CORSIA EMISSIONS MONITORING PLAN SAMPLES

In order to prepare for the monitoring, reporting and verification (MRV) of CO_2 emissions, each operator will need to develop an emissions monitoring plan. The emissions monitoring plan shall include information on the operator, its fleet and operations. The emissions monitoring plan will also detail the methods that will be used by the operator to monitor fuel use and calculate emissions, and all associated data management.

The emissions monitoring plan is important for the verification process. It helps the verifier to understand the methods chosen, assess if they are consistent with the requirements under CORSIA and if they have been applied properly.

The emissions monitoring plan will have to be approved by the administrating authority, who should be satisfied that the processes described by the operator are appropriate and sufficient to comply with the prescribed MRV requirements. Before approving it, the administrating authority will review the emissions monitoring plan to ensure it is complete and consistent with the requirements of Annex 16 vol. IV. It will notably assess if the procedures in place are sufficient and and if the operator has a suitable data management plan in place.

The approval by the administrating authority will give the operator the assurance that the processes detailed in its emissions monitoring plan are satisfactory.

In order to assist operators with the preparation of their emissions monitoring plan, IATA has put together a few sample emissions monitoring plans for fictional airlines. These samples are solely aimed at illustrating the level of detail and type of information which we would recommend including in the emissions monitoring plan. **Please note:**

- **The template and the level of information to be included will ultimately depend on the expectations of individual ICAO Member States.** We would therefore urge all operators to check with their authorities which template they shall use and clarify any doubts they may have on the expectations of their administrating authority.
- **The procedures which are suitable and appropriate for one operator may not be appropriate for another operator.** Therefore, we would strongly caution against copying the descriptions in any of the sample emissions monitoring plans. Individual operators must make sure that the procedures they describe in their emissions monitoring plans are tailored for their organization and that they will be able to implement them as described.

An overview and comments for the three sample emissions monitoring plans are provided in the following pages. The descriptions of the three fictional airlines are also provided. The sample emissions monitoring plans are provided as separate documents.

