国 际 民 用 航 空 组 织

工 作 文 件

A41-WP/14
EC/4
14/7/22

大会 — 第 41 届会议

经济委员会

议程项目 37：航空数据 — 监测和分析

关于包括 COVID-19 大流行后情景的最新长期业务量预测的报告

（由国际民航组织理事会提交）

执行摘要

本工作文件报告了根据大会第 A40-9 号决议在预测和规划方面所开展活动的情况。该决议要求理事会继续对单独一套长期的业务量预测（LTF）进行更新。COVID-19 大流行之前的长期业务量预测显示，从 2018 年到 2050 年，全球客运量的年均复合增长率（CAGR）为 4.2%，而依照 COVID-19 大流行之后长期业务量预测的中等情景，同期的年均复合增长率降至 3.6%。全球货运业务量将保持 3.5%的相同增长率。该文件还介绍了国际民航组织有关预测和规划的未来工作计划（作为国际民航组织 2023 年至 2025 年业务计划的运行计划产出 DEV 4 —“增强各国最大程度地利用航空数据/统计和长期业务量预测的能力”的一部分）。除其他外，计划每半年更新一次长期业务量预测，以尽最大可能发挥细化的长期业务量预测的效用，并持续完善计量经济学方法。

行动：请大会：

a) 审查第 2 段和第 3 段所载的国际民航组织完成的工作；

b) 核准第 4 段所载的本组织工作方案；和

c) 审议本文件所载的信息，以便更新大会第 A40-9 号决议：国际民航组织关于航空运输领域持续政策的综合声明。

战略目标:	本工作文件涉及战略目标 — *航空运输的经济发展*。
财务影响:	本文件中提及的活动将根据 2023 年至 2025 年经常方案预算和、或包括航空运输自愿基金（TRAF）在内的预算外捐助的可用资源情况进行。
参考文件:	Doc 10140 号文件：《大会有效决议》（截至 2019 年 10 月 4 日） Doc 10139 号文件：《大会第 40 届会议经济委员会的报告》 A40-WP/20-EC/5 号文件：关于最新长期业务量预测的报告 A41-WP/15-EC/5 号文件：国际民航组织统计方案和大数据分析 A41-WP/17-EC/7 号文件：国际民航组织关于航空运输领域持续政策的综合声明 国际民航组织 2023 年至 2025 年业务计划

1. 背景

1.1 自 2016 年制定国际民航组织单独一套长期业务量预测(LTF)以来，秘书处根据大会 A40-9 号决议(附录 E)，通过与航空数据和分析专家组(ADAP)下设的长期业务量预测多学科工作组(MDWG-LTF)[1]合作，对预测进行了定期更新。

1.2 提交给大会第 40 届会议的长期业务量预测使用 2015 年作为基线(参见 A40-WP/20-EC/5 号文件)。作为对 A40-9 号决议的后续行动，并应航空环境保护委员会(CAEP)的要求，在 2020 年初对这一长期业务量预测进行了更新，使用 2018 年作为基线，并将预测期延长至 2050 年(以下简称 COVID-19 前的长期业务量预测)。由于 COVID-19 大流行的重大影响，在 2021 年初进行了进一步的更新，以虑及大流行病各年估计的业务量下降和恢复途径，以及对长期预测的影响(以下简称 COVID-19 后的长期业务量预测)。

2. COVID-19 前的长期业务量预测

2.1 COVID-19 前的长期业务量预测是以 50 个航线组的年收入客公里数(RPK)和 6 个统计地区的年货运吨公里数(FTK)来表示。附录 A 概述了数据和模型规范。使用 RPK 和 FTK 的预测值来计算 10 年(2018-2028 年)、20 年(2018-2038 年)、30 年(2018-2048 年)和 32 年(2018-2050 年)期间客运和货运年均复合增长率(CAGR)。详细结果载于附录 B。

2.2 根据这一预测，从 2018 年到 2038 年，全球客运量预计将以每年 4.2%的速度增长。增长最快的前 15 个航线组主要是中西南亚的航线组，其中中西南亚 — 中东的年增长率估计最高，达 8.3%。非洲、中美洲/加勒比和中东内部及其之间的航线组则比照全球速度增长。成熟市场内部及其之间的航线组(如欧洲国内、北美和北亚)的增长率预测要低一些。

