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AVIATION PERSONNEL FORECASTS

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Chief Aviation Data and Analysis ICAO

Shenzhen / 13th December 2018





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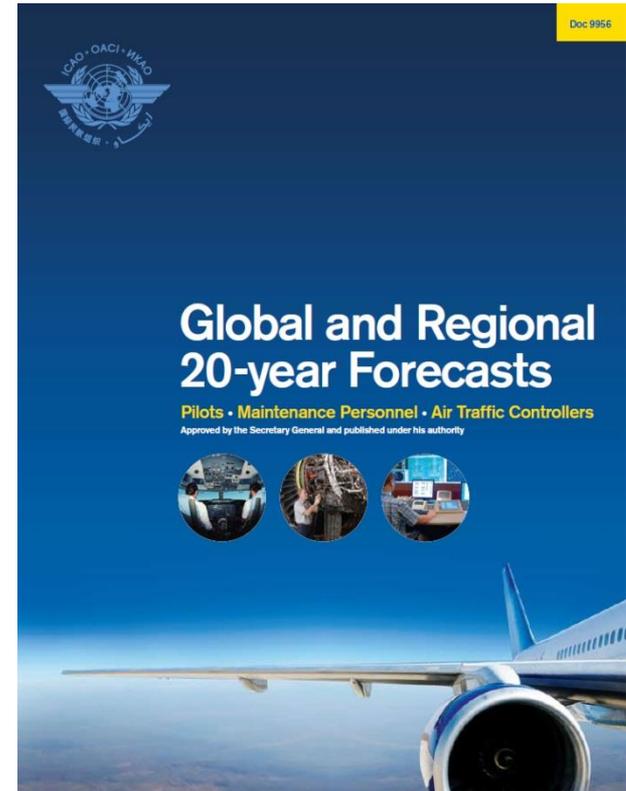
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39th Assembly Outcome regarding Personnel Forecasts

**Report on the Development of a single set of harmonized
long-term forecasts (A39-WP/64)**

Update global and regional 20-year forecasts for pilots,
maintenance personnel and air traffic controllers (DOC 9956)
in April 2018 to meet the needs of the ICAO Next Generation
Aviation Professional (NGAP) programme.





Aviation Data and Analysis Panel met in March 2017

The Panel recommended that:

- a) the Secretariat should continue its work in the development of the forecast of licensed aviation professionals within the timeline proposed and with the help of the MDWG-LTF and the TFGs; and
- b) the Secretariat should consider other sources of information available, which can supplement existing ICAO data and results of the survey.

Traffic forecasts

Endorsed by A39

Fleet forecasts

Developed using Traffic
Forecasts

ICAO Survey

New Personnel Forecasts



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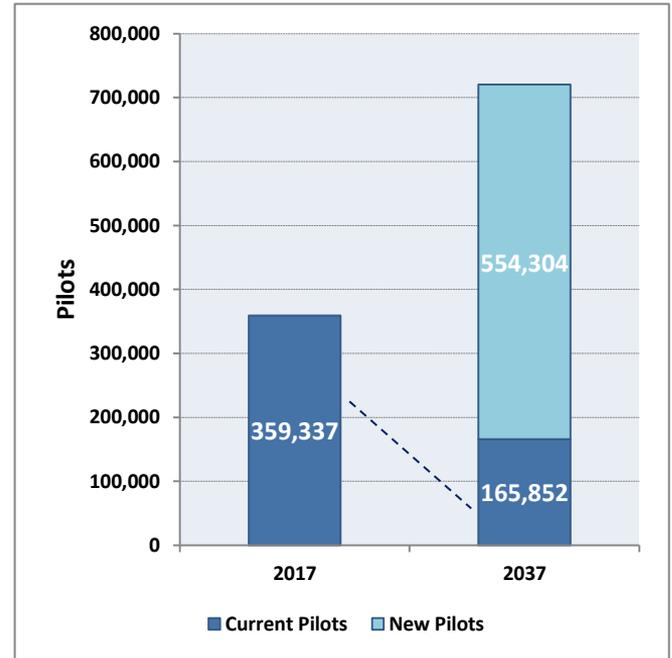
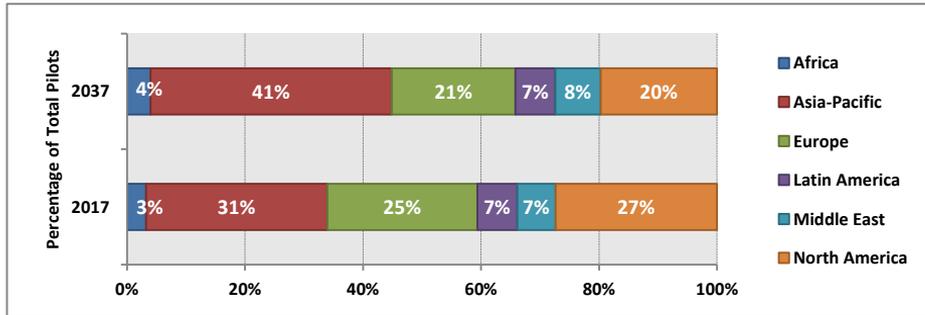
Pilots





