

NGAP Sri Lanka

**Analysis and Forecast into the Need of Aviation Professionals in
Sri Lanka by 2030**

Background

- For the purpose of this analysis, aviation professionals are considered as persons holding and exercising the privileges of following licences/certifications:
 - Aircraft Maintenance Licence (AML) holders
 - Cabin Crew
 - Flight Crew
 - Flight Dispatchers
 - Air Traffic Controllers
 - Aeronautical Station Operators

Collection of Data

- Information for previous years and the current year is required to form a data trend
- Certain extrapolations will allow a viable forecast into the future requirements of licence holders
- CAASL has been requested to write to CAASL certified aviation organisations (airlines & training schools) to obtain employment information for the following years:
 - 2005
 - 2010
 - 2015
 - 2017

Collection of Data

- Employment information includes;
 - The number of licence holders employed at the organisations for the requested years (2005, 2010, 2015 & 2017)
 - Number of licence holders that resigned and retired
 - The shortage of licence holders
 - The designations that the licence holders were employed under, i.e. Managers, Senior Managers, Engineers, etc.
 - Vacancies forecasted as per the requirements of the respective organisations
- Table 1 shows the layout that will be used to obtain employment information from the relevant organisations

Employment Information

Table 1 – Employment Information – Database Layout

		Employed in 2005	Employed in 2010	Employed in 2015	Employed in 2017
Srilankan Airlines	Flight Crew				
	Cabin Crew				
	Aircraft Maintenance Engineers				
	Flight Dispatchers				

AASL	Aeronautical Station Operators				
	ATC				

Sample Organisations

- Sample organisations have been selected in order to obtain and analyse the employment information
- These organisations will act as a reference until further information is obtained from other organisations
- SriLankan Airlines and Airport and Aviation Services (Sri Lanka) Ltd. (AASL) were chosen since employment information for previous and current years were easily accessible.

Employment Information

Table 2 – Employment Information

		Employed in 2005	Employed in 2010	Employed in 2015	Employed in 2017
SriLankan Airlines	Flight Crew	206	226	322	325
	Cabin Crew	795	790	1133	1210
	Aircraft Maintenance Licence Holders	114	115	174	181
	Flight Dispatchers	16	15	20	28

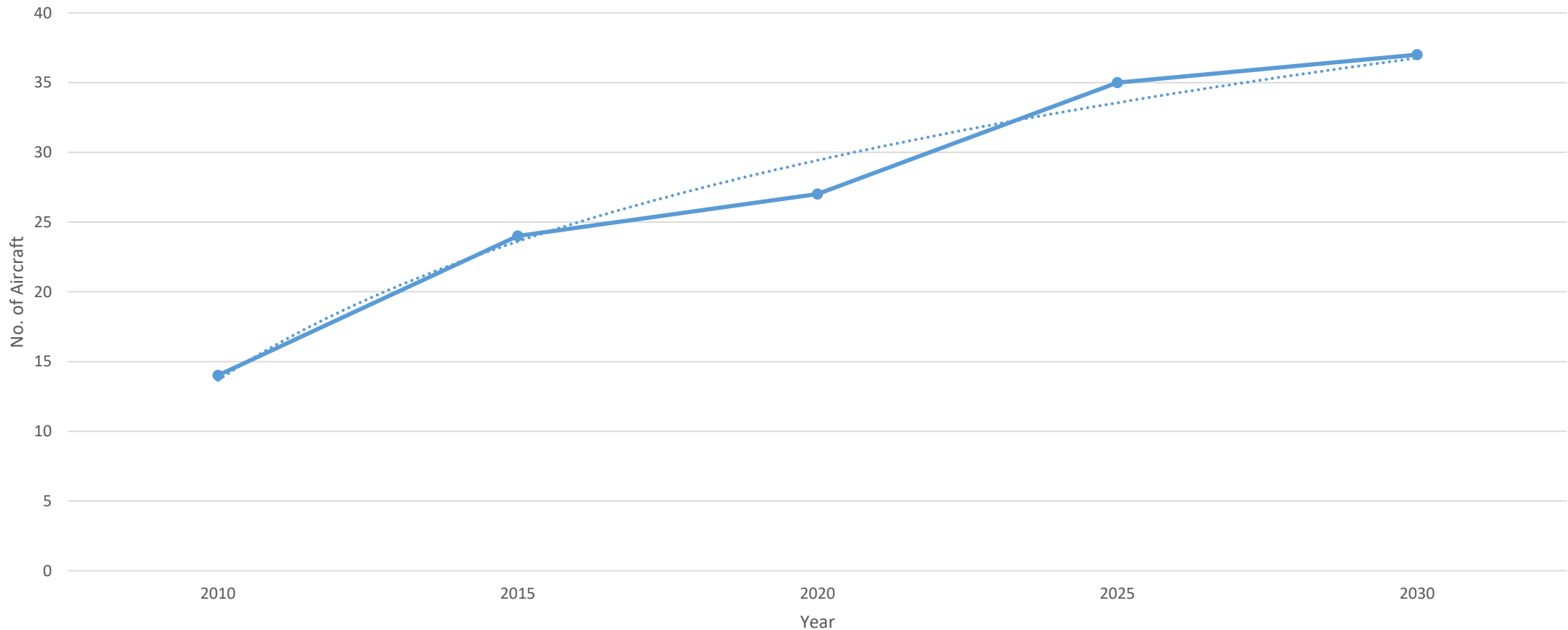
AASL	Aeronautical Station Operators	24	16	22	23
	ATC	60	60	80	82

Analysis

- One way of prediction into the number of future aviation professionals was the analysis of trend based on previous employment data. Both linear and logarithmic trend lines were generated for all employment graphs, however, the values from the logarithmic trend lines were used for the calculations where appropriate
- The following slides provide another type of analysis and visual representation of;
 - The increase in number of aircraft operated by SriLankan Airlines during the years of 2005, 2010, 2015, and 2017
 - A forecast into the required number of aircraft in the years 2020, 2025 and 2030, based on known fleet growth and aircraft lease returns until 2025
 - A forecast of required number of Aviation Professionals based on the assumption that this number is proportional to the number of aircraft operated by the airline

Aircraft Analysis – Forecasted up to 2030

Graph 2 – Forecasted Trend – SriLankan Airlines



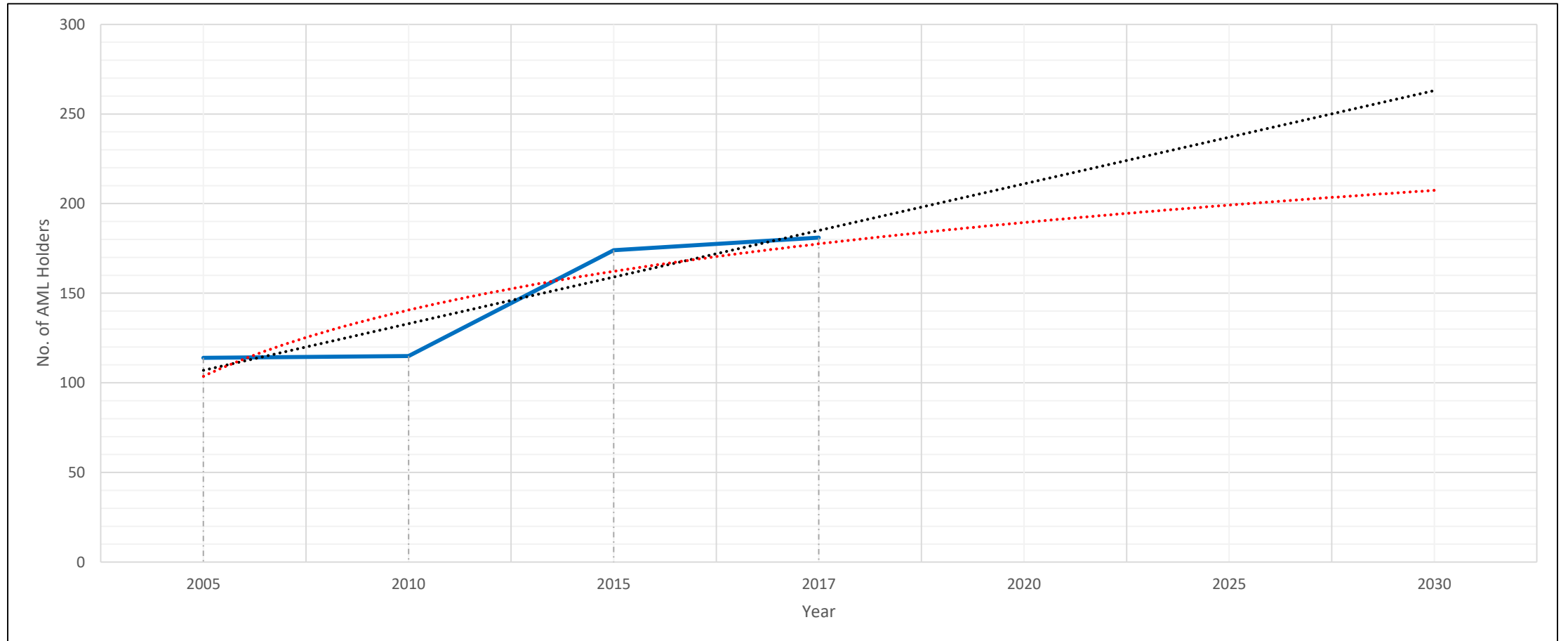
AML Holders

- Two methods were used in order to obtain an accurate forecast of the number of AML holders that will be required by 2030
 - Graph based on extrapolating the employment figures for the years ranging from 2005 to 2017
 - Graph based on the number of AML holders with respect to the number of aircraft
- Data obtained from the two methods were used to calculate a mean value

Method 1:

Based on employment figures for years 2005 to 2017

Graph 3 – No. of AML Holders vs Year – SriLankan Airlines



Method 2:

Based on the number of aircraft

Graph 4 – No. of AML Holders vs No. of Aircraft – SriLankan Airlines



Mean Value

- The following values for the required number of AML holders by 2030 were obtained using the two methods;
 - Method 1: 210
 - Method 2: 240
- The mean value can be calculated to be;

$$\frac{210 + 240}{2} = 225$$

Corrections

- The mean figure that was obtained using the two forecasting methods does not include resignations, retirements and shortage
- Taking these corrections into account, the total number of AML holders can be calculated to be;
 - Taking total number by 2030 as X;

$$\begin{aligned}X &= \text{Mean Value} + \text{Shortage} \\X &= 225 + 28 \\&= 253\end{aligned}$$

- Hence the required number of AML holders that need to be trained and qualified by 2030 (Y) is;

$$\begin{aligned}Y &= X - \text{Current number} + \text{Retirements} + \text{Resignations} \\&= 253 - 181 + 104 \\&= 176\end{aligned}$$

Method 3:

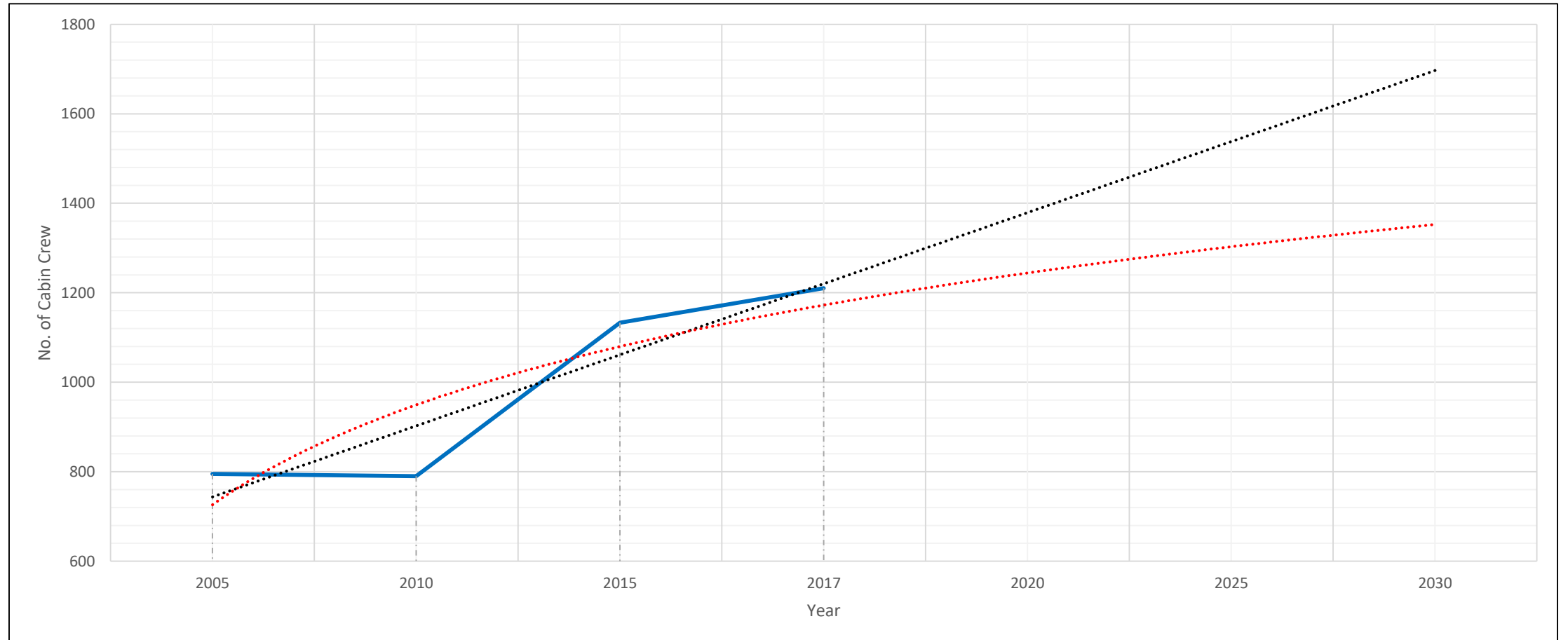
Based on the ICAO forecast for passenger movement

- ICAO has published passenger and cargo forecast figures for certain regions
- CAASL has been requested to liaise with the NGAP committee of ICAO to help determine a localised methodology
- This will allow for a calculation to be performed in order to obtain a passenger forecast specific to Sri Lanka
- The passenger data can then be used to forecast the required number of aviation professionals in Sri Lanka by 2030

Cabin Crew – Method 1:

Based on employment figures for years 2005 to 2017

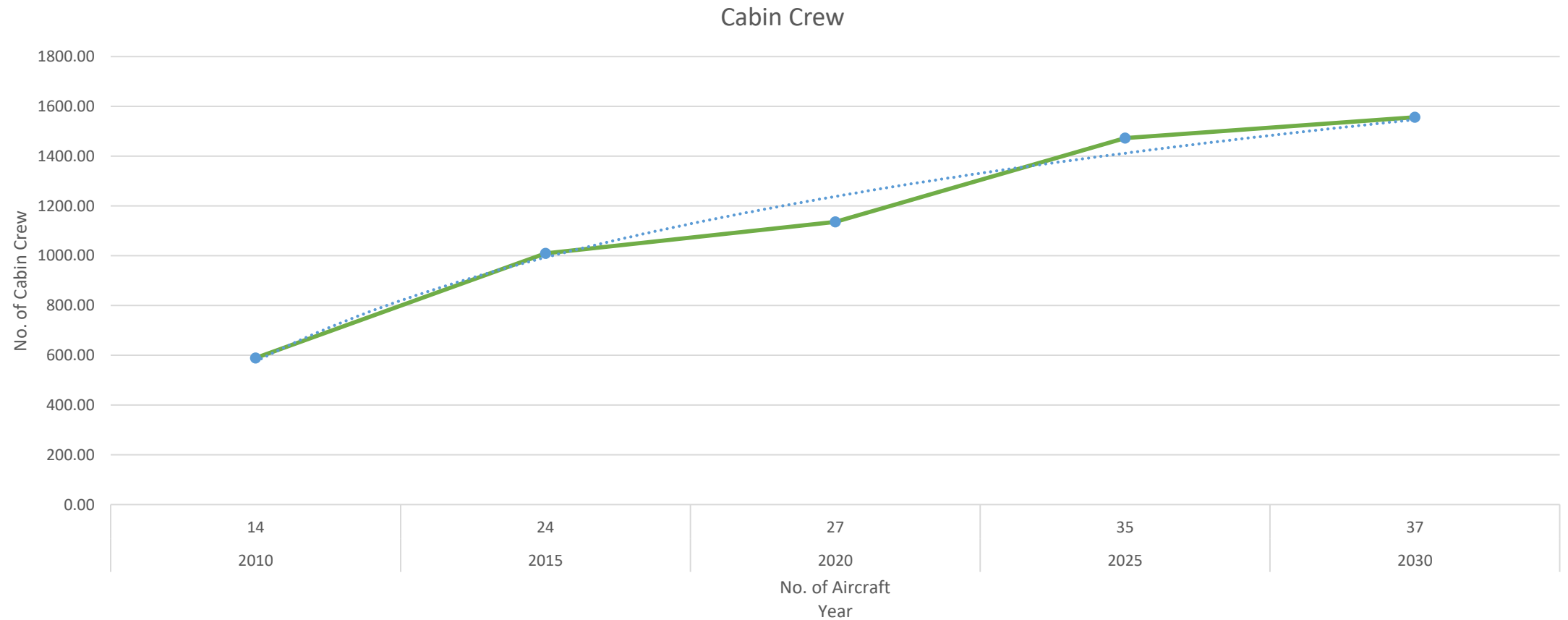
Graph 5 – No. of Cabin Crew – SriLankan Airlines



Cabin Crew – Method 2:

Based on the number of aircraft

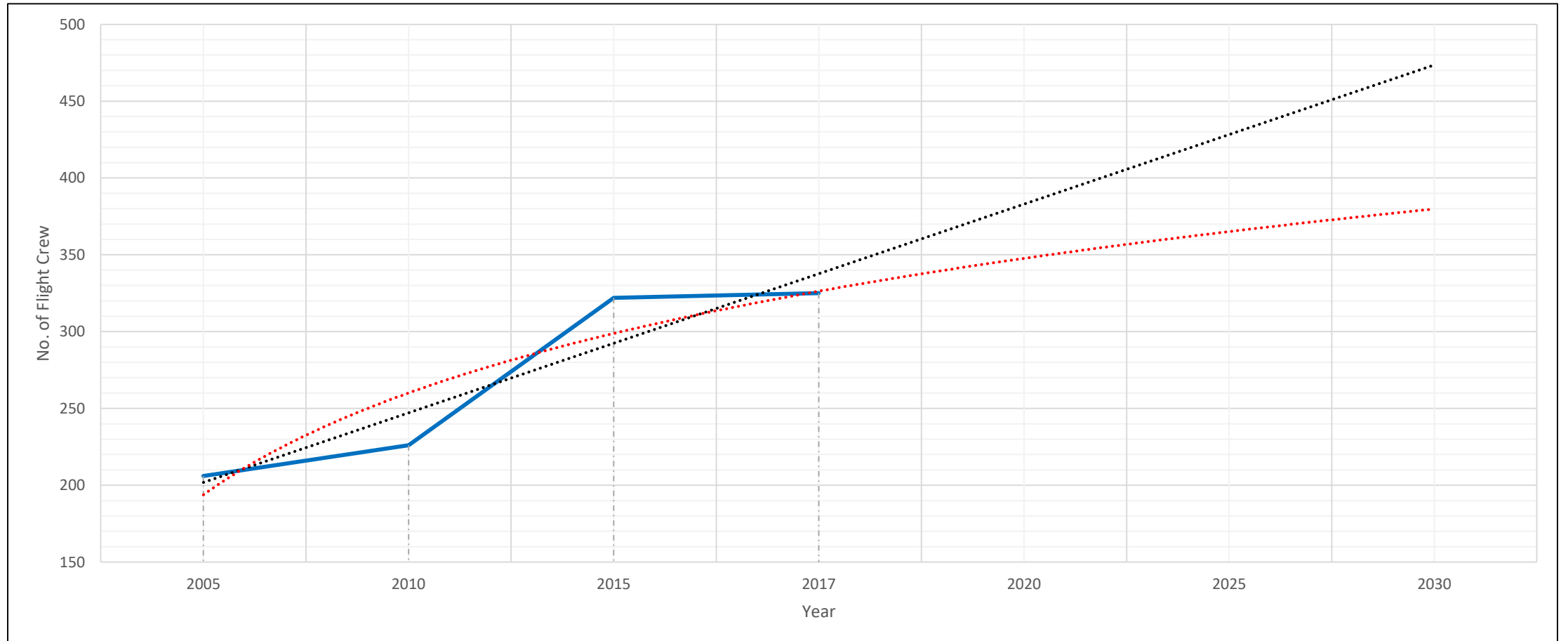
Graph 6 – No. of Cabin Crew – SriLankan Airlines



Flight Crew – Method 1:

