees (including ESP staff) involved in the activity are thoroughly familiar with proper waste handling and emergency procedures relevant to their responsibilities during normal facility operations and emergencies.

■ **Contingency plan and emergency procedures.** ADA has a contingency plan, as outlined in the ERP Manual, that is designed to minimize hazards in the case of a sudden or non-sudden release, fire, explosion, or similar emergency. The Waste Management Supervisor is the designated ERP coordinator responsible for responding to an emergency at site.

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6. Collection, treatment and disposal process

(a) Acceptance criteria

Prior to transportation of the contaminated wastewater from the ADA facility to the ESP water treatment plant, the ESP will require a laboratory analyses to ensure that the composition of the wastewater stream to be treated is within the specifications of the water treatment plant. If concentrations exceed the specifications, the ESP may refuse to collect and treat the contaminated wastewater. Wastewater is collected from ADA facility by the ESP using a 4,500 GL tanker.

(b) Treatment process

The Water Treatment Plant is designed to process contaminated wastewater streams throughout a series of industrial processes, through: oil waste separation; contaminated sludge through flotation, sludge thickening and filter pressing; and treated final effluent through aeration, filtering, ultra filtration and buffering processes before being discharged to the Municipality sewer mains operated by the Abu Dhabi Sewerage Services Company (ADSSC).

Component	Concentration
pH	2-13
Total Suspended Solids	0-10.000 mg/l-1
Total Dissolved Solids	0-7.500 mg/l-1
COD	0.60.000 mg/l-1
Biological Oxygen Demand	0-30.000 mg/l-1
Oil	0 -50.000 mg/l-1
Ammonia	≤ 100 mg/l-1
Sulphate	≤ 1000 mg/l-1
Aluminium	≤ 500 mg/l-1
Chloride	≤ 2000 mg/l-1
Cadmium	≤ 20 mg/l-1
Chromium	≤ 20 mg/l-1
Copper	≤ 400 mg/l-1
Phosphor	≤ 50 mg/l-1
Lead	≤ 60 mg/l-1
Manganese	≤ 50 mg/l-1
Mercury	≤ 0.01 mg/l-1
Nickel	≤ 150 mg/l-1
Iron	≤ 200 mg/l-1
Zinc	≤ 500 mg/l-1

Table 1. Chemical concentrations limit prior acceptance by treatment facility. Limits based on RSB Abu Dhabi Trade Effluent Control Regulation 2010.

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(c) Waste oil

Waste oil generated through the oil separation process will be temporarily stored within an aboveground storage tank, provided with an adequate secondary system in order to prevent any spillage within the premises in the event of tank failure. Waste oil will be subsequently diverted and transported to a recycling facility, authorized to operate by the Tadweer.

(d) Treated effluent

Prior to the discharge of the treated effluent within the sewer mains operated by the ADSSC, a full set of laboratory analyses will be undertaken by an approved laboratory under the responsibility of the ESP's Treatment Plant Supervisor in order to ensure that the composition of the treated effluent is within the limits imposed by ADSSC. Limits imposed by ADSSC for discharged within the sewer mains are shown on the opposite table.

(e) Sludge

Sludge generated by the Water Treatment Plant through flotation, thickening and pressing processes will be temporarily stored in open container prior to be diverted to the Al Dhafra Engineered Landfill facility.

Component	Concentration
pH	6-9
Total Suspended Solids	≤ 500 mg/l-1
Total Dissolved Solids	≤ 3000 mg/l-1
COD	≤ 3000 mg/l-1
Biological Oxygen Demand	≤ 1000 mg/l-1
Oil	≤ 50 mg/l-1
Ammonia	≤ 40 mg/l-1
Sulphate	≤ 1000 mg/l-1
Aluminium	≤ 5 mg/l-1
Chloride	≤ 500 mg/l-1
Cadmium	≤ 0.2 mg/l-1
Chromium	≤ 1 mg/l-1
Copper	≤ 1 mg/l-1
Phosphor	≤ 50 mg/l-1
Lead	≤ 1 mg/l-1
Manganese	≤ 1 mg/l-1
Mercury	≤ 1 mg/l-1
Nickel	≤ 150 mg/l-1
Iron	≤ 2 mg/l-1
Zinc	≤ 2 mg/l-1

Table 2. Chemical concentrations limit prior final disposal to sewage system. Limits based on RSB Abu Dhabi Trade Effluent Control Regulation 2010.

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(f) Waste manifest and record-keeping

A waste manifest will be generated as requested by the CWM, and copies retained by the waste originator. The assigned ESP and the disposal facility will specify the following information: waste originator, waste transporter, final disposal, nature of the waste, and quantity of the waste. The ADA Waste Management Section will keep a logbook for the purpose of tracking and maintaining a record of collection and disposal. Waste manifest record will be submitted to Tadweer through their online system (Bolisaty).

(g) Ongoing compliance and performance monitoring

Internal control and performance monitoring is carried out by the Waste Management Supervisor. Monthly and quarterly waste management reports are submitted to Management and EHS Department. Incident and hazard reporting is carried out through the Company Safety Reporting System.



ESP wastewater collection truck at ADA Maintenance Facility.



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