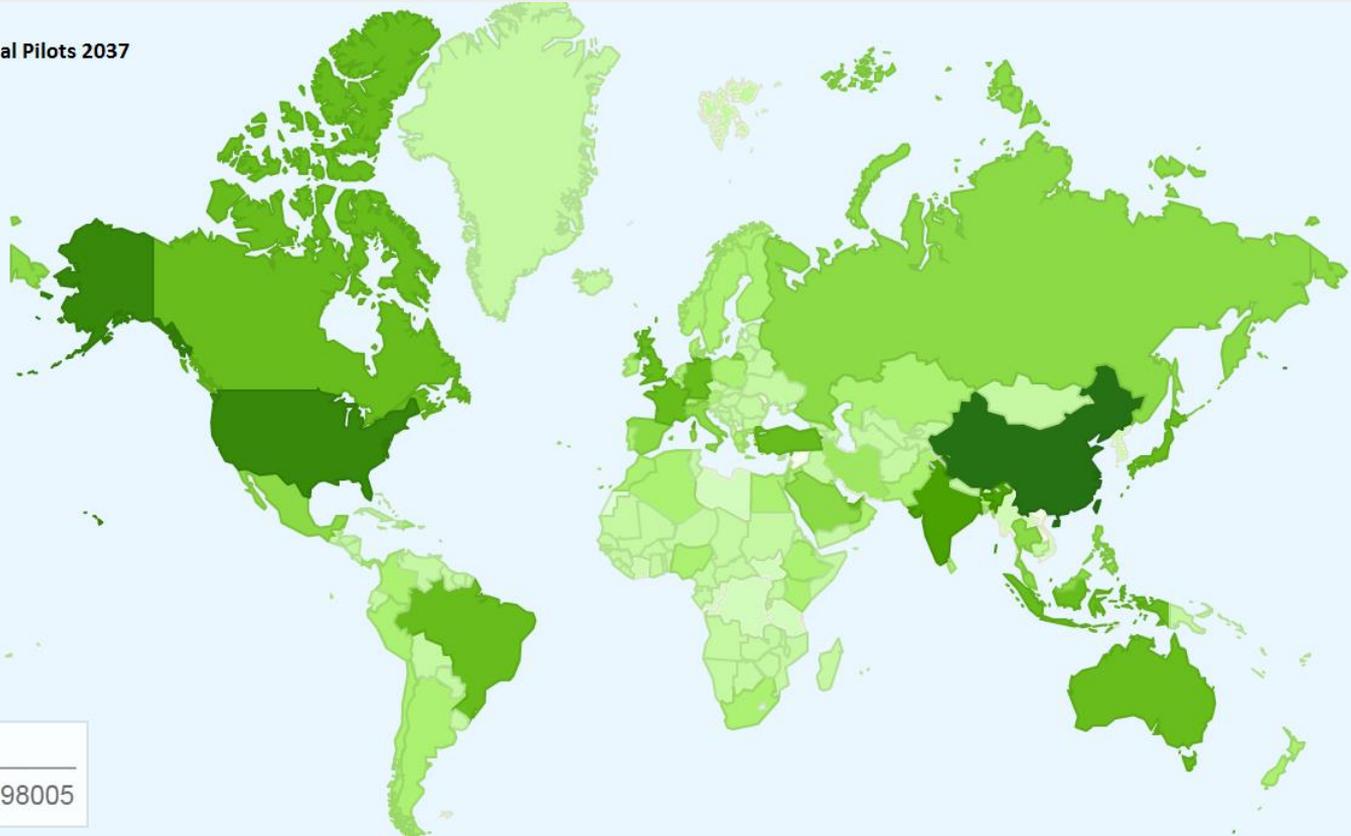
Commercial Pilot Demand Forecasts

Region	2017 Total	2037 Total	2037 New*
Africa	11,610	28,915	23,457
Asia/Pacific	110,461	294,362	244,975
Europe	91,393	150,926	111,236
Latin America/Caribbean	24,189	48,454	36,374
Middle East	23,374	55,755	44,692
North America	98,310	141,744	93,570
World	359,337	720,156	554,304