Based on employment figures for years 2005 to 2017

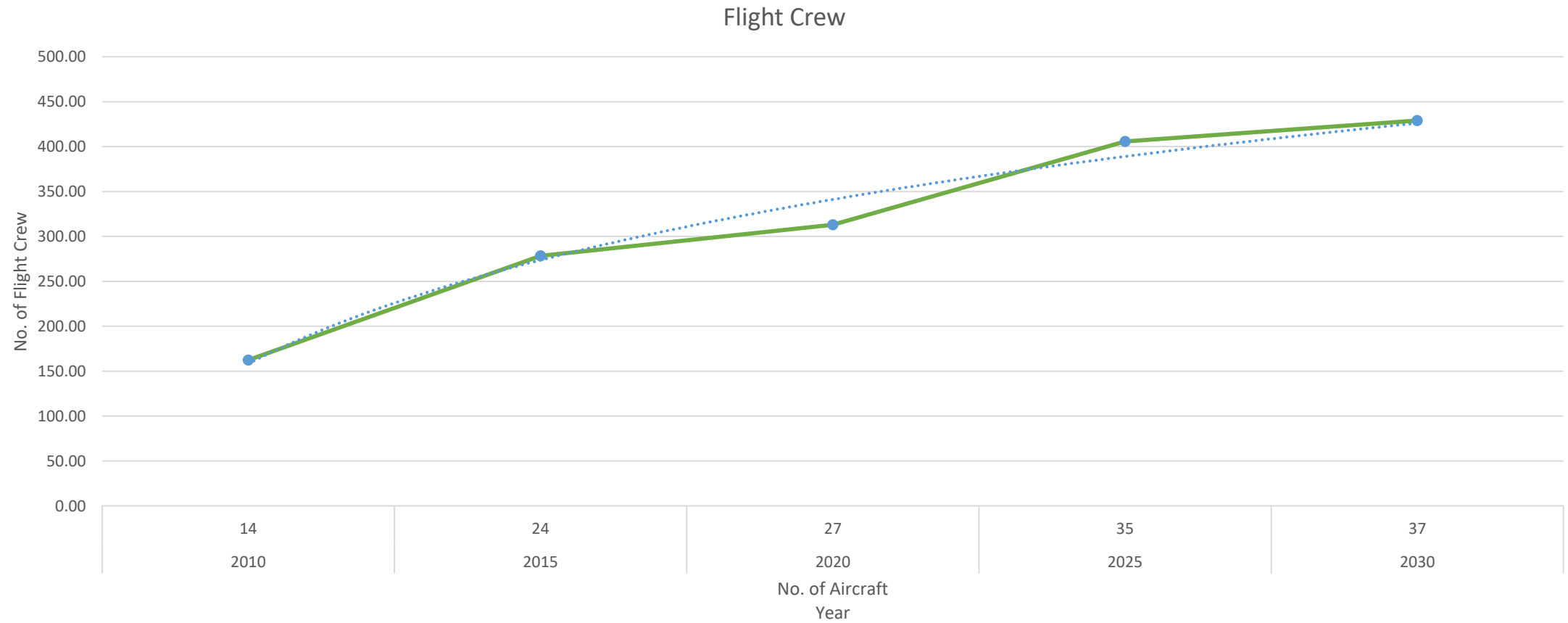
Graph 7 – No. of Flight Crew – SriLankan Airlines



Flight Crew – Method 2:

Based on the number of aircraft

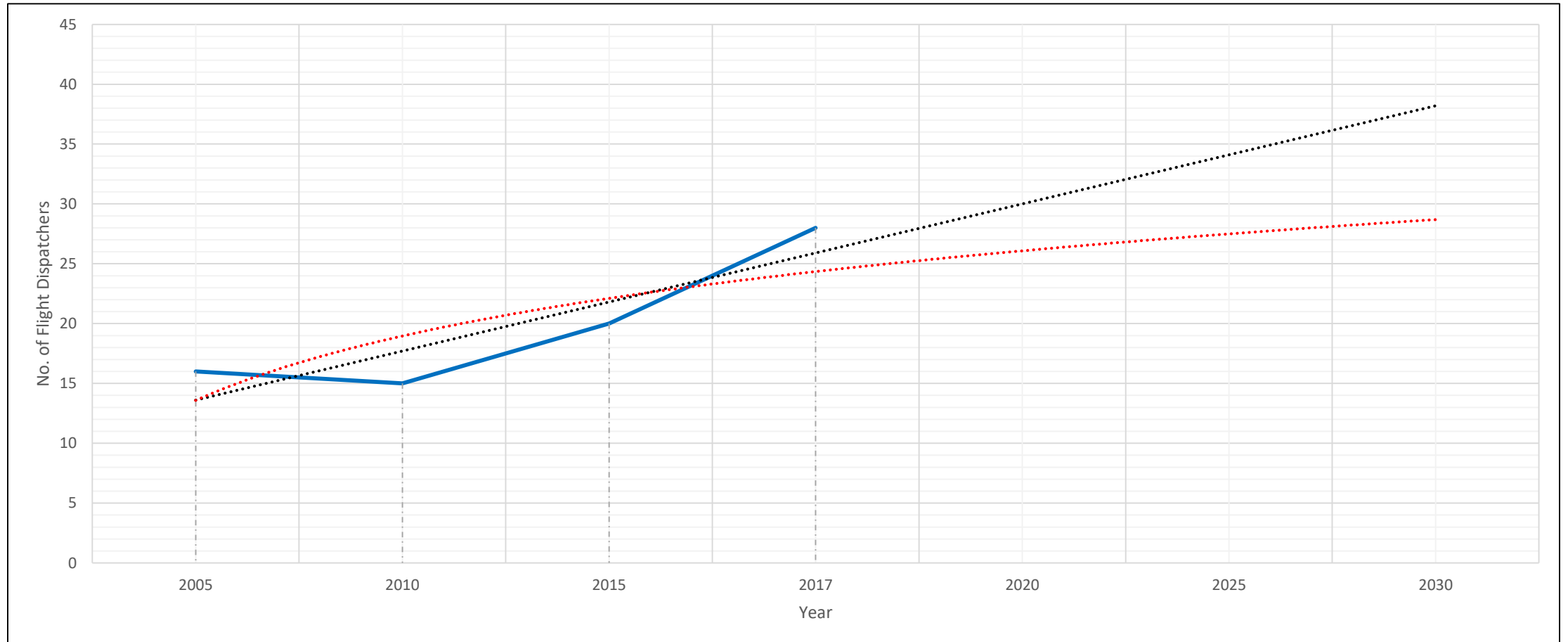
Graph 8 – No. of Flight Crew – SriLankan Airlines



Flight Dispatchers – Method 1:

Based on employment figures for years 2005 to 2017

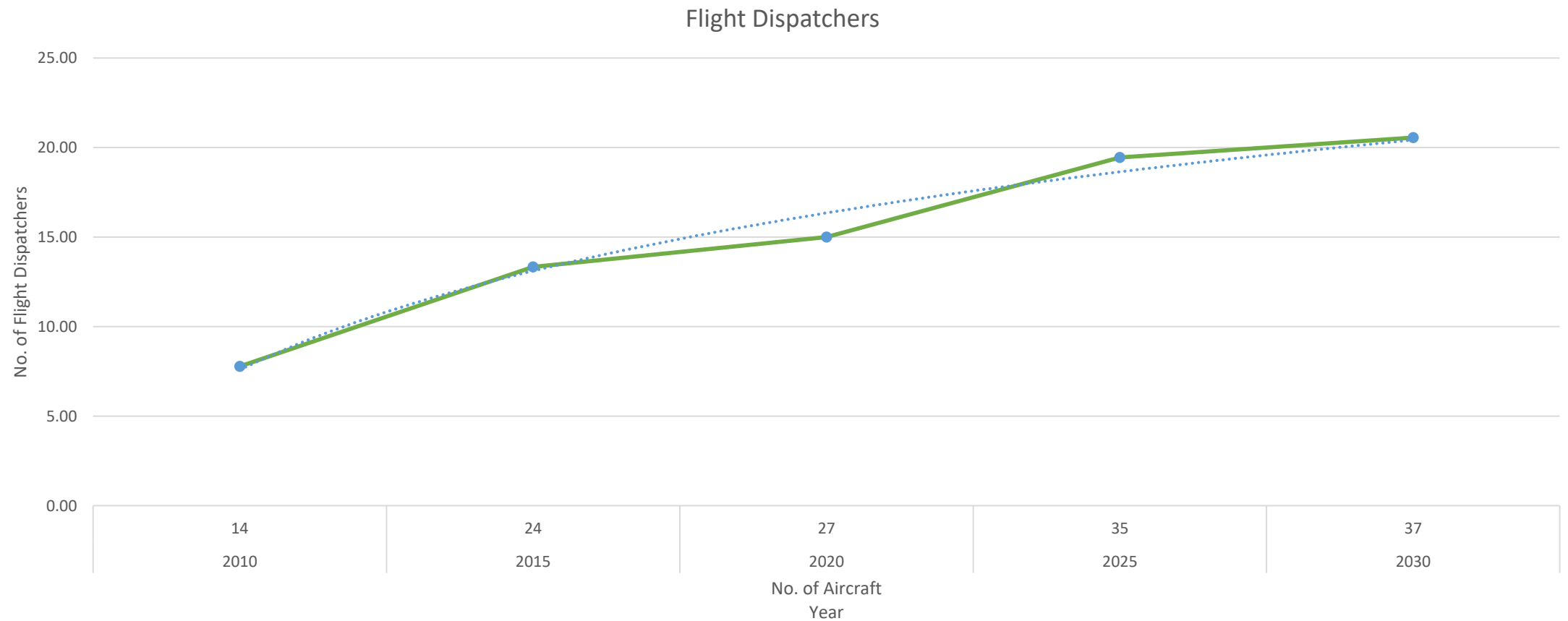
Graph 9 – No. of Flight Dispatchers – SriLankan Airlines



Flight Dispatchers – Method 2:

Based on the number of aircraft

Graph 10 – No. of Flight Dispatchers – SriLankan Airlines



AASL

- In addition to SriLankan Airlines, the following personnel from AASL have been analysed using one method; extrapolating employment data obtained for previous years (2005 to 2017)
 - Air Traffic Controllers
 - Aeronautical Station Operators
- The following slides contain individual graphs for each category

Air Traffic Controllers

- It is estimated that approximately 8 to 9 ATC personnel will resign or retire for every three years at the company
- A 40% shortage is currently present
- Due to this, the required number of Air Traffic Controllers for 2018 is estimated to be 144
- This is a 69.4% increase from the 2017 figure of 82 ATC licence holders