2.3 同期，全球货运量预计将以每年 3.5%的速度增长。中东地区的增长率最高，比全球估计值高出 2.7 个百分点，其次是非洲。亚洲/太平洋地区的增长速度预计与全球估计值几乎相同。北美和欧洲的增长率将略低于全球估计值，而拉丁美洲/加勒比地区的增长速度在所有地区中是最慢的，低于 2%。

3. COVID-19 后的长期业务量预测

3.1 可以肯定的是，由于 COVID-19 大流行的重大影响，COVID-19 前的长期业务量预测不再成立。鉴于围绕恢复的不确定性很高，COVID-19 后的长期业务量预测分为三种指示性情景，即中等、高端和低端情景，如**附录 C** 所述。

3.2 在更新客运长期业务量预测时，虽然 COVID-19 前的长期业务量预测模型中的变量系数保持不变，但采用了最新的社会经济预测，以反映出与 COVID-19 相关的实际国内生产总值(GDP)和人口的变化。此外，通过引入调整因子，使中等情景与国际航空运输协会(IATA)的预测假设保持一致，从而计入了大流行病对航空业务量的短期影响及其可能的恢复路径。按照中等情景，估计航空业务量将在

[1] 长期业务量预测多学科工作组的成员包括：加拿大、中国、法国、印度、肯尼亚、突尼斯、土耳其、英国、美国、国际机场理事会(ACI)、欧洲空中航行安全组织(EUROCONTROL)、国际航空运输协会(IATA)、航空航天业国际协调理事会(ICCAIA)和经济合作与发展组织的国际运输论坛(ITF-OECD)。

2024 年恢复到 2019 年的水平。

3.3 客运长期业务量预测结果列于附录 D。第一个表格提供了 COVID-19 前长期业务量预测（2018 年基线）和 COVID-19 后三种情景之间全球 RPK 年均复合增长率的比较。第二个表格列示了三种情景下按航线组划分的 32 年 RPK 年均复合增长率的比较。全球 32 年中等年均复合增长率为 3.6%，低于 COVID-19 前长期业务量预测估计的 4.2%。这一降低意味着 2020-2050 年期间全球经济损失高达 40 万亿美元，座位数量减少高达 100 万亿（以可用座位公里数计算）。

3.4 货运长期业务量预测也以类似于客运长期业务量预测的方式予以重新计算，使用带有最新经济预测的 COVID-19 前长期业务量预测模型，同时根据 MDWG-LTF 的意见投入和国际航协的信息，虑及 2020 年衰退和短期复苏的规模。

3.5 货运长期业务量预测结果列于附录 E。第一个表格提供了 COVID-19 前长期业务量预测（2018 年基线）和 COVID-19 后三种情景之间全球 FTK 年均复合增长率的比较。第二个表格列示了三种情景下按地区划分的 32 年 FTK 年均复合增长率的比较。全球 32 年中等年均复合增长率为 3.5%，与 COVID-19 前的长期业务量预测水平相似。

4. 今后的预测和规划工作

4.1 鉴于在恢复阶段市场条件不断变化，业务量波动很大，重要之处在于成员国和航空利害攸关方能够获得最新的预测，以满足其大流行病后的规划和实施需求。如果更频繁地更新长期业务量预测，将使成员国和利害攸关方能够更好地将运力与预期需求相匹配，从而减少因 COVID-19 大流行的各种不确定性所带来的风险。

4.2 最新的业务量预测对于有效交付国际民航组织所有战略目标的成果也是至关重要的，包括但不限于：对噪声、排放和微粒物质的未来趋势进行估计；在制定航空基础设施方案和计划以及航空系统组块升级（ASBU）时进行商业案例、成本效益分析、经济影响分析和成本有效性分析；建立与全球航空安全计划（GASP）、全球空中航行计划（GANP）、全球航空安保计划（GASeP）和适当监督体系相一致的评估和监测框架。

4.3 为了满足所有这些需求，国际民航组织利用其统计方案中的官方报告交通数据，并分析大数据来源（即广播式自动相关监视（ADS-B）和市场情报数据传输（MIDT）），继续对长期业务量预测进行更新（参见 A41-WP/15-EC/5 号文件）。将连同从外部来源获得的宏观经济数据（如国内生产总值和人口）一起使用这些数据。这些不同的数据库与长期业务量预测的计量经济学模型相结合，除了降低当前年度与预测起始年之间的滞后性外，还可以生成两年一次的预测更新。通过国际民航组织民用航空数据解决方案（iCADS）平台，将向成员国提供从机场、城市、国家到航线组在内的细化的预测更新（如航班、座位、客运和货运吨数）。