Demand for New Commercial Pilots 2037





Commercial Pilot Demand Forecasts

Top 10 Countries Driving the Growth in Demand for new Pilots

Country	Flag	Rank 2017	Pilots 2017	% of World 2017	Rank 2037	Pilots 2037	% of World 2037	Demand for new Pilots* 2037
China		2	41,979	12.2%	1	115,876	16.7%	98,005
United States		1	81,366	23.6%	2	115,023	16.5%	74,811
India		8	9,346	2.7%	3	35,701	5.1%	31,849
United Kingdom		3	12,387	3.6%	4	22,600	3.2%	17,058
United Arab Emirates		9	9,330	2.7%	5	20,467	2.9%	16,031
Australia		13	7,711	2.2%	6	18,552	2.7%	14,827
Canada		5	10,285	3%	7	18,234	2.6%	13,176
Japan		4	10,745	3.1%	8	17,558	2.5%	12,403
France		10	9,329	2.7%	9	15,708	2.3%	11,445
Germany		7	9,485	2.8%	10	14,944	2.1%	10,635





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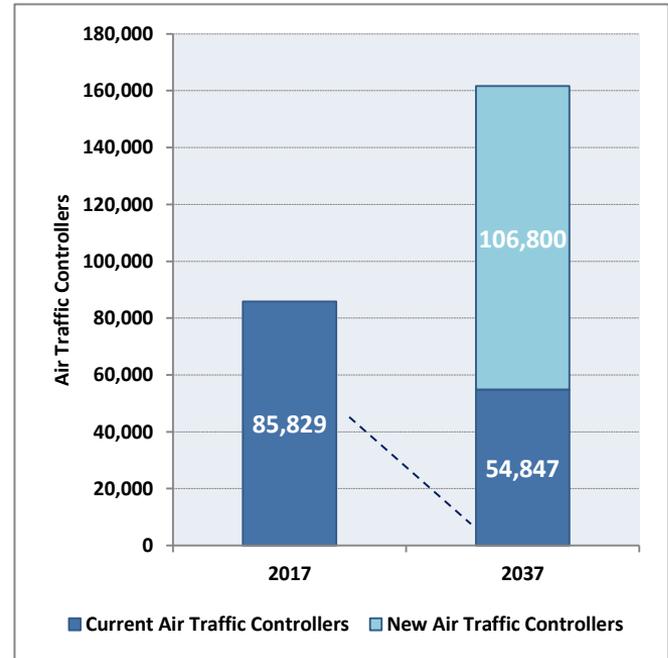
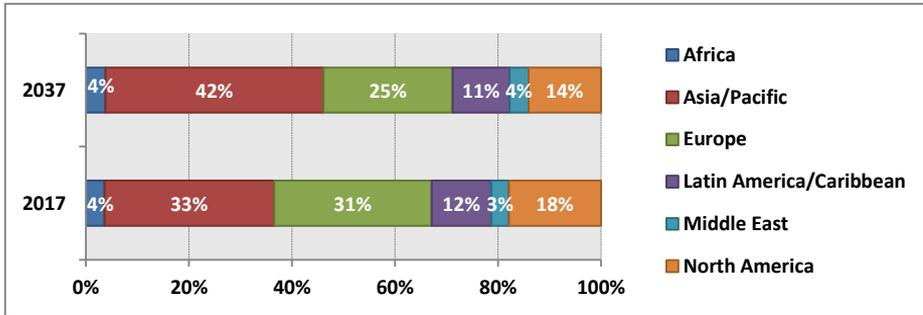
Air Traffic Controllers





Air Traffic Controller Demand Forecasts

Region	2017 Total	2037 Total	2037 New*
Africa	3,098	6,190	4,203
Asia/Pacific	28,270	68,427	50,732
Europe	26,249	40,498	23,540
Latin America/Caribbean	9,962	17,895	11,418
Middle East	2,940	5,933	4,056
North America	15,310	22,704	12,852
World	85,829	161,647	106,800





Air Traffic Controller Demand Forecasts

Top 10 Countries Driving the Growth in Demand for new Air Traffic Controllers

Country	Flag	Rank 2017	ATC 2017	% of World 2017	Rank 2037	ATC 2037	% of World 2037	Demand for new ATC 2037
China		2	9,804	11.4%	1	26,021	16.1%	20,021
United States		1	13,868	16.2%	2	20,445	12.6%	11,522
India		11	2,229	2.6%	3	8,586	5.3%	7,234
United Kingdom		3	4,392	5.1%	4	7,292	4.5%	4,470
Australia		10	2,239	2.6%	5	4,852	3%	3,436
Brazil		5	3,182	3.7%	6	5,337	3.3%	3,237
France		7	2,880	3.4%	7	4,667	2.9%	2,795
Turkey		13	1,914	2.2%	8	3,686	2.3%	2,463
Germany		4	3,273	3.8%	9	4,516	2.8%	2,403
Japan		6	2,997	3.5%	10	4,364	2.7%	2,394



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Maintenance Technicians and Cabin Crew