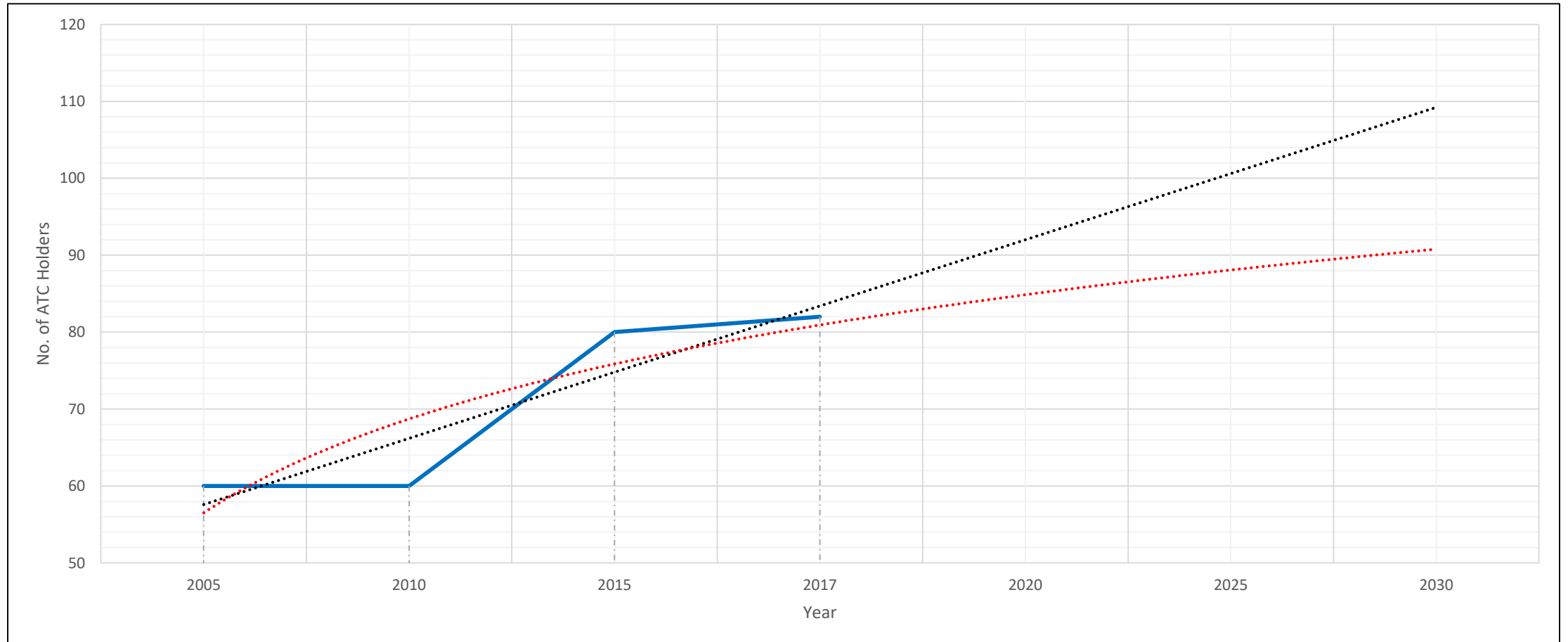
Air Traffic Controllers

- Similar to the previous categories, two methods were used to forecast the required number of ATC personnel by 2030
 - Graph based on employment figures for the years 2005, 2010, 2015 & 2017
 - Graph based on the required figure of 144 for the year 2020
- Extrapolation of these graphs help visualise a viable forecast into the required number of ATC personnel by 2030

Method 1:

Based on employment figures for years 2005 to 2017

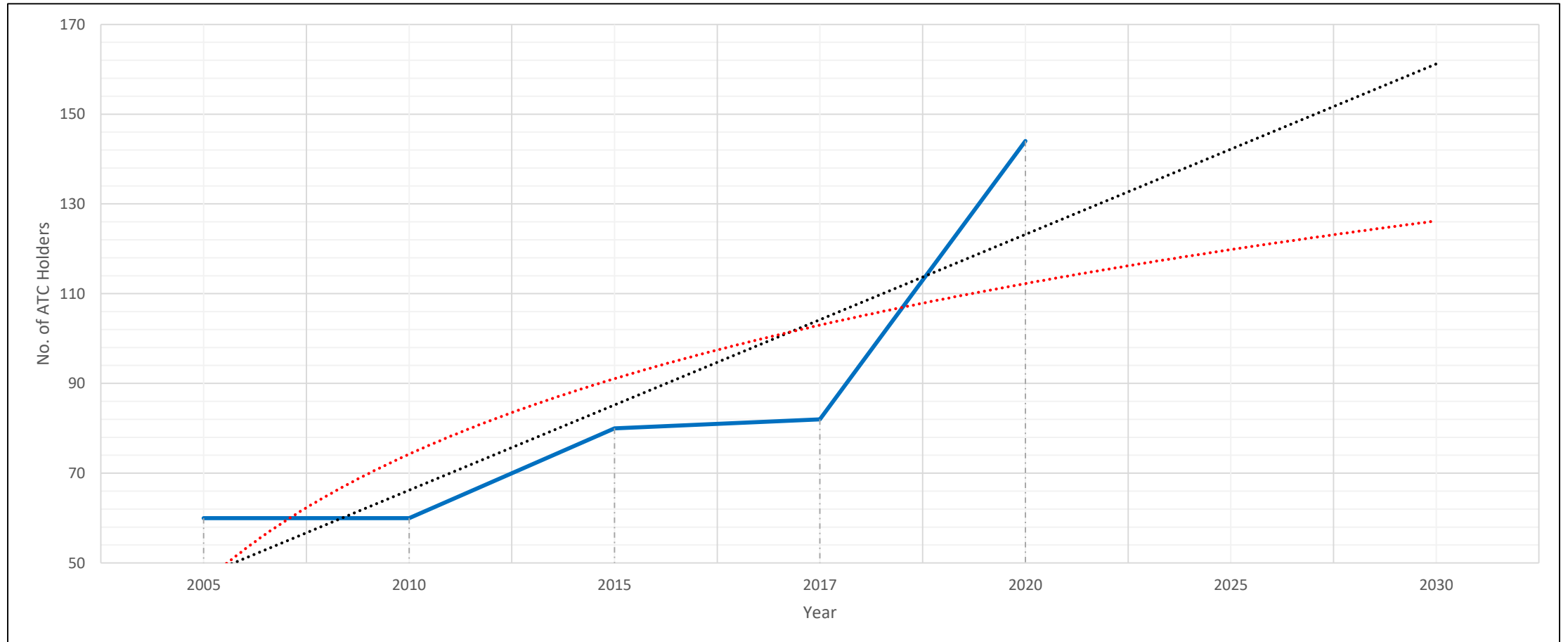
Graph 11 – No. of Air Traffic Controllers vs Year - AASL



Method 2:

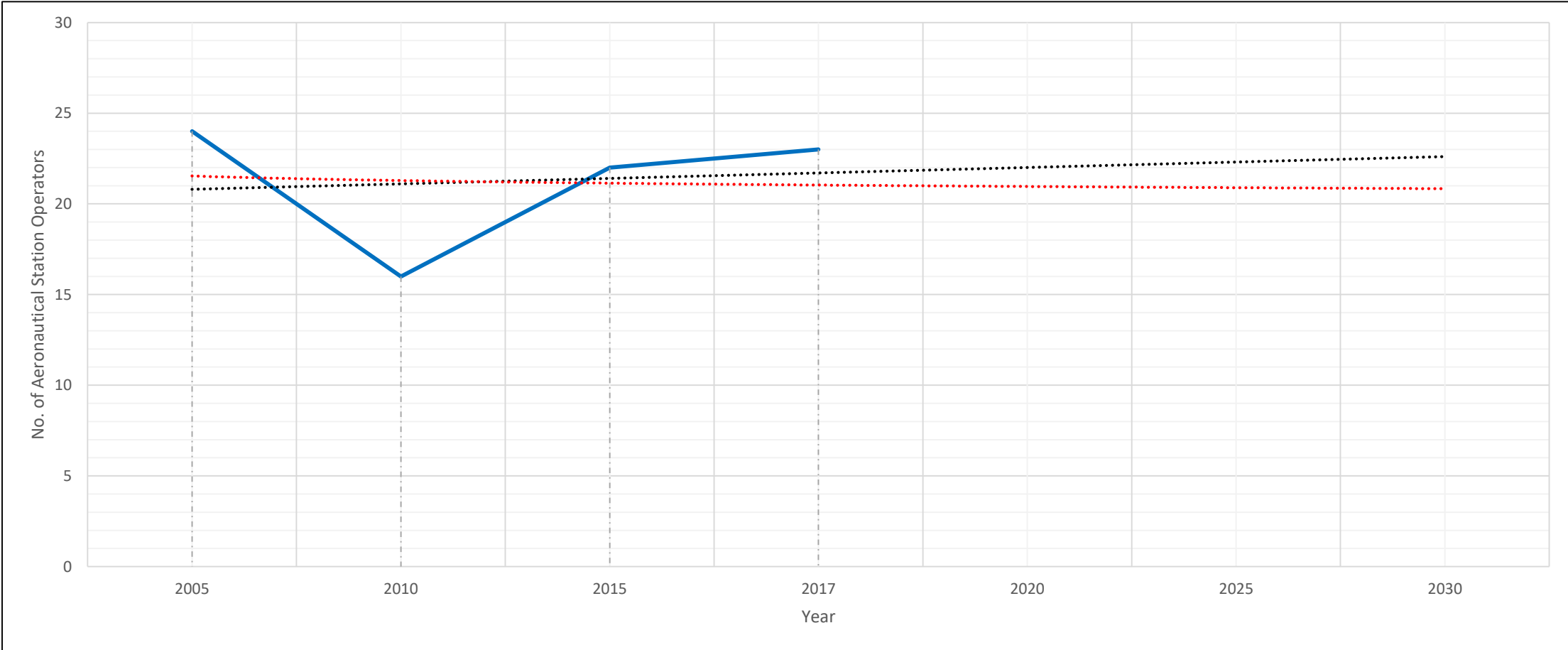
Based on the required figure of 144 for the year 2020

Graph 12 – No. of Air Traffic Controllers vs Year - AASL



Aeronautical Station Operators

Graph 13 – No. of Aeronautical Station Operators – AASL



Summary

Table 3 – Summary of Calculated Figures

	2030 Figures using Different Methods (without corrections)	Mean Value	2030 Forecasted Numbers*	Resignations & Retirements until 2030	Current Figure	Required Number to be Trained & Qualified
AML	210	225	253	104	146	211
	240					
Cabin Crew	1360	1459	1493	949	1210	1232
	1557					
Flight Crew	380	368	395	221	325	291
	429					
Flight Dispatchers	29	25	26	52	28	50
	21					
ATC	91	109	142	39	82	99
	126					
ASO	21	21	26	39	23	42

*Mean value corrected for current shortage.

Conclusion

- From the information obtained from SriLankan Airlines and AASL, it is evident that there has been a significant growth in the number of employed licence holders
- However, the current shortages show that the requirement for more personnel is much higher than anticipated
- Data entailing the number of licences issued in the previous years until now can be obtained from CAASL
- Using this, a comparison can be made in order to determine the number of licence holders who are employed, unemployed and are retired

Proposed Research

- Information for the relevant licences/certifications will be obtained from other aviation organisations in liaison with CAASL
- Upon receipt of the required data, an in-depth analysis will be conducted to determine the previous employment trend of specific licence holders, and the current shortage in Sri Lanka
- This will allow a viable comparison and forecast to be made into the required number of aviation professionals in Sri Lanka by 2030
- In addition, CAASL has been requested to liaise with the NGAP committee of ICAO to help determine a localized methodology in order to obtain a passenger forecast specific to Sri Lanka. Based on the passenger forecast, forecasting the required number of aviation professionals in Sri Lanka by 2030 is another method (Method 3) proposed in this presentation.