4.4 如国际民航组织 2023-2025 年业务计划所述，预测和规划领域未来工作的重点和优先事项（作为 DEV 4 产出 —“增强各国最大程度地利用航空数据/统计和长期业务量预测的能力”的一部分）将是：a) 通过一年两次的细化更新以及根据需要进行定制，最大程度地利用长期业务量预测；和 b) 通过与航空数据和分析专家组下设的长期业务量预测多学科工作组开展合作，不断完善计量经济学方法和数据

集。此外，本组织除其他外将更新持照航空人员（驾驶员、维修人员和空中交通管制员）预测。虑及电子商务货运呈指数级增长，国际民航组织将与经合发组织国际运输论坛、万国邮政联盟（UPU）和联合国贸易和发展会议（UNCTAD）协调制定一种方法，以预测航空运输模式的电子商务增长情况。

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APPENDIX A

DATA AND MODEL SPECIFICATION FOR PRE-COVID-19 LTF[2]

Passenger Forecasts

Demand for passenger air travel is measured by Revenue Passenger-Kilometres (RPKs). The historical time-series data set of RPKs by city-pair and carrier from 1995 to2018 for both international and domestic operations was used for the passenger forecasts.

The compilation of the data sets includes following sources:

a) *actual* traffic data reported by States to ICAO through the Air Transport Reporting Forms A, B and C, the coverage of which was over 90 per cent of passenger traffic and 95 per cent of freight traffic;

b) *actual* origin and destination passenger traffic data collected through the Market Intelligence Data Transfer (MIDT) big data; and

c) *estimated* traffic data based on the airline schedules published in the Official Airline Guide (OAG) and aircraft operations recorded in the Automatic Dependent Surveillance—Broadcast (ADS–B) big data, which were used to fill the gaps.

Similar to the previous LTF, passenger traffic data were segmented into 40 international and 10 domestic route groups. These 50 route groups were also assigned to six different "tiers" according to the income level and market maturity in the same manner as previous forecasts. The income thresholds to segregate the tiers were updated from the most recent World Bank data of low, lower-middle, upper-middle and high-income economies.

The model examines how passenger demand (passenger traffic in RPKs) is affected by real Gross Domestic Product (GDP) per capita and cost of travel (airfares), and predicts annual change in RPKs for each route group. The passenger forecasts model is as the following:

$$\Delta nlog\widehat{RPK\_PC}_{rt} = \sum_{i=1,j=1}^{6} \beta_i \left(T_j * \Delta nlogGDP\_PC_{rt}\right) + \beta_{Oil}\Delta nlog_{rt}Oil_{rt}Year\ Indicators$$

i: Tier Coefficient Index, j: Tier Index, t: Time, r: Route Group

[2] More details about the methodology followed by the MDWG-LTF can be found at this page: https://www.icao.int/sustainability/Pages/eap-fp-guidance.aspx

Economic and demographic data were sourced from the International Transport Forum at the Organization for Economic Co-operation and Development (ITF-OECD). This includes real GDP per capita in 2011 constant USD, which varies from the data in 2005 constant USD used for the previous forecasts.

Freight Forecasts

Demand for freight is measured by Freight Tonne-Kilometres (FTKs). The historical time-series data set of FTKs at the regional level were extended from 1995–2015 to 1995–2018 for both international and domestic operations. The data sets were compiled from the similar sources as for the passenger forecasts with the exception of MIDT data.

Economic data was taken from the same source as the passenger traffic forecasts and aggregated by region to preserve the relatively large heterogeneity amongst the different regions in terms of the relationship between FTKs and real GDP. Forecasting model remains similar to previous freight forecasts. The freight forecasts model is as the following:

$$logFTK_{Rt} = \widehat{\alpha +} \beta logGDP_{Rt}$$

t: Time, R: Region

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APPENDIX B

PRE-COVID-19 LTF

PASSENGER TRAFFIC FORECASTS (RPKs)