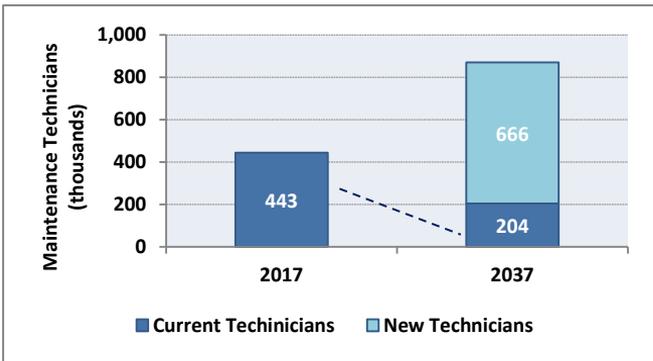




Maintenance Technicians and Cabin Crew Demand Forecasts

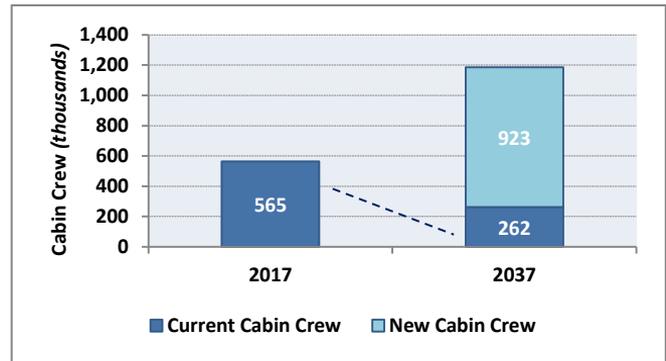
Maintenance Technicians

Region	2017 Total	2037 Total	2037 New*
Africa	14,081	35,008	28,407
Asia/Pacific	132,910	354,931	295,572
Europe	114,084	181,408	132,690
Latin America/Caribbean	30,310	59,869	44,734
Middle East	24,718	59,501	47,760
North America	127,174	179,015	116,827
World	443,276	869,732	665,990



Cabin Crew

Region	2017 Total	2037 Total	2037 New*
Africa	18,660	46,239	37,452
Asia/Pacific	182,215	484,718	402,826
Europe	139,110	250,080	187,882
Latin America/Caribbean	36,080	74,644	56,719
Middle East	49,559	116,771	93,435
North America	139,540	213,096	144,864
World	565,163	1,185,548	923,179





Maintenance Technicians and Cabin Crew Demand Forecasts

Top 10 Countries Driving the Growth in Demand for new Technicians and Cabin Crew

Country	Flag	Maintenance Technicians 2017	Cabin Crew 2017	Maintenance Technicians 2037	Cabin Crew 2037	New Maintenance Technicians 2037	New Cabin Crew 2037
China		52,062	63,784	142,617	179,608	120,468	152,425
United States		100,512	124,328	139,876	182,631	90,053	121,804
India		11,404	14,488	43,358	56,670	38,663	50,695
United Kingdom		14,198	22,107	24,977	43,368	18,664	33,356
United Arab Emirates		9,111	21,938	20,686	45,916	16,385	35,389
Australia		8,851	13,609	21,189	32,999	16,909	26,451
Japan		11,724	21,102	18,206	37,684	12,644	27,371
Canada		12,552	15,140	21,172	30,343	14,959	22,973
France		11,157	15,226	18,368	26,959	13,288	19,962
Germany		11,085	16,434	17,023	27,319	12,015	19,779



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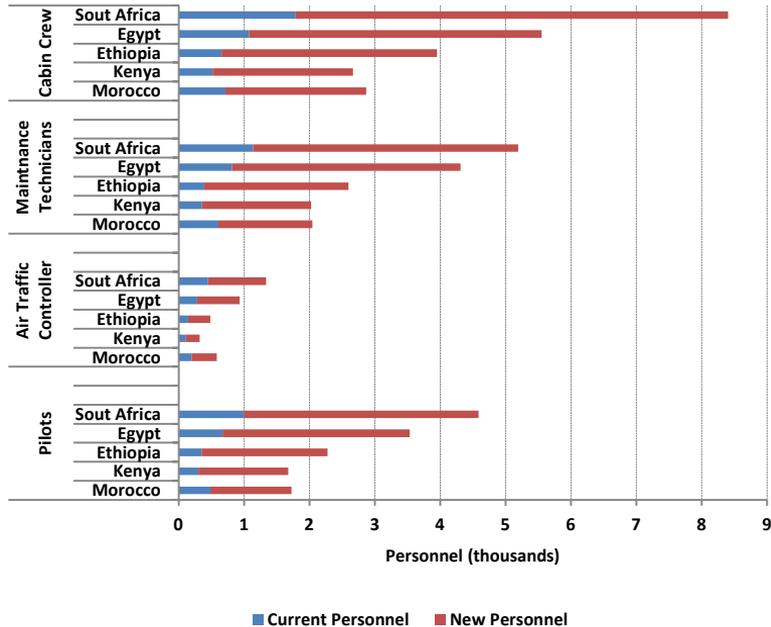
Regional and Global Personnel Summary