For any questions, please do not hesitate to contact the IATA CORSIA team at corsia@iata.org.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Aircraft identification	For most commercial operators, the attribution of flights will be based on the ICAO designator. Operators without an ICAO designator will use registration marks. In some situations, operators may have to use both (see Charlie Airways).	Attribution is based on ICAO designators. As Alpha Airlines and its subsidiary Bravo Air will request to be treated as one entity for CORSIA, additional information is provided in field d4. Field d4 is also used to provide information on the operation of wet-leased aircraft. Field d3 does not need to be filled if registration marks are not used for flight attribution.	Charlie Airways provides aircraft management services to aircraft owners. While these flights are operated by Charlie Airways under their AOC, they are not performed using the Charlie Airways ICAO designator. Charlie Airways will therefore use both the ICAO designator and registration marks for flight attribution. In such situations, there is no need to list all aircraft in field d3. The registration marks of aircraft which are operating flights exclusively with the ICAO designator do not need to be listed. Field d4 should be used to explain the situation and in which cases flights are attributed on the basis of registration marks.	The situation of Juliet Wings is straightforward, with all flights performed by Juliet Wings and under their ICAO designator. In such cases, it may not be necessary to provide any additional information in field d4.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Ownership structure	Field f) should be used to provide a high level overview of any relationships with other operators performing international flights. Fields f2 to f5 are only required if the operator is in a situation where two operators decide to be treated as one entity for compliance with CORSIA (see Alpha Airlines).	Alpha Airlines owns all shares in a Bravo Air, a subsidiary also administrated by Switzerland. Therefore, both operators can be treated as one entity under CORSIA. In fields f to f5, information is provided to confirm that the operators wish to be treated as one entity and how flights operated by Bravo Air will be attributed to the single entity. The relationship with Charlie Airways, an operator who owns shares in Alpha Airlines, is also indicated here. Alpha Airlines and Charlie Airways can however not be treated as a single operator as they are not administrated by the same State and as Charlie does not own all shares in Alpha.	Only general information is provided in the EMP as there is not a situation where another operator could be "pooled" with Charlie Airways.	Juliet Wings wholly owns a subsidiary, but the subsidiary does not operate any flights subject to CORSIA. This is mentioned in field f) for information only.
Description of the operator's activities	Field g should be used to provide an overview of the operator's operations. It may be used to provide details on potential leasing arrangements and activities which may be exempt from CORSIA (for example humanitarian flights).	The field has been used to inform the authority that Alpha Airlines uses wet-leased aircraft and operates occasional humanitarian flights.	The field has been used to provide background information on Charlie Airways' operations which are not subject to CORSIA MRV. Flights performed on behalf of other operators are also indicated here.	No particular comments.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Fleet declaration	Operators need to indicate the number of aircraft they operate, by aircraft type. The fleet declaration should be based on the current fleet. If wet-leased aircraft are operated on a long-term basis, the operator should consider including them, especially if a different fuel use method is used for wet-leased aircraft. The ICAO template does not allow to select more than one fuel type by aircraft. However, many aircraft will, for example, use jet A and jet A-1. It is recommended to contact the authority to ask how to provide the information. In the absence of different guidance from an authority, we would suggest indicating the fuel which is most commonly used in field a). If your "usual" fuel is not provided as an option in the drop-down list (for example TS-1), it could be mentioned in field d) (completeness of all aircraft) In cases where new aeroplane types may be introduced in the fleet in the future, the operator may use fields b and b1 in case they are planning to use a different fuel monitoring method for the new types.	The aircraft that Alpha Airlines wet-leases are identified separately from the other aircraft in Alpha Airlines' fleet. This was considered useful as a different fuel use monitoring method will be chosen for wet-leased aircraft. The number of aircraft for wet-leased fleets are not provided as the operator performing the wet-leases may alternate the aircraft used and it is therefore difficult to specify the number of aircraft actually operated. The new types that will enter in service in 2019 have not been listed in the fleet declaration (which refers to types which are operated at the time of submission of the EMP), but the information on future deliveries is mentioned under c) and the methods are already specific in the next section. If the monitoring methods had been different for future types, field b) should be used.	No particular comments.	No particular comments.
Completeness of monitoring	Fields c and d are used to provide the authority with the assurance that the operator has processes in place to capture all operations.	In the EMP, the process by which the flight operations department is ensuring the completeness of the data routinely collected is described. In many instances, the validation of the data may occur before it reaches the CORSIA MRV team.	Operators may wish to identify who is best placed to provide information to the MRV team. In the example of Charlie Airways, the fuel procurement team was identified as appropriate to notify the MRV team of new aircraft deliveries as no delivery will occur without fuel being procured for it.	For changes in fleet, Juliet Wings builds on existing processes: - internal communications for changes in fleet; - existing financial processes to check the completeness of the monitoring.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Determination of international flights	The operator should have processes in place to ensure that the different categories of flights are properly distinguished: flights not subject to any MRV requirements, flights not subject to offsetting requirements, etc.	