Route Group	10 Year (2018-2028)	20 Year (2018-2038)	30 Year (2018-2048)	32 Year (2018-2050)
Africa	4.6%	5.0%	5.2%	5.3%
Africa - Asia/Pacific	5.8%	5.3%	5.1%	5.1%
Africa - Middle East	4.6%	5.2%	5.5%	5.6%
Africa - North America	1.8%	2.2%	2.6%	2.7%
Africa & Middle East - Central America/Caribbean	4.2%	4.7%	5.3%	5.5%
Africa & Middle East - South America	4.2%	4.6%	5.0%	5.0%
Central America/Caribbean	3.5%	3.9%	4.1%	4.1%
Central America/Caribbean - Europe	3.7%	3.9%	3.7%	3.7%
Central America/Caribbean - North America	3.2%	3.4%	3.3%	3.3%
Central America/Caribbean - South America	4.3%	4.5%	4.2%	4.2%
China & South West Asia - North Asia	8.7%	7.7%	6.9%	6.7%
China & South West Asia - Pacific South East Asia	6.5%	6.2%	6.2%	6.1%
Central Southwest Asia	6.9%	6.0%	5.2%	5.1%
Central Southwest Asia - Europe	5.2%	4.7%	4.5%	4.5%
Central Southwest Asia - Middle East	8.0%	8.3%	8.2%	8.2%
Central Southwest Asia - North America	5.9%	4.9%	4.5%	4.4%
Europe	2.6%	2.8%	3.0%	3.0%
Europe - Middle East	3.4%	3.2%	3.2%	3.3%
Europe - North Africa	3.6%	4.0%	4.2%	4.3%
Europe - North America	2.5%	2.7%	2.9%	2.9%
Europe - North Asia	2.5%	2.7%	2.9%	2.9%
Europe - Pacific South East Asia	4.3%	4.2%	4.1%	4.0%
Europe - South America	3.6%	3.3%	3.3%	3.3%
Europe - Sub Saharan Africa	1.9%	2.2%	2.5%	2.6%
Intra Africa	4.6%	5.0%	5.2%	5.3%
Intra Central America/Caribbean	3.5%	3.9%	4.1%	4.1%
Intra China & South West Asia	7.0%	5.9%	5.1%	5.0%
Intra Europe	2.6%	2.8%	3.0%	3.0%

Intra Middle East	3.6%	3.9%	4.0%	4.0%
Intra North America	2.3%	2.5%	2.7%	2.7%
Intra North Asia	2.2%	2.5%	2.5%	2.5%
Intra Pacific South East Asia	5.1%	5.1%	5.2%	5.2%
Intra South America	3.9%	3.6%	3.5%	3.4%
Latin America/Caribbean - China	6.5%	5.5%	4.8%	4.7%
Latin America/Caribbean - North Asia & Pacific South East Asia	5.0%	4.5%	4.2%	4.2%
Middle East	3.6%	3.9%	4.0%	4.0%
Middle East - North America	2.8%	2.8%	2.9%	3.0%
Middle East - North Asia & Pacific South East Asia	4.4%	4.1%	4.0%	4.0%
North America	2.3%	2.5%	2.7%	2.7%
North America - North Asia	2.3%	2.5%	2.7%	2.7%
North America - Pacific South East Asia	4.0%	4.1%	3.9%	3.9%
North America - South America	3.3%	3.1%	3.1%	3.1%
North Asia	2.2%	2.5%	2.5%	2.5%
North Asia - Pacific South East Asia	4.7%	4.7%	4.4%	4.3%
Pacific South East Asia	5.1%	5.1%	5.2%	5.2%
South America	3.9%	3.6%	3.5%	3.4%
World	**4.2%**	**4.2%**	**4.2%**	**4.2%**

FREIGHT TRAFFIC FORCASTS (FTKs)

Region	10 Year (2018-2028)	20 Year (2018-2038)	30 Year (2018-2048)	32 Year (2018-2050)
Middle East	6.1%	6.2%	6.1%	6.1%
Asia and Pacific	4.1%	3.5%	3.1%	3.0%
Africa	3.4%	3.9%	4.1%	4.1%
North America	3.0%	3.1%	3.2%	3.2%
Europe	1.4%	1.7%	1.9%	1.9%
Latin America/Caribbean	0.8%	1.1%	1.2%	1.2%
World Total	**3.5%**	**3.5%**	**3.5%**	**3.5%**