Africa (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
Sout Africa		2,025	4,585	3,589
Egypt		1,386	3,530	2,859
Ethiopia		741	2,279	1,927
Kenya		694	1,675	1,372
Morocco		1,014	1,724	1,238

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
Sout Africa		692	1,336	887
Egypt		443	935	652
Ethiopia		225	482	339
Kenya		162	323	219
Morocco		312	585	385

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
Sout Africa		2,300	5,192	4,053
Egypt		1,677	4,312	3,495
Ethiopia		810	2,598	2,209
Kenya		815	2,027	1,672
Morocco		1,265	2,046	1,439

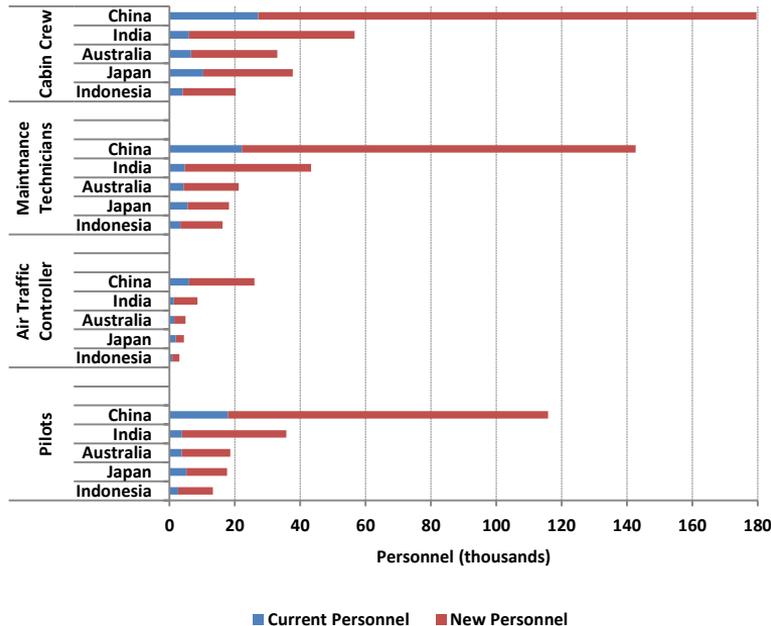
Cabin Crew

Country	Flag	2017	2037 Total	2037 New
Sout Africa		3,694	8,405	6,616
Egypt		2,236	5,551	4,478
Ethiopia		1,415	3,954	3,295
Kenya		1,150	2,667	2,150
Morocco		1,499	2,868	2,151



Asia/Pacific (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
China		41,979	115,876	98,005
India		9,346	35,701	31,849
Australia		7,711	18,552	14,827
Japan		10,745	17,558	12,403
Indonesia		5,794	13,232	10,581

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
China		9,804	26,021	20,021
India		2,229	8,586	7,234
Australia		2,239	4,852	3,436
Japan		2,997	4,364	2,394
Indonesia		1,302	2,987	2,164

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
China		52,062	142,617	120,468
India		11,404	43,358	38,663
Australia		8,851	21,189	16,909
Japan		11,724	18,206	12,644
Indonesia		7,176	16,210	12,930

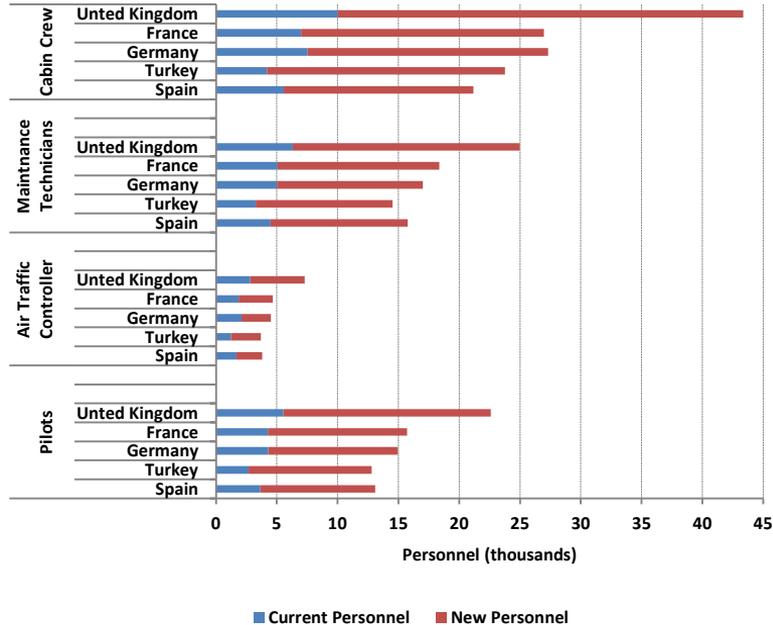
Cabin Crew

Country	Flag	2017	2037 Total	2037 New
China		63,784	179,608	152,425
India		14,488	56,670	50,694
Australia		13,609	32,999	26,451
Japan		21,102	37,684	27,372
Indonesia		8,598	20,299	16,325