In the case of Alpha Airlines, an internal database will be used to categorize flights. The operator will have the responsibility to ensure that the underlying data used to categorize flights is up to date and reflects the information published by ICAO. The information provided by Alpha also includes how exempt flights will be identified in their day-to-day operations.	Charlie Airways relies on an external system to manage CORSIA data. This external system (FRED+) will categorize flights, but some manual treatment may also be required (for example to remove data for aircraft with an MTOM below 5.7t)	In the baseline period, Juliet Wings will use the CERT that automatically categorizes flights. While during the 2021+ period, Juliet Airways will use a fuel uplift method and will have to collect and manage fuel slips manually, it will still be able to input all the data in the CERT that will (1) automatically sort international flights, (2) fill data gaps with CERT CO_2 estimations and (3) automatically generate an emissions report.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Methods and means for calculating emissions	Section 4 of the emissions monitoring plan is used to indicate the method which will be used to monitor emissions. In its emissions monitoring plan, the operator will need to describe how it plans to collect the data for the application of a specific fuel monitoring method, including the equipment, procedures and documentation which will be used. The operator will also need to detail the exact points in time when the measurements will be made.	3 different methods have been selected for Alpha Airlines, mainly to illustrate the different information that needs to be provided for each method. It can be noted that the operator is proposing to use a different fuel use method for its A332 and the A332 which are wet-leased. While in principle the same method is to be used for all aircraft of the same type, the situation of wet-leases may justify that the authority approves derogations in such cases. For method A and B, Annex 16, vol IV, provides that block-off/block-on should be used for flights performed by another operator on an ad-hoc basis. It can also be noted that information is included on how situations where the activity preceding a flight is not another flight will be handled.	It is important to note that method A relies on data from the subsequent flight, which may be a domestic flight. Therefore, to prevent data gaps it is recommended that operators using method A systematically collect all fuel measurements used in method A for all flights (domestic and international) operated by aircraft which are used in international operations. This is why Charlie Airways has preferred to choose method A only for aircraft which are used exclusively on international flights.	Juliet Wings is eligible for simplified monitoring (CERT) in the baseline period. It is uncertain whether it would still be eligible for simplified procedures after the baseline period as its CO2 emissions on routes subject to offsetting are close to the 50,000 tCO2 threshold. Therefore the fuel uplift method was chosen for monitoring from 2021. The eligibility for simplified monitoring in the baseline period has been determined using the CERT. A copy of the CERT assessment is to be provided. The assessment could however also be based on sample actual data from the operator, such as total fuel uplift in a recent year.
Description of data management	Operators need to provide an overview of their data management in the last section of the EMP. This must include a flow chart. It is important that the procedures in place ensure the reliability of the data management process and that the operator will be in a position to follow the procedures in practice.	No particular comments.	No particular comments.	No particular comments.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Data gaps	Data gaps occur when an operator is missing data relevant for the determination of the fuel use of a flight in accordance with the approved fuel monitoring method. In cases where the operator can use a secondary data source to determine fuel use in accordance with the approved fuel monitoring method, this would not constitute a data gap. As long as data gaps affect less than 5% of all international flights in 2019-2020 and less than 5% of all flights subject to offsetting requirements from 2021, the CERT shall be used to fill them. If they exceed that threshold, the operator has to reach out to the authority to identify remedial action. An operator could suggest potential remedial actions in field b2, such as calculating fuel use on the basis of another fuel use monitoring method for which data could be available, subject to the approval of its authority. Some operators may implement the CEMs directly in their IT systems instead of using the downloadable CERT version. This approach is permitted by Annex 16 Volume IV under Part II, Chapter 1, Section '1.6 Equivalent procedures' that states that "The use of equivalent procedures in lieu of the procedures specified in this Volume of Annex 16 shall be approved by the State to which the aeroplane operator has been attributed to in 1.2." The implementation of the CEMs as an equivalent procedure does not consist in the development of a new estimation methodology as the results will be the same as those obtained through the use of the downloadable version of the CERT.	Alpha Airlines has indicated that in some cases a data gap may occur even if a secondary source (the technical log) exists. This would be the case where the technical log would be difficult to obtain as a flight was performed by another operator on behalf of Alpha Airlines.	In its EMP, Charlie Airways suggests that if data gaps exceed the 5% threshold, a potential method to fill gaps could be to use the fuel uplift method as the data for that method is routinely collected as well.	Data gaps in the context of an AO that is eligible to use the CERT are strictly secondary data sources of flight information (AC type, Origin Airport, Destination Airport). If not available in the primary source (e.g., automated flight tracking system from Flight Ops Dept), then pilot log books of technical logs could be used. If the operator cannot locate this minimum information and has no idea (after reasonable investigation) where its aircraft are flying… then CORSIA should be the least of its worry (compared to safety and security issues/compliance). However, if, for example, an operator using the block time input for the CERT is missing block time, it could use the great circle distance input method to fill the data gap.