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APPENDIX C

POST-COVID-19 FORECAST SCENARIO ASSUMPTIONS

Passenger LTF Assumptions

Commercial Passenger Market							
Scenario/Assumption	**Vaccine**	**Global Economic Activity**	**Regional Variation**	**Route Variation -- Domestic/International**	**Business Travel Demand**	**Return to 2019 RPKs**	**Return to pre-crisis Trend (levels)**
High	Announced early 2021 Available/wide spread use mid/late 2021	V-shaped recovery -- back to 2019 levels in early 2021	--Solid and sustained global recovery --Asia (China) pick-up quickly in 2021 --Recovery in traffic tracks economic growth (NA/EUR follow Asia)	--Domestic traffic responds quickly particularly in U.S./Europe/Asia (China) --International lags somewhat (2022) --solid income growth drives leisure travel	-- Business Travel growth resumes late 2021 --Returns to normal levels in 2022 -- Drives solid recovery in both markets (B2B and conferences)	2023	Yes -- around 2030
Mid	Announced mid-2021 Available/wide spread use early/mid 2022	Return to 2019 levels in late 2021/2022 (running behind the optimistic outlook)	-- Recovery lags economic growth (some behavioral changes/lower incomes) -- Resumption in domestic traffic first -- International lags --China/Asia leads the recovery, followed by NA and EUR	--Domestic traffic growth resumes in 2022 U.S./Europe/Asia (China) --International lags (2023) -- Lower incomes reduce leisure travel	--Business Travel growth resumes in late 2022/2023, but never fully returns to normal levels (i.e., some permanent reduction due to substitutes -- Zoom, etc.)	2024	No -- permanent shift due to substitution of online technologies for business and changes in household vacation/travel patterns

Commercial Passenger Market							
Scenario/Assumption	**Vaccine**	**Global Economic Activity**	**Regional Variation**	**Route Variation -- Domestic/International**	**Business Travel Demand**	**Return to 2019 RPKs**	**Return to pre-crisis Trend (levels)**
Low	Announced early 2022 Available/wide spread use late 2022/early 2023	Return to 2019 levels by 2023/2024	--Recovery lags economic growth -- resumption in domestic traffic slow to gain traction --International lags further behind --China/Asia and developing nations lead recovery. NA and EUR lag.	--Domestic traffic resumes growth in 2024 Asia (China) --International lags (2025) -- Lower incomes reduce leisure travel	--Business travel does not fully recover --Permanent and sustained loss in domestic/international travel as a result.	2027	No -- permanent shift due to substitution of online technologies for business and changes in household vacation/travel patterns

Freighter LTF Assumptions

Freighter Market					
Scenario/Assumption	**Vaccine**	**Economic Activity**	**Regional Variation**	**Return to 2019 RTKs**	**Return to pre-crisis Trend (levels)**
High	Announced early 2021 Available/wide spread use mid/late 2021	V-shaped recovery -- back to 2019 levels in early 2021	Regional variation will depend upon differences in regional economic activity -- Pacific/Asia & Asia/Middle East will lead, followed by North America/Europe	2021	Yes
Mid	Announced mid-2021 Available/wide spread use early/mid 2022	Return to 2019 levels in late 2021/2022 (running behind the optimistic outlook)	Regional variation will depend upon differences in regional economic activity -- Pacific/Asia & Asia/Middle East will lead, followed by North America/Europe	2022	Yes

Freighter Market					
Scenario/Assumption	**Vaccine**	**Economic Activity**	**Regional Variation**	**Return to 2019 RTKs**	**Return to pre-crisis Trend (levels)**
Low	Announced early 2022 Available/wide spread use late 2022/early 2023	Return to 2019 levels by 2023/2024	Regional variation will depend upon differences in regional economic activity -- Pacific/Asia & Asia/Middle East will lead, followed by North America/Europe	2023	Dependent upon economic forecast

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APPENDIX D

POST-COVID-19 PASSENGER LTF

Global CAGR RPK Comparison

	10 Year (2018-2028)	20 Year (2018-2038)	30 Year (2018-2048)	32 Year (2018-2050)
COVID-19 : Low	1.2%	2.4%	2.8%	2.9%
COVID-19 : Mid	2.6%	3.3%	3.5%	3.6%
COVID-19 : High	3.6%	4.1%	4.2%	4.2%
2018 LTF	4.2%	4.2%	4.2%	4.2%