Europe (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
United Kingdom		12,387	22,600	17,058
France		9,329	15,708	11,445
Germany		9,485	14,944	10,635
Spain		8,533	13,094	9,446
Turkey		6,191	12,814	10,141

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
United Kingdom		4,392	7,292	4,470
France		2,880	4,667	2,795
Germany		3,273	4,516	2,403
Spain		2,612	3,805	2,120
Turkey		1,914	3,686	2,463

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
United Kingdom		14,198	24,977	18,665
France		11,157	18,368	13,288
Germany		11,085	17,023	12,015
Spain		10,581	15,779	11,281
Turkey		7,628	14,530	11,254

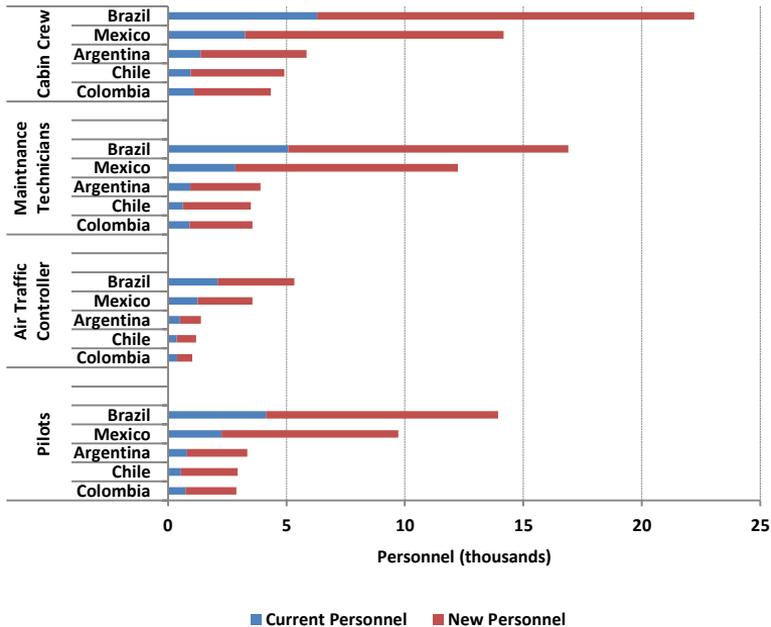
Cabin Crew

Country	Flag	2017	2037 Total	2037 New
United Kingdom		22,107	43,368	33,356
Germany		16,434	27,319	19,779
France		15,226	26,959	19,962
Spain		12,855	21,163	15,590
Turkey		9,570	23,770	19,582



Latin America/Caribbean (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
Brazil		7,723	13,939	9,807
Mexico		4,836	9,726	7,468
Argentina		1,577	3,347	2,548
Chile		1,104	2,937	2,393
Colombia		1,527	2,882	2,145

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
Brazil		3,182	5,337	3,237
Mexico		1,945	3,562	2,308
Argentina		769	1,392	894
Chile		560	1,183	818
Colombia		597	1,027	639

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
Brazil		9,437	16,900	11,827
Mexico		6,116	12,237	9,389
Argentina		1,846	3,907	2,969
Chile		1,277	3,493	2,859
Colombia		1,882	3,559	2,650

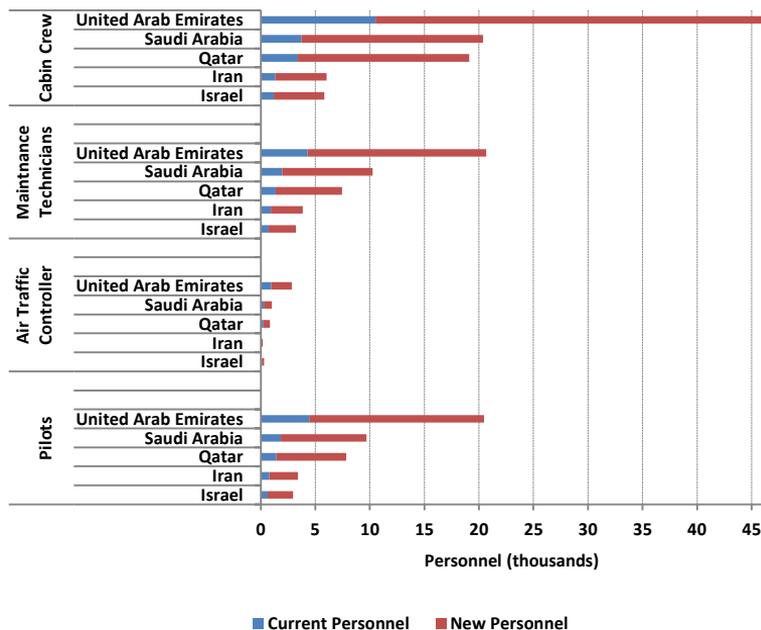
Cabin Crew

Country	Flag	2017	2037 Total	2037 New
Brazil		11,988	22,212	15,922
Mexico		6,927	14,170	10,921
Argentina		2,745	5,854	4,478
Chile		1,970	4,912	3,955
Colombia		2,273	4,334	3,229