Topic	General comments	Alpha Airlines	Charlie Airways	Juliet Wings
Record keeping and risk management	The risk assessment should include any risks associate with the collection of data, but also risks associated with the storage of data (including physical destruction of records, etc).	No particular comments.	No particular comments.	No particular comments.
Revisions of EMP	The operator should specify which department is responsible to maintain the emissions monitoring plan and identify material changes.	No particular comments.	No particular comments.	No particular comments.

CORSIA EMP Sample: Airline Description

1. Introduction

Alpha Airlines is an airline based at Geneva International Airport (GVA/LSGG). Its operations include passenger and all-cargo operations. In addition to its normal scheduled flights, it also operates occasional charter humanitarian flights for the International Committee of the Red Cross.

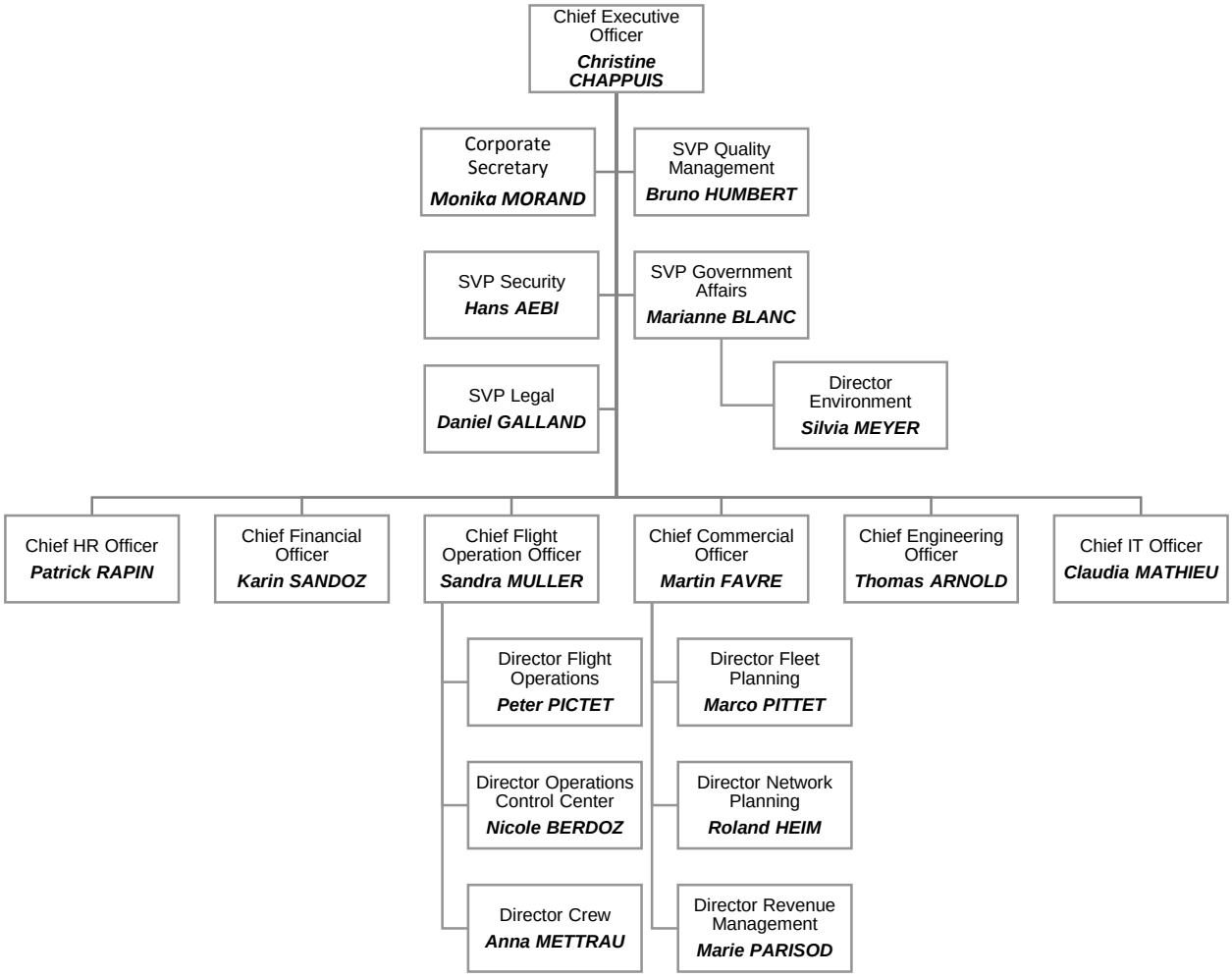
2. Corporate structure and governance

2.1 Ownership structure

Charlie Airways is the airline's largest shareholder, with a holding of 49%. The other 51% of shares are split between public and private shareholders.

Alpha Airlines owns all shares in Bravo Air, a regional airline based in Geneva.

2.2 Corporate governance



3. Network

3.1 Scheduled passenger services

Alpha Airlines' timetable lists the following schedules:

Flight number	Origin	Destination	Frequency	Equipment
001	GVA	YUL	Daily	788
002	YUL	GVA	Daily	788
003	GVA	BOG	Mo, Th	332
004	BOG	GVA	Mo, Th	332
005	GVA	SIN	Tu, Fr	332
006	SIN	GVA	We, Sa	332
007	GVA	CAI	Daily	321
008	CAI	GVA	Daily	321
009	GVA	DME	Daily	321
010	DME	GVA	Daily	321
011	GVA	DEL	Mo, We, Sa	788
012	DEL	GVA	Mo, We, Sa	788
013	GVA	NBO	Tu, Th, Fr	788
014	NBO	GVA	Tu, Th, Fr	788
1001	GVA	MXP	Daily	E90
1002	MXP	GVA	Daily	E90
1003	GVA	CDG	Daily	E90
1004	CDG	GVA	Daily	E90
1005	GVA	VIE	Daily	E90
1006	VIE	GVA	Daily	E90
1007	GVA	FRA	Daily	E90
1008	FRA	GVA	Daily	E90
1009	GVA	FCO	Daily	E90
1010	FCO	GVA	Daily	E90
1011	GVA	MUC	Daily	E90
1012	MUC	GVA	Daily	E90
1013	GVA	MAD	Daily	E90
1014	MAD	GVA	Daily	E90
1015	GVA	LIS	Daily	E90
1016	LIS	GVA	Daily	E90
1017	GVA	MUC	Daily	E90
1018	MUC	GVA	Daily	E90
1019	GVA	LUG	Daily	CN1
1019	LUG	MXP	Daily	CN1
1020	MXP	GVA	Daily	CN1
1021	GVA	MXP	Daily	CN1
1022	MXP	LUG	Daily	CN1
1022	LUG	GVA	Daily	CN1