32-Year CAGR RPK Comparison by Route Group

Route Group	2018 LTF	COVID-19: High	COVID-19: Mid	COVID-19: Low
Africa	5.3%	5.0%	4.5%	4.0%
Africa - Asia/Pacific	5.1%	4.9%	4.3%	3.5%
Africa - Middle East	5.6%	5.2%	4.6%	3.8%
Africa - North America	2.7%	3.1%	2.5%	1.7%
Africa & Middle East - Central America/Caribbean	5.5%	4.8%	4.3%	3.6%
Africa & Middle East - South America	5.0%	4.7%	4.1%	3.3%
Central America/Caribbean	4.1%	3.9%	3.2%	2.8%
Central America/Caribbean – Europe	3.7%	3.8%	3.2%	2.6%
Central America/Caribbean - North America	3.3%	3.7%	3.0%	2.1%
Central America/Caribbean - South America	4.2%	3.9%	3.3%	2.6%
China – Europe	4.2%	4.0%	3.4%	2.7%
China - Middle East	4.7%	4.5%	3.8%	3.0%
China - North America	4.3%	4.2%	3.5%	2.7%
China & South West Asia - North Asia	6.7%	6.3%	5.5%	4.4%
China & South West Asia - Pacific South East Asia	6.1%	5.9%	5.2%	4.4%
China/Mongolia	4.7%	5.0%	4.3%	3.4%
Europe	3.0%	3.1%	2.7%	2.3%
Europe - Middle East	3.3%	3.3%	2.7%	2.2%
Europe - North Africa	4.3%	4.4%	3.8%	3.1%

Europe - North America	2.9%	3.2%	2.6%	2.1%
Europe - North Asia	2.9%	3.0%	2.5%	2.2%
Europe - Pacific South East Asia	4.0%	4.1%	3.5%	2.8%
Europe - South America	3.3%	3.3%	2.7%	2.2%
Europe - South West Asia	5.0%	5.0%	4.4%	3.7%
Europe - Sub Saharan Africa	2.6%	2.8%	2.3%	1.9%
Intra Africa	5.3%	5.0%	4.5%	4.0%
Intra Central America/Caribbean	4.1%	3.9%	3.2%	2.8%
Intra China & South West Asia	5.0%	4.8%	4.2%	3.4%
Intra Europe	3.0%	3.1%	2.7%	2.3%
Intra Middle East	4.0%	3.6%	3.0%	2.5%
Intra North America	2.7%	3.1%	2.5%	1.8%
Intra North Asia	2.5%	2.6%	2.2%	1.8%
Intra Pacific South East Asia	5.2%	4.9%	4.3%	3.6%
Intra South America	3.4%	3.2%	2.7%	2.2%
Latin America/Caribbean – China	4.7%	4.5%	3.9%	3.1%
Latin America/Caribbean - North Asia & Pacific South East Asia	4.2%	3.9%	3.3%	2.7%
Middle East	4.0%	3.6%	3.0%	2.5%
Middle East - North America	3.0%	3.3%	2.6%	1.8%
Middle East - North Asia & Pacific South East Asia	4.0%	3.8%	3.2%	2.5%
Middle East - South West Asia	8.7%	8.1%	7.3%	6.2%
North America	2.7%	3.1%	2.5%	1.8%
North America - North Asia	2.7%	3.0%	2.4%	1.8%
North America - Pacific South East Asia	3.9%	4.2%	3.5%	2.5%
North America - South America	3.1%	3.3%	2.6%	1.9%
North America - South West Asia	5.2%	5.3%	4.6%	3.5%
North Asia	2.5%	2.6%	2.2%	1.8%
North Asia - Pacific South East Asia	4.3%	4.2%	3.6%	2.9%
Pacific South East Asia	5.2%	4.9%	4.3%	3.6%
South America	3.4%	3.2%	2.7%	2.2%
South West Asia	6.8%	6.4%	5.8%	4.9%
World	4.2%	4.2%	3.6%	2.9%

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APPENDIX E

POST-COVID-19 FREIGHTER LTF

Global CAGR FTK Comparison

	10 Year (2018-2028)	20 Year (2018-2038)	30 Year (2018-2048)	32 Year (2018-2050)
COVID-19 : Low	2.3%	2.5%	2.6%	2.6%
COVID-19 : Mid	3.5%	3.4%	3.5%	3.5%
COVID-19 : High	4.1%	4.1%	4.2%	4.2%
2018 LTF	3.5%	3.5%	3.5%	3.5%

32-Year CAGR FTK Comparison by region

Region	2018 LTF	COVID-19: High	COVID-19: Mid	COVID-19: Low
Middle East	6.1%	7.2%	6.0%	4.4%
Asia and Pacific	3.0%	3.5%	3.1%	2.6%
Africa	4.1%	4.6%	3.8%	3.0%
North America	3.2%	3.9%	3.2%	2.1%
Europe	1.9%	2.4%	1.9%	1.5%
Latin America/Caribbean	1.2%	1.5%	1.2%	0.8%
World Total	**3.5%**	**4.2%**	**3.5%**	**2.6%**

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