Middle East (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
United Arab Emirates		9,330	20,467	16,031
Saudi Arabia		3,787	9,704	7,874
Qatar		3,117	7,846	6,431
Iran		1,627	3,410	2,628
Israel		1,322	2,954	2,321

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
United Arab Emirates		1,476	2,836	1,894
Saudi Arabia		445	1,007	721
Qatar		400	843	588
Iran		124	203	124
Israel		154	295	197

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
United Arab Emirates		9,111	20,686	16,385
Saudi Arabia		4,015	10,250	8,285
Qatar		2,964	7,454	6,092
Iran		1,909	3,864	2,947
Israel		1,475	3,237	2,523

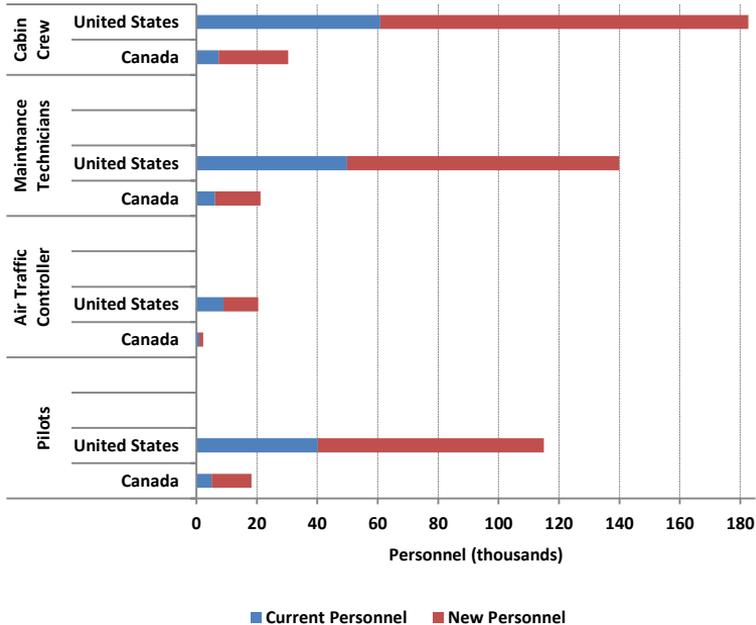
Cabin Crew

Country	Flag	2017	2037 Total	2037 New
United Arab Emirates		21,938	45,916	35,389
Saudi Arabia		7,898	20,371	16,630
Qatar		7,579	19,102	15,710
Iran		2,787	6,042	4,694
Israel		2,515	5,816	4,634



North America (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
United States		81,366	115,023	74,811
Canada		10,285	18,234	13,176

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
United States		13,868	20,445	11,522
Canada		1,434	2,249	1,326

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
United States		100,512	139,876	90,053
Canada		12,552	21,172	14,958

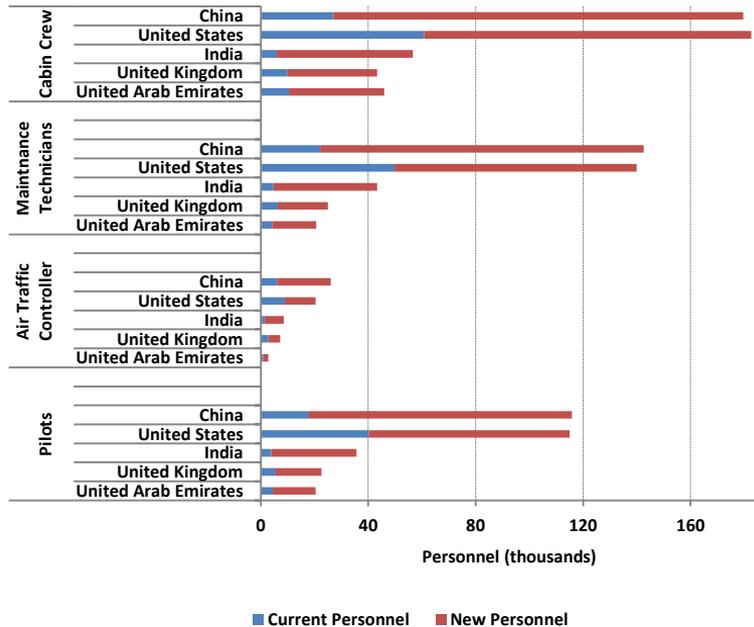
Cabin Crew

Country	Flag	2017	2037 Total	2037 New
United States		124,328	182,631	121,804
Canada		15,140	30,343	22,973