Flights 003 to 006 are new routes which were launched on 1 January 2018. Flights 1001 to 1022 are operated by Bravo Air, under Bravo Air's AOC and ICAO Designator.

3.2 Scheduled cargo services

Alpha Airlines offers a limited number of cargo services:

Flight	Origin	Destination	Frequency	Equipment
9001	GVA	DEL	Mo, Th	748
9001	DEL	SIN	Mo, Th	748
9001	SIN	GVA	Tu, Fr	748
9002	GVA	DEL	Daily	332
9002	DEL	IST	Daily	332
9002	IST	GVA	Daily	332

All its cargo operations are operated under a wet-lease agreement by Air Delta, using Alpha Airlines' ICAO Designator.

3.3 Other operations

Alpha Airlines operates charter flights for the International Committee of the Red Cross. In 2017, ten round-trips flights were operated with an Airbus A330-200 between Switzerland and Ethiopia. In January 2018, 2 round-trips were operated between Switzerland and Somalia.

The maintenance of Alpha Airlines' Airbus 330-200 is carried out in Frankfurt, with regular ferry flights from GVA to FRA. The rest of the maintenance is conducted at its home base in Geneva.

Bravo Air operates charter sightseeing flights around the Mont Blanc in France. Bravo Air also operates charter flights to ski resorts in France, Italy and Switzerland. These charter flights are operated either by helicopter or with the Cessna Caravan.

4. Fleet

4.1 Alpha Airlines

Registration	Aircraft type	Notes
HB-GVA	A321-100	Not equipped with ACARS
HB-GVB	A321-100	Not equipped with ACARS
HB-GVC	A321-100	Not equipped with ACARS
HB-GVD	B787-800	Equipped with ACARS
HB-GVE	B787-800	Equipped with ACARS
HB-GVF	B787-800	Equipped with ACARS
HB-GFG	A330-200	Equipped with ACARS

Alpha Airlines will take delivery of three A350-900 between July 2019 and January 2020. The A350-900s will be used to expand the airline's network. Starting in 2020, new routes will be launched to the United States, Malaysia and frequencies to Singapore will be increased to daily flights.

Alpha Airlines is also replacing its A321-100 with 3 A321 neos, which will all be delivered in 2019. The new A321s will be equipped with ACARS.

4.2 Bravo Air

Registration	Aircraft type	Notes
HB-BAA	Embraer E190	
HB-BAB	Embraer E190	
HB-BAC	Embraer E190	
HB-BAD	Cessna C208 Caravan	
HB-BAE	Cessna C208 Caravan	
HB-BAF	Bell 206	

CHARLIE AIRWAYS

CORSIA EMP Sample: Airline Description

1. Introduction

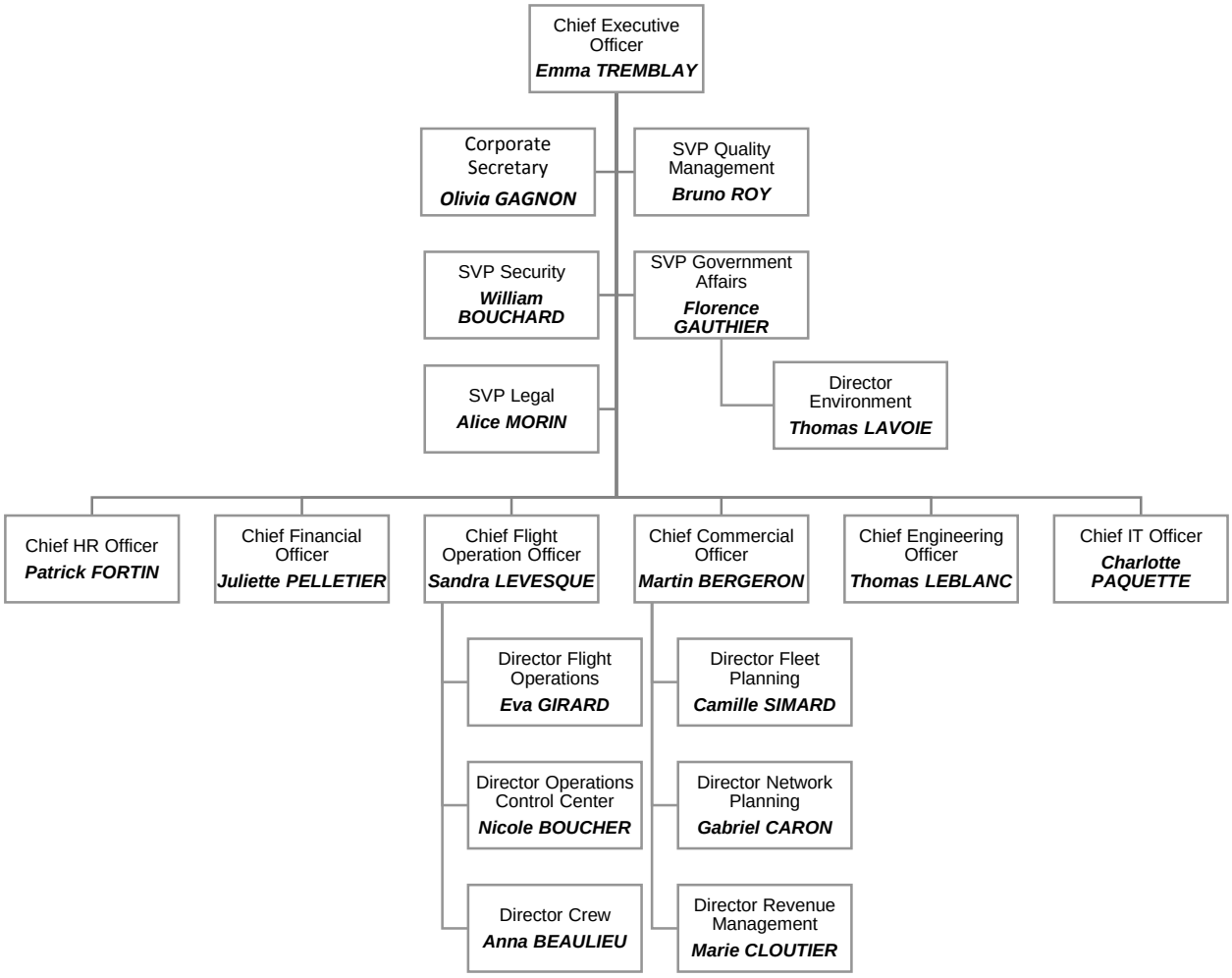
Charlie Airways is an airline based at Montreal Pierre-Elliott-Trudeau airport (YUL/CYUL). In addition to its scheduled flights, Charlie Airways provides aircraft management services to owners of private aircraft.

2. Corporate structure and governance

2.1 Ownership structure

Charlie Airways' shares are split between public and private shareholders. Charlie Airways holds 49% of the shares in Alpha Airlines, an airline based in Geneva.

2.2 Corporate governance



3. Network

3.1 Scheduled services

Charlie Airways' timetable lists the following schedules:

Flight	Origin	Destination	Frequency	Equipment
001	YUL	BOG	Daily	788
001	BOG	GRU	Daily	788
002	GRU	BOG	Daily	788
002	BOG	YUL	Daily	788
003	YUL	GRU	Daily	763
003	GRU	SCL	Daily	763
004	SCL	GRU	Daily	763
004	GRU	YUL	Daily	763
005	YUL	FDF	Daily	763
006	FDF	YUL	Daily	763
007	YUL	LIM	Daily	763
008	LIM	YUL	Daily	763
009	YUL	HNL	Daily	763
010	HNL	YUL	Daily	763
011	YUL	YVR	Daily	319
012	YVR	YUL	Daily	319
013	YUL	JFK	Daily	319
014	JFK	YUL	Daily	319
015	YUL	BOS	Daily	319
016	BOS	YUL	Daily	319
101	YUL	YQB	Daily	Varies
102	YQB	YUL	Daily	Varies
103	YUL	YHZ	Daily	Varies
104	YHZ	YUL	Daily	Varies
105	YUL	FSP	Daily	Varies
106	FSP	YUL	Daily	Varies
107	YUL	MHT	Daily	Varies
108	MHT	YUL	Daily	Varies
109	YUL	IAG	Daily	Varies
110	IAG	YUL	Daily	Varies
111	YUL	BTV	Daily	Varies
112	BTV	YUL	Daily	Varies
113	YUL	RUT	Daily	Varies
114	RUT	YUL	Daily	Varies

Flights 101 to 114 are operated either by a Twin Otter or a Dash 8-300.