World (Top 5 Countries driving the demand for new personnel)

Personnel Forecast 2037



Pilots

Country	Flag	2017	2037 Total	2037 New
China		41,979	115,876	98,006
United States		81,366	115,023	74,811
India		9,346	35,701	31,849
United Kingdom		12,387	22,600	17,058
United Arab Emirates		9,330	20,467	16,031

Air Traffic Controllers

Country	Flag	2017	2037 Total	2037 New
China		9,804	26,021	20,022
United States		13,868	20,445	11,521
India		2,229	8,586	7,234
United Kingdom		4,392	7,292	4,470
United Arab Emirates		1,476	2,836	1,894

Maintenance Technicians

Country	Flag	2017	2037 Total	2037 New
China		52,062	142,617	120,468
United States		100,512	139,876	90,053
India		11,404	43,358	38,663
United Kingdom		14,198	24,977	18,664
United Arab Emirates		9,111	20,686	16,385

Cabin Crew

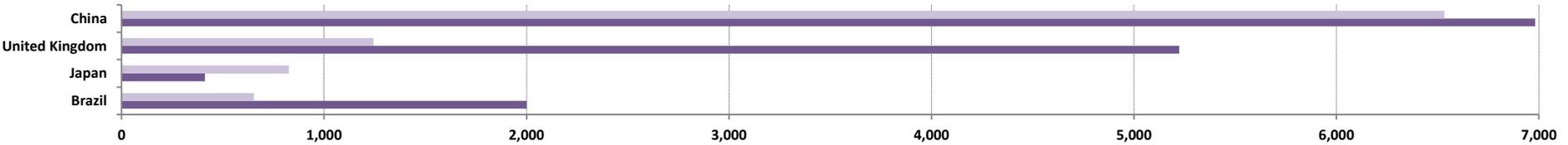
Country	Flag	2017	2037 Total	2037 New
China		63,784	179,608	152,425
United States		124,328	182,631	121,804
India		14,488	56,670	50,695
United Kingdom		22,107	43,368	33,356
United Arab Emirates		21,938	45,916	35,389



Training Capacity

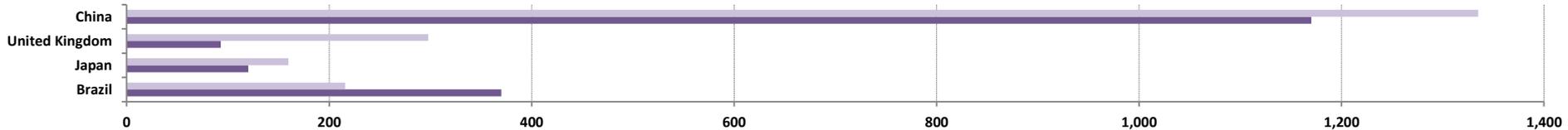
Pilots

20 Years Annual Capacity to Meet Demand Current Annual Capacity



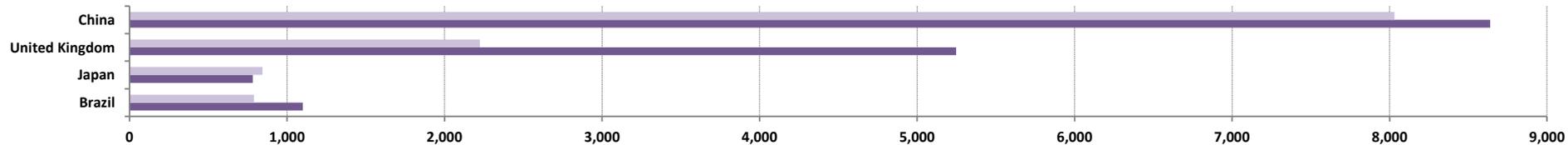
Air Traffic Controllers

20 Years Annual Capacity to Meet Demand Current Annual Capacity



Maintenance Technicians

20 Years Annual Capacity to Meet Demand Current Annual Capacity





Technology impact on Personnel Demand

- Ride sharing companies such as Uber plan to offer multimodal air transportation between suburbs, cities, and ultimately within cities in the future
- They will likely develop fleets of small, electric VTOL (Vertical Take-off and Landing)
- These fleet will require pilots and technicians to be maintained. The impact of this futuristic air transportation mode is not reflected in ICAO personnel forecast.





Conclusion

- Asia will lead the growth for new fleet and personnel
- Analysis shows that gap exists between available training capacity and demand in fast growing markets
- Need to invest in new training capacity and or utilize available surplus capacity in more mature markets
- Addressing the gap by appropriate policy interventions is therefore essential for States to secure the sustainable growth of air transport and maximize the social and economic benefits offered by air transport.
- States are invited to use the ICAO personnel forecast application in <https://data.icao.int/trafficforecast> for their planning needs. Please contact Wendy Fu wfu@icao.int for further information.



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