3.2 Charter flights

Charlie Airways also operates charter flights, which have been used by the Canadian Government for diplomatic missions and to transport military personnel.

3.2 Aircraft management services

Charlie Airways provides aircraft management services to owners of private aircraft. While these flights are operated by Charlie Airways under their AOC, they are not operated using the Charlie Airways ICAO Designator. All such flights are unscheduled operations. As of today, Charlie Airways has 5 clients which use the aircraft management services.

5. Fleet

Registration	Aircraft type	Notes
C-CHAA	A319-100	Equipped with ACARS
C-CHAB	A319-100	Equipped with ACARS
C-CHAD	B767-300ER Winglets	Equipped with ACARS
C-CHAE	B767-300ER Winglets	Equipped with ACARS
C-CHAF	B767-300ER Winglets	Equipped with ACARS
C-CHAG	B767-300	Not equipped with ACARS
C-CHAH	B767-300	Not equipped with ACARS
C-CHAI	B767-300ER	Equipped with ACARS
C-CHAJ	B767-300ER	Equipped with ACARS
C-CHAK	B767-300ER	Equipped with ACARS
C-CHAL	B767-300ER	Equipped with ACARS
C-CHAM	B767-300ER	Equipped with ACARS
C-CHAN	B787-800	Equipped with ACARS
C-CHAP	B787-800	Equipped with ACARS
C-CLAA	DHC-6 Twin Otter	Not equipped with ACARS
C-CLAB	DHC-6 Twin Otter	Not equipped with ACARS
C-CLAC	DHC-8-300	Not equipped with ACARS
C-CLAD	DHC-8-300	Not equipped with ACARS

In 2020, Charlie Airways expects the delivery of 5 Airbus A320 neo and 3 Boeing 787-800.

1 Boeing 787-800 and 4 Boeing 767-300 are operated by Charlie Airways under a wet-lease agreement with Echo. Echo's ICAO designator is used for all flights, with the exception of ferry flights between Miami and Charlie Airways' base in Montreal, Canada.

The aircraft that Charlie Airways manages for private clients are the following:

Registration	Aircraft type	Notes
VQ-BUZ	Boeing 737-700 Winglets (BBJ)	Not equipped with ACARS
VQ-MBM	Boeing 737-700 Winglets (BBJ)	Not equipped with ACARS
M-JETS	Boeing 737-700 Winglets (BBJ)	Not equipped with ACARS
M-JETZ	Boeing 737-700 Winglets (BBJ)	Not equipped with ACARS
N12324	Dassault Falcon 900	Not equipped with ACARS

JULIET WINGS

CORSIA EMP Sample: Airline Description

1. Introduction

Juliet Wings is a regional airline based at Verona, Italy.

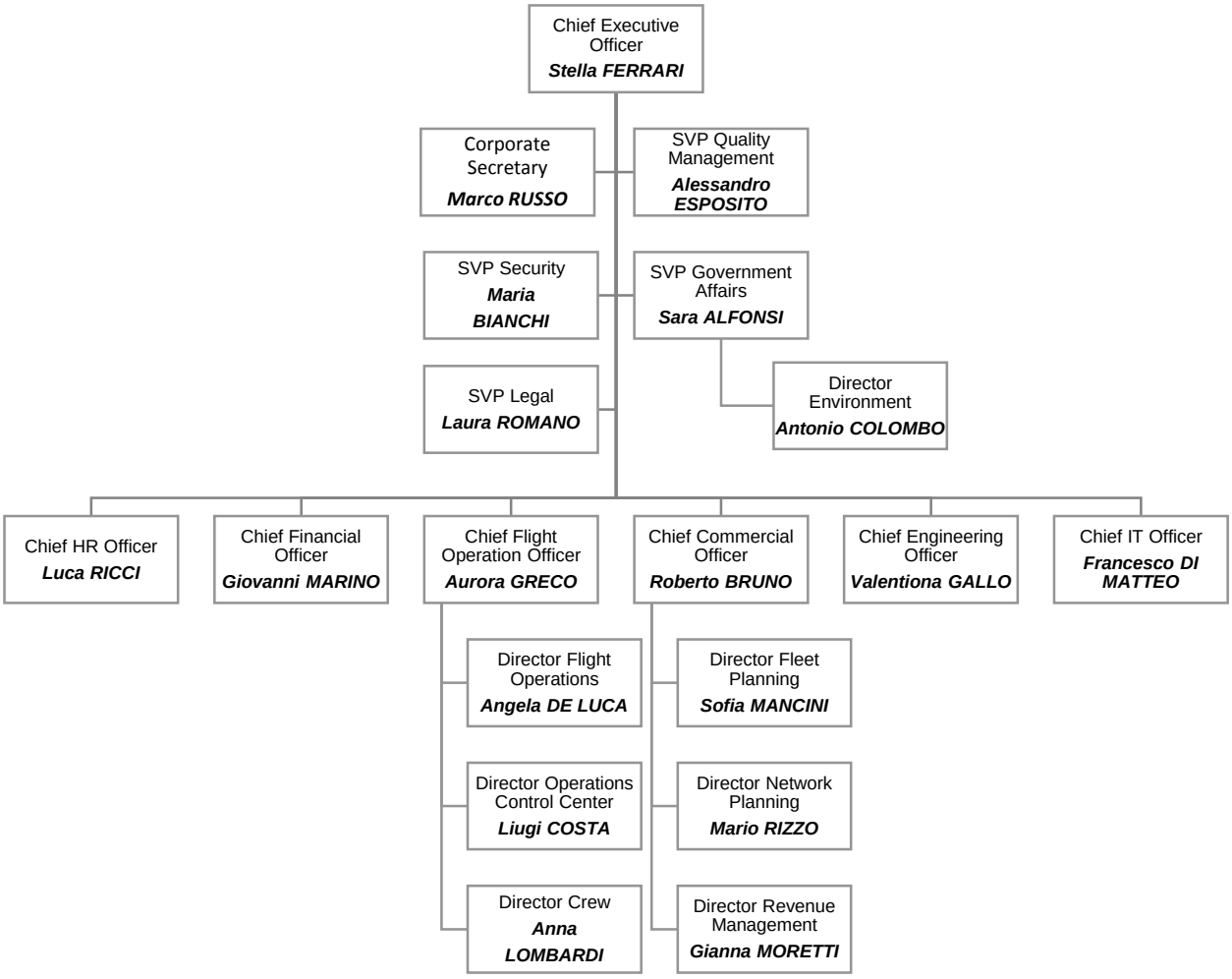
2. Corporate structure and governance

2.1 Ownership structure

Juliet Wings' shares are split between public and private shareholders.

Juliet Wings' wholly owns Juliet Sightseeing, a subsidiary with an Italian AOC, but no ICAO designator.

2.2 Corporate governance



3. Network

3.1 Scheduled services

Juliet Wings' current timetable lists the following schedules:

Flight	Origin	Destination	Frequency	Equipment
109	VRN	BCN	Daily	CS1
110	BCN	VRN	Daily	CS1
101	VRN	GVA	Daily	CS1
102	GVA	VRN	Daily	CS1
105	VRN	LIS	Daily	CS1
106	LIS	VRN	Daily	CS1
109	VRN	MUC	Daily	CS1
110	MUC	VRN	Daily	CS1
103	VRN	NCE	Daily	CS1
104	NCE	VRN	Daily	CS1
107	VRN	CDG	Daily	CS1
108	CDG	VRN	Daily	CS1

In 2022, Juliet Wings is planning to launch a number of new routes to European destinations.

3.2 Unscheduled operations

Juliet Sightseeing operates VFR sightseeing flights around Lake Garda as well as seasonal charter flights to ski resorts in South-East Switzerland.

4. Fleet

Registration	Aircraft type	Notes
I-ROMA	Bombardier C-Series CS100	
I-ROMB	Bombardier C-Series CS100	
I-ROMC	Bombardier C-Series CS100	
I-ROMD	Bombardier C-Series CS100	
I-ROME	EMB-110 BANDEIRANTE	Operated by Juliet Sightseeing
I-ROMF	EMB-110 BANDEIRANTE	Operated by Juliet Sightseeing

Juliet Wings expects to receive three Airbus A220-300 by the end of 2021.