NGAP Sri Lanka

**Analysis and Forecast into the Need of Aviation Professionals in
Sri Lanka by 2030 – Phase 2**

Summary of Phase 1

- The task under consideration is to draw-up a methodology to forecast human requirements in aviation professional disciplines in Sri Lanka until year 2030.
- For the analysis under Phase 1, persons holding and exercising the privileges of following licenses/certifications were considered as aviation professionals:
 - Aircraft Maintenance Licence (AML) holders
 - Cabin Crew
 - Flight Crew
 - Flight Dispatchers
 - Air Traffic Controllers
 - Aeronautical Station Operators

Summary of Phase 1 (Continued)

- Under Phase 2, this analysis will be extended to other aviation professionals as well.
- Two sample organizations were taken for the analysis:
 - SriLankan Airlines Limited
 - AASL
- Forecast of staff requirement in year 2030 was done in two different methods for each sample organization:
 - Method 1 - By extrapolation of past and current employment information
 - Method 2 - Based on the business plans of each sample organization forecasted to the furthest possible extent
- For each type of aviation professional, the requirement was calculated using both methods, the mean value was taken and corrected for estimated shortage, resignations, retirements, in reaching the required number to be trained and qualified.

Summary of Phase 1 (Continued)

Table 3 – Summary of Calculated Figures

	2030 Figures using Different Methods (without corrections)	Mean Value	2030 Forecasted Numbers*	Resignations & Retirements until 2030	Current Figure	Required Number to be Trained & Qualified
AML	210	225	253	104	181	176
	240					
Cabin Crew	1360	1459	1493	949	1210	1232
	1557					
Flight Crew	380	368	395	221	325	291
	429					
Flight Dispatchers	29	25	26	52	28	50
	21					
ATC	91	109	142	39	82	99
	126					
ASO	21	21	26	39	23	42

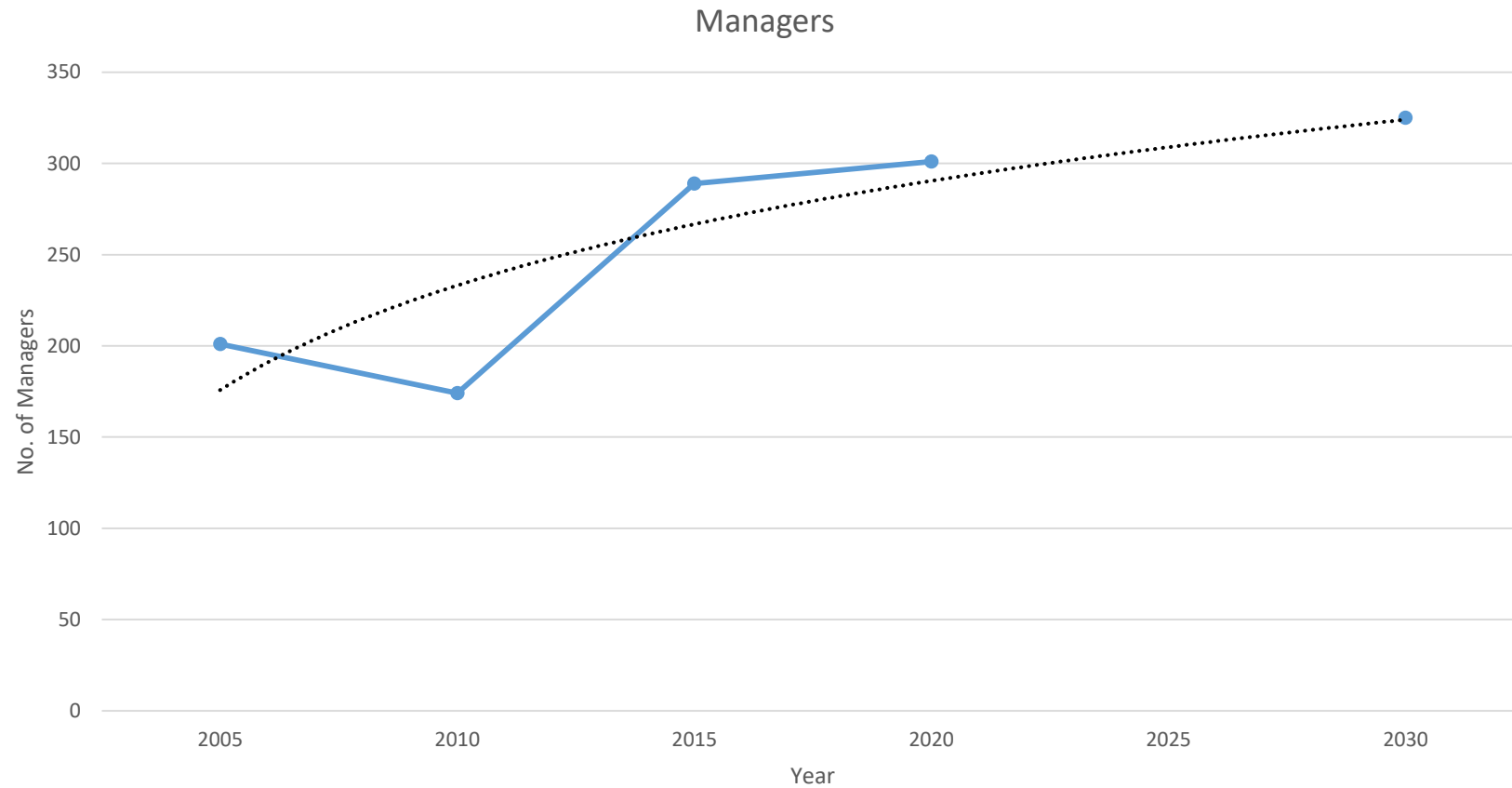
*Mean value corrected for current shortage.

Summary of Phase 1 (Continued)

- The sub committee appointed for the task under discussion requested CAASL to forward information applicable to other CAASL approved organizations, for the purpose of extending the analysis to the whole country.
- CAASL was also requested to write to ICAO NGAP to see the possibility of obtaining the future aviation professional requirements for Sri Lanka, providing another solution (method 3) to the task under discussion.
- Analysis under methods 1 and 2 for forecasting other aviation professionals namely, Managers, Executives, other Engineers, Technicians/ Mechanics, Auditors/ Inspectors, Airport Services staff, Cargo Operations staff, Security staff, Aircraft Dispatchers, Instructors and all other staff categories in SriLankan Airlines is done under Phase 2 and shown graphically on subsequent slides.

Managers – Method 1:

Based on employment figures for years 2005 to 2018



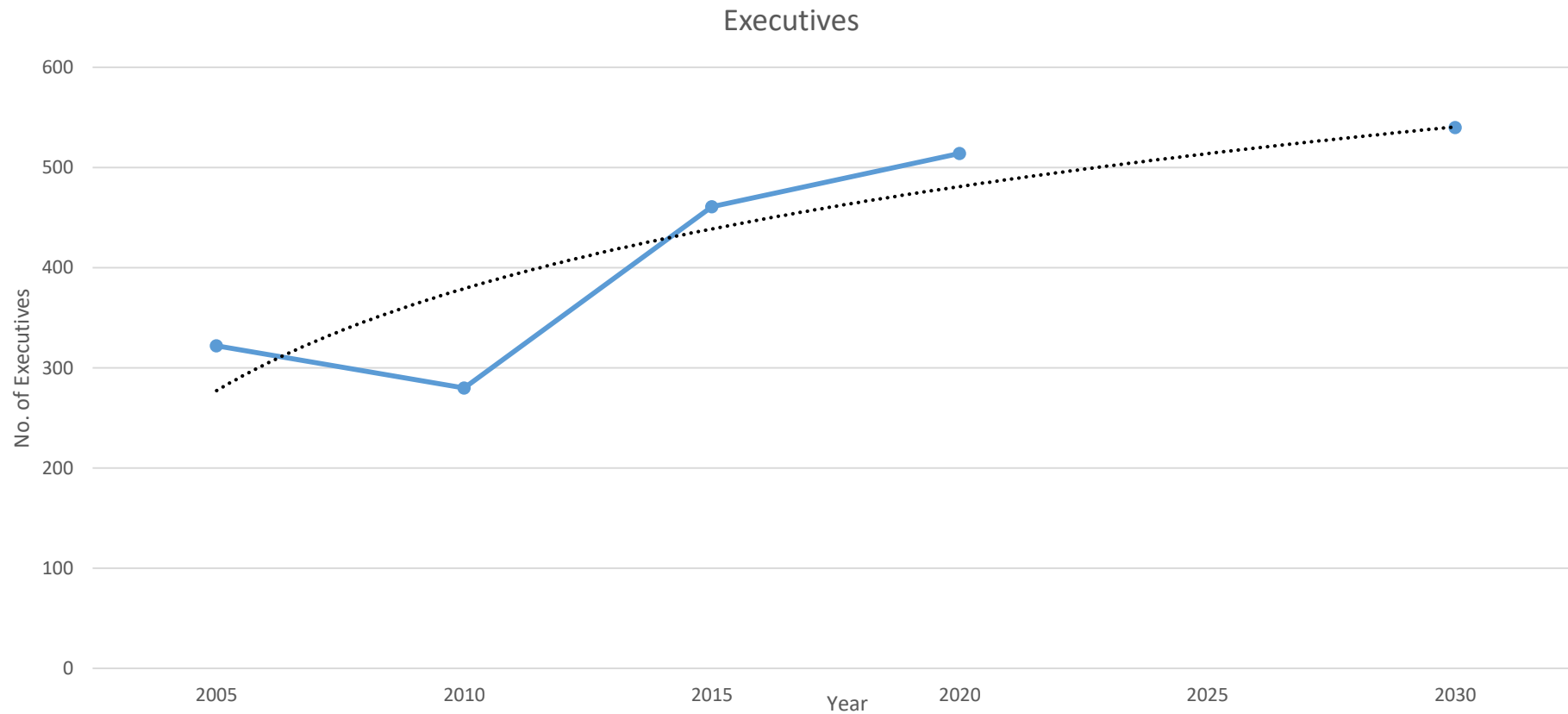
Managers – Method 2:

Based on the number of aircraft



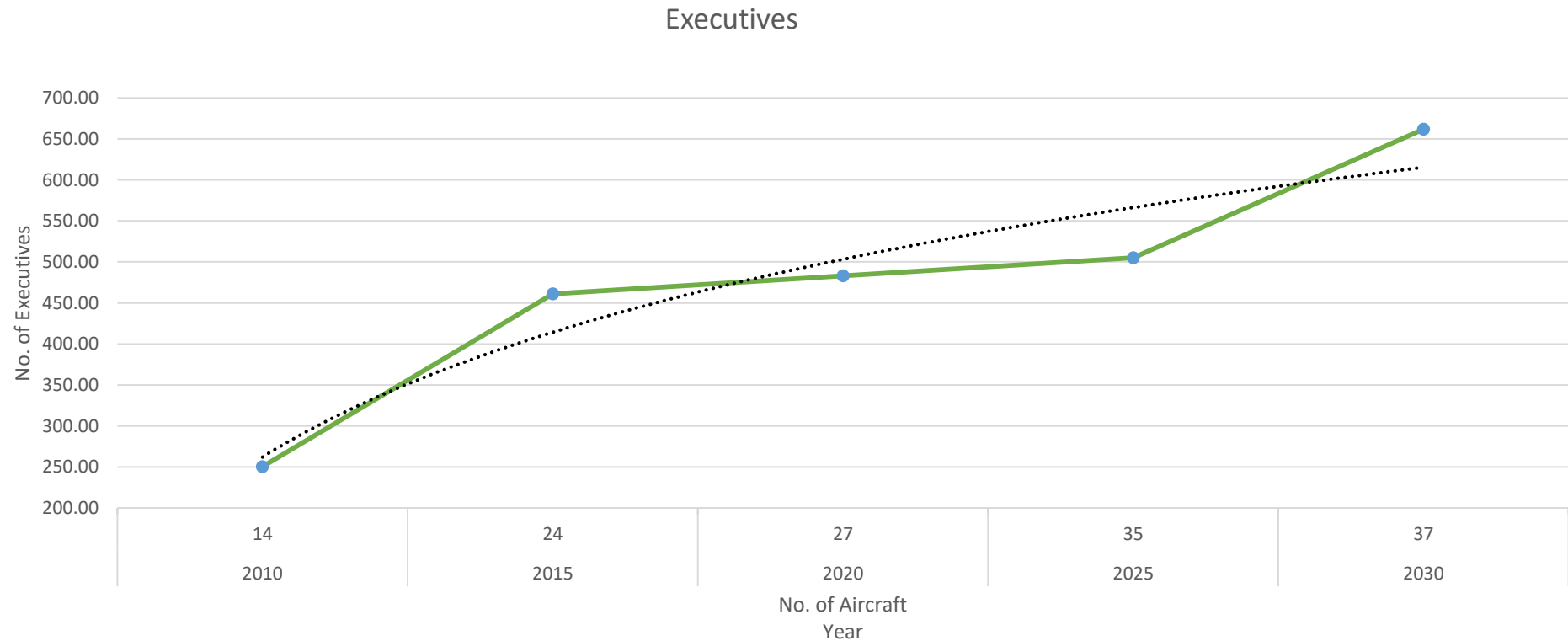
Executives – Method 1:

Based on employment figures for years 2005 to 2018



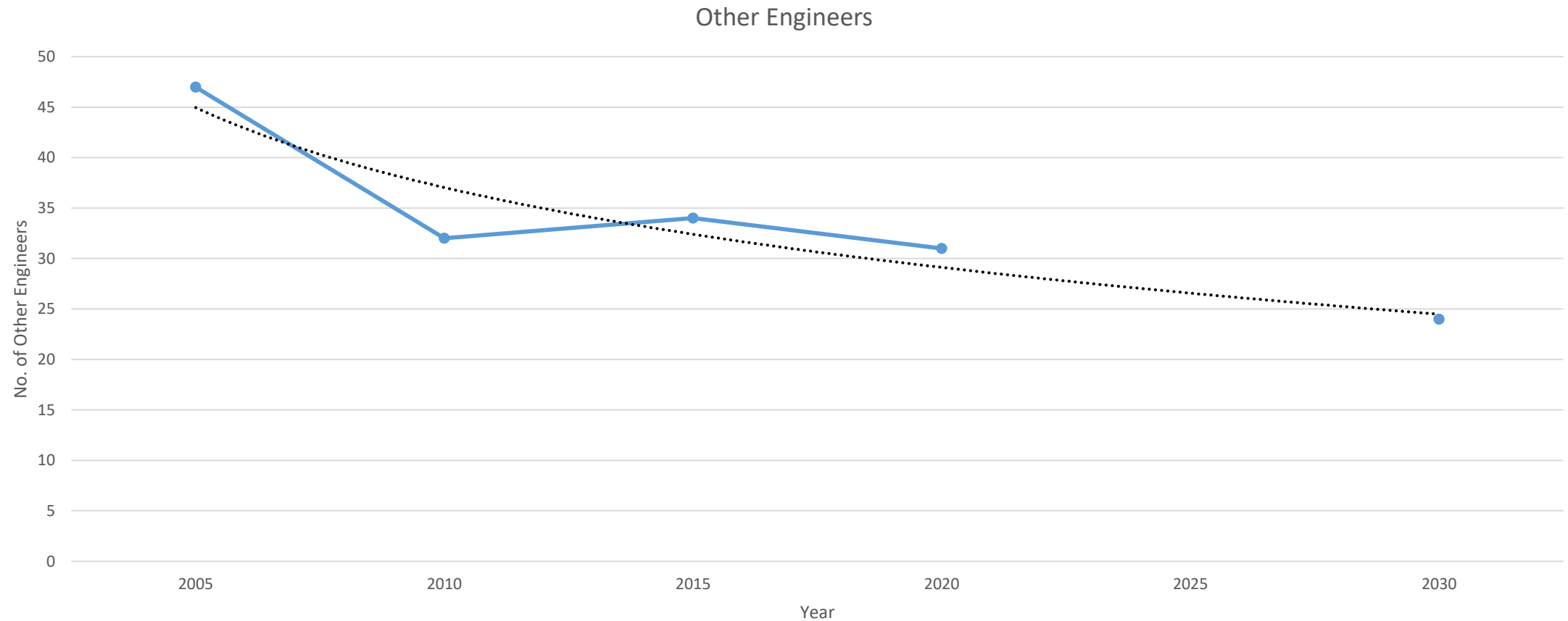
Executives – Method 2:

Based on the number of aircraft



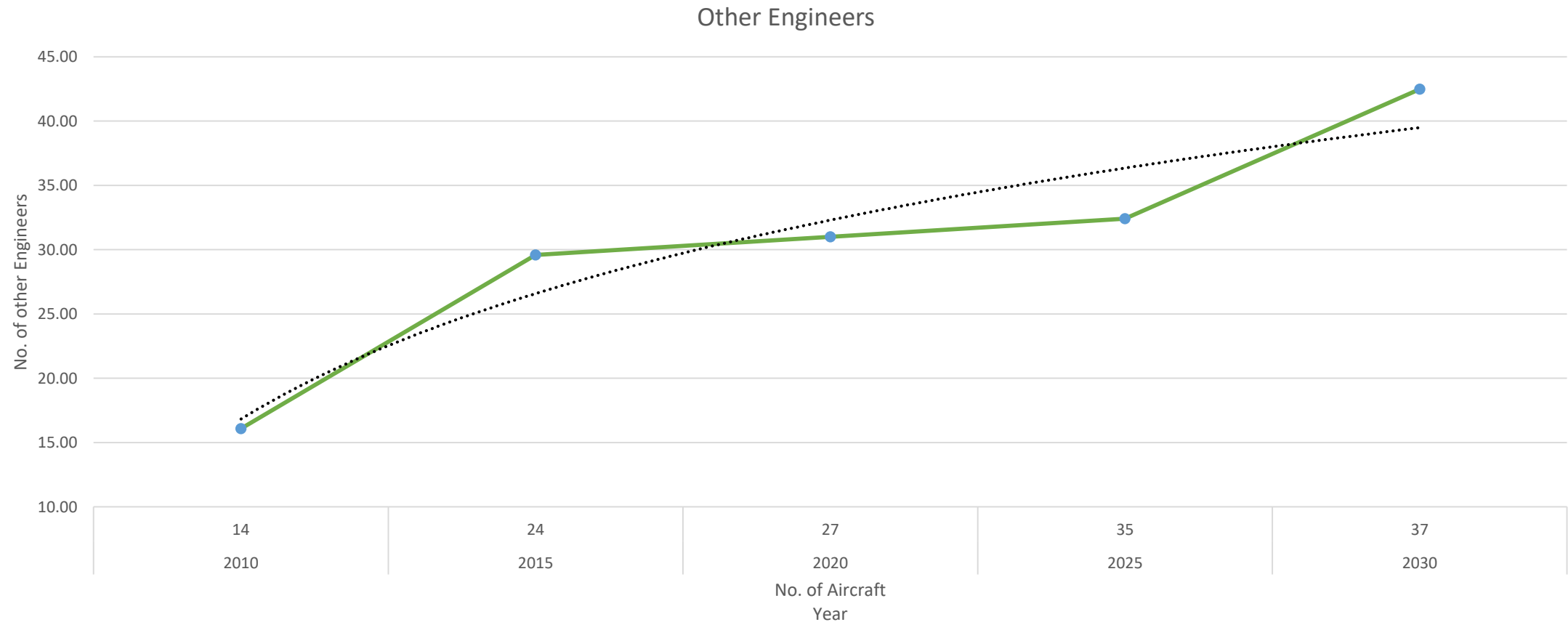
Other Engineers – Method 1:

Based on employment figures for years 2005 to 2018



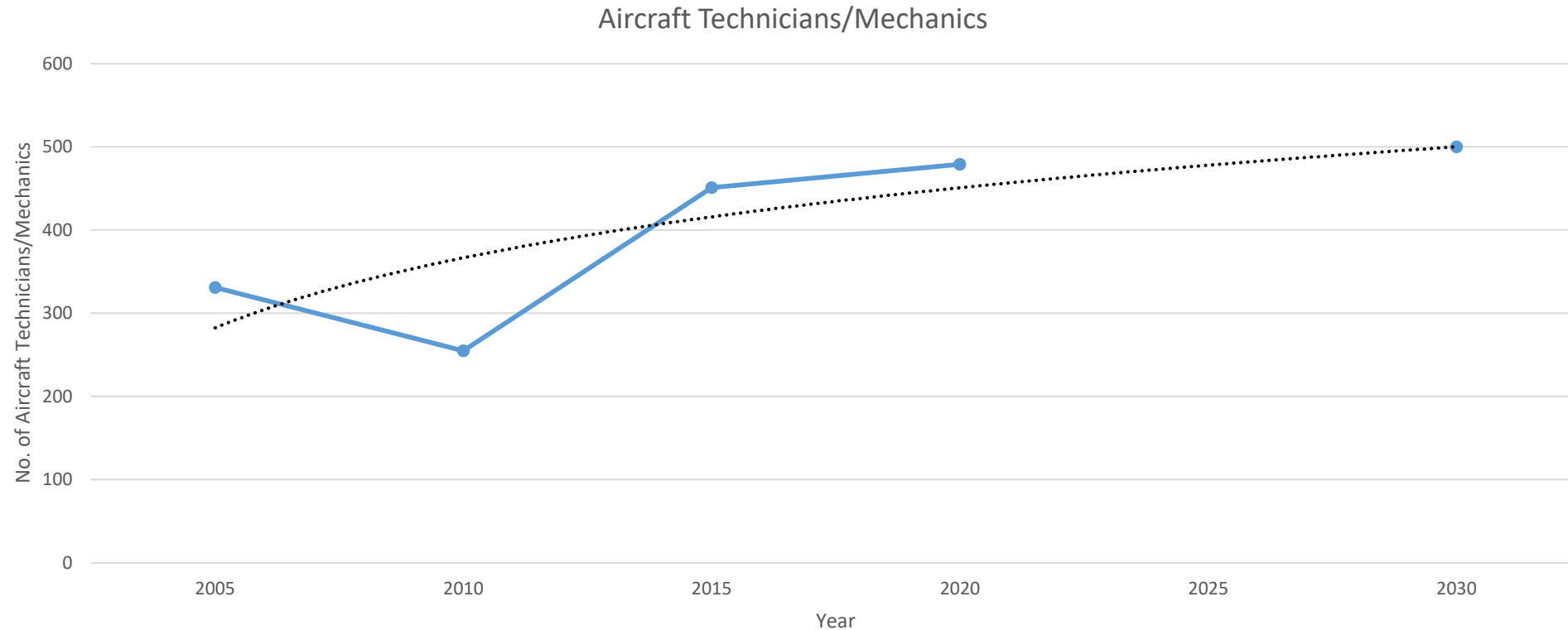
Other Engineers – Method 2:

Based on the number of aircraft

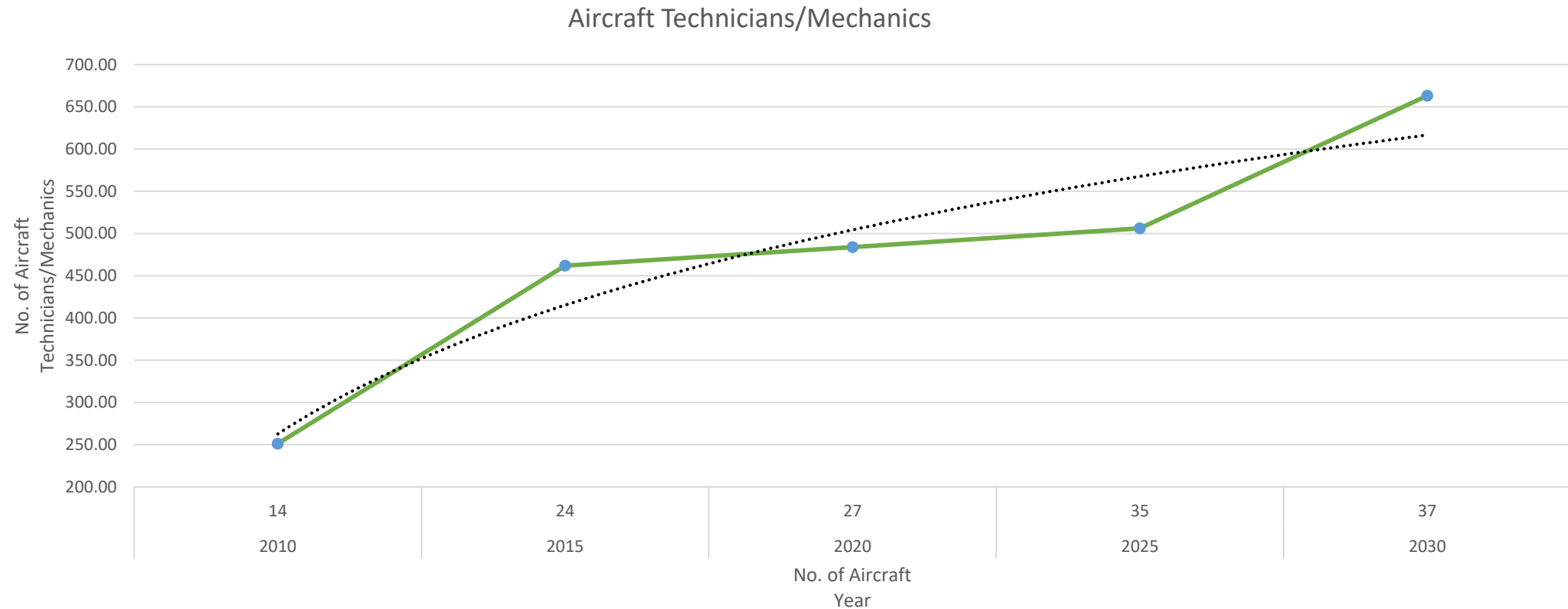


Aircraft Technicians/Mechanics – Method 1:

Based on employment figures for years 2005 to 2018

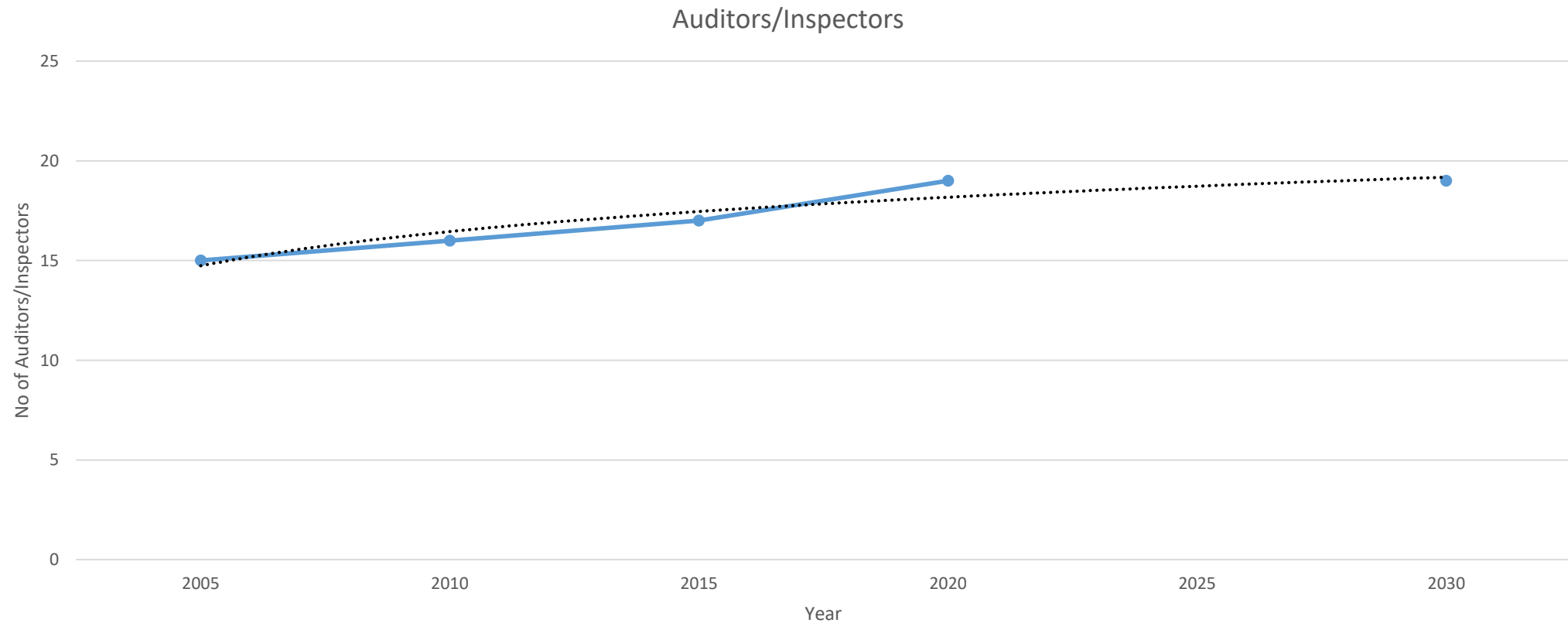


Aircraft Technicians/ Mechanics – Method 2: Based on the number of aircraft



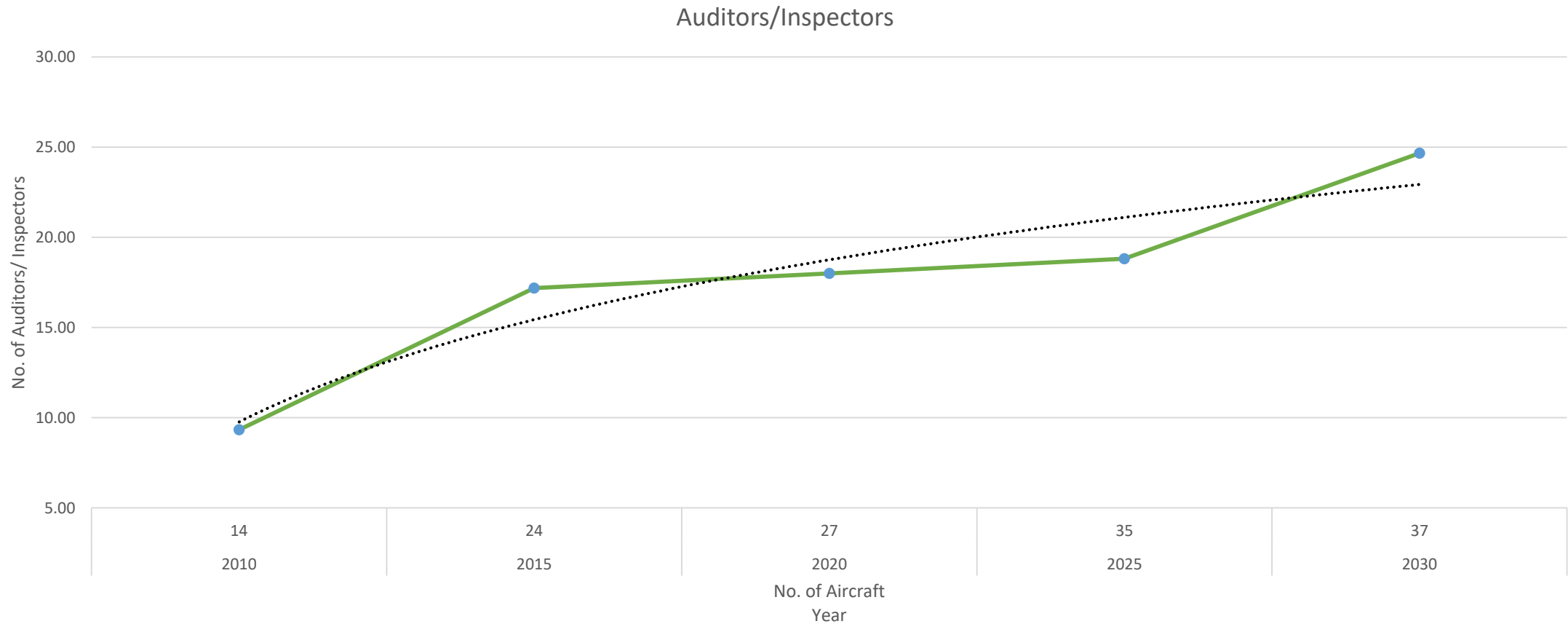
Auditors/ Inspectors – Method 1:

Based on employment figures for years 2005 to 2018



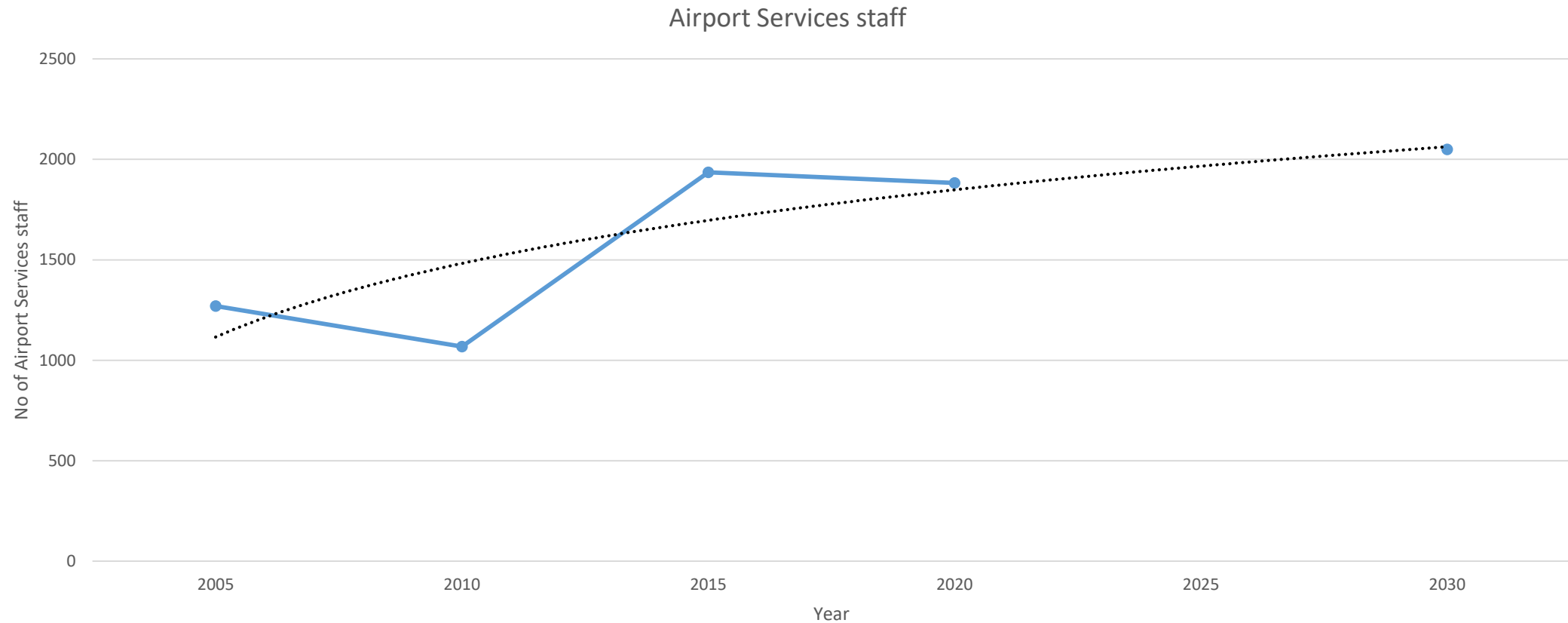
Auditors/ Inspectors – Method 2:

Based on the number of aircraft



Airport Service staff – Method 1:

Based on employment figures for years 2005 to 2018

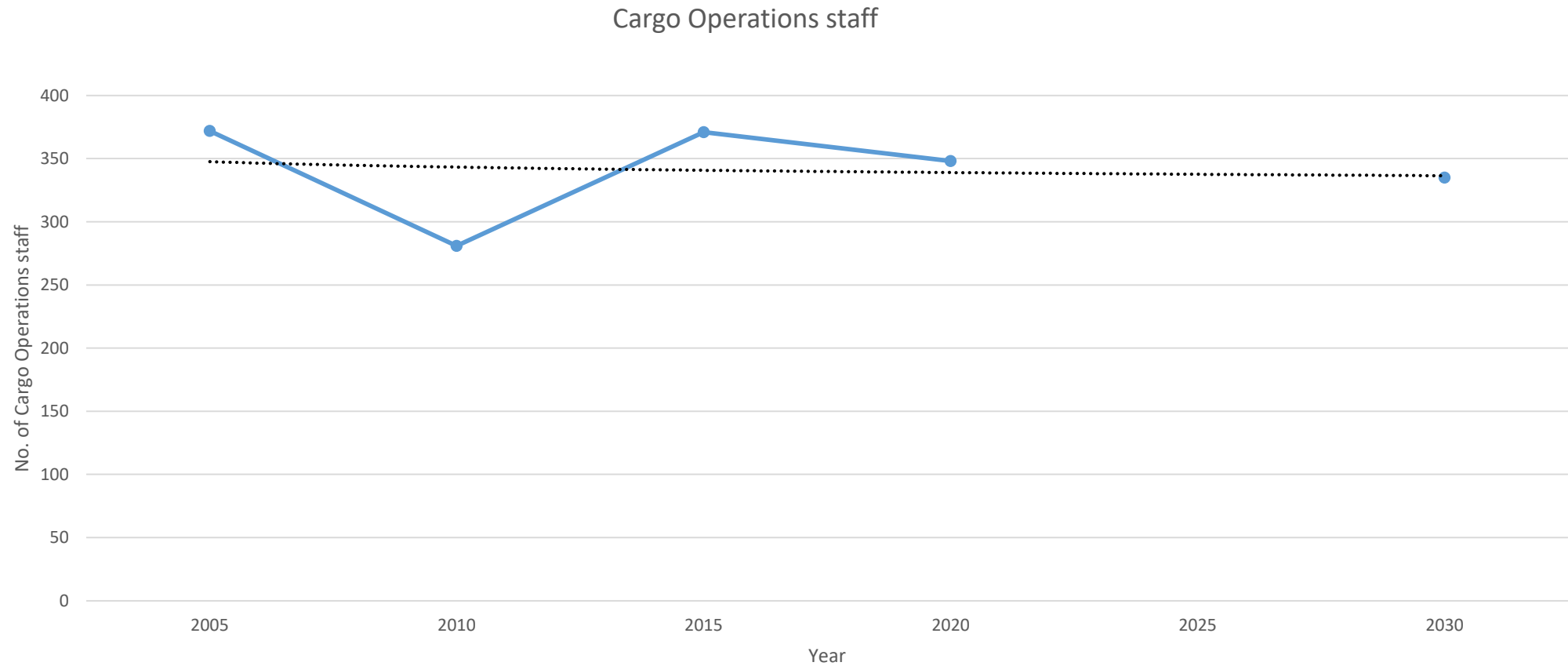


Airport Services staff – Method 2: Based on the number of aircraft

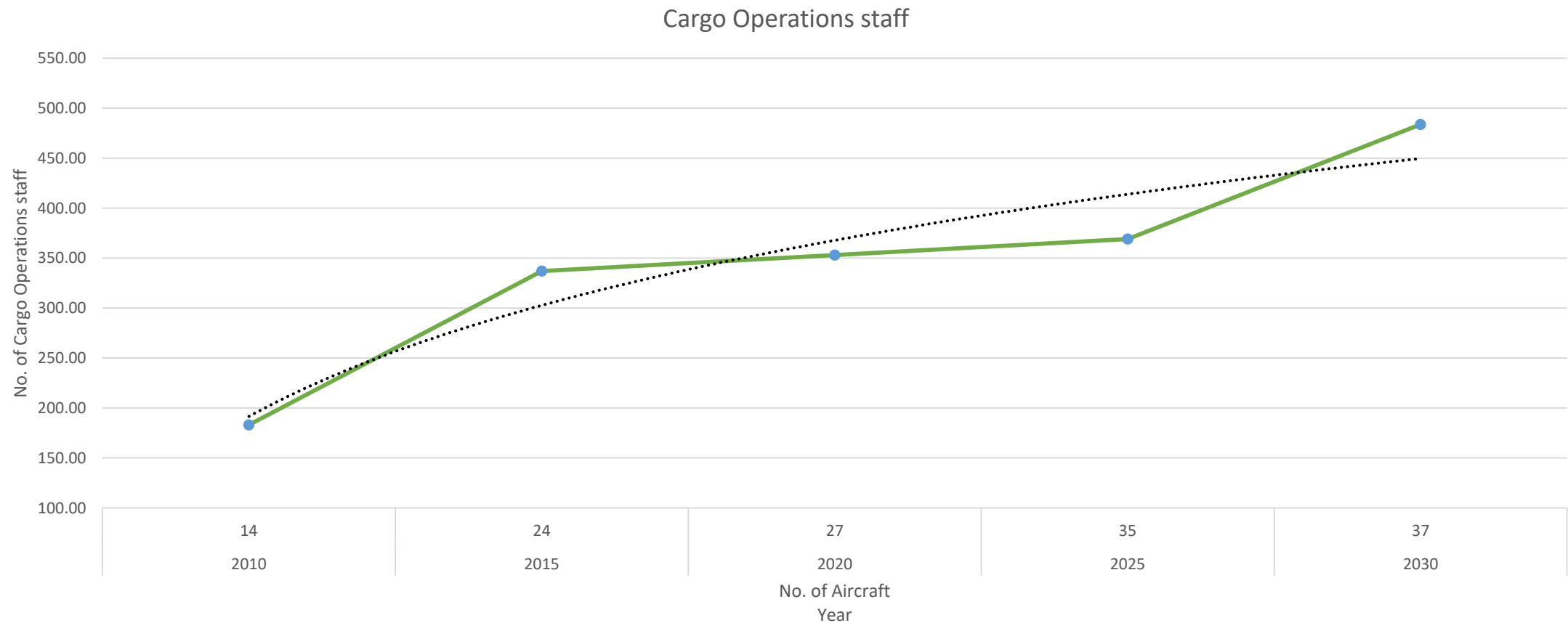


Cargo Operations staff – Method 1:

Based on employment figures for years 2005 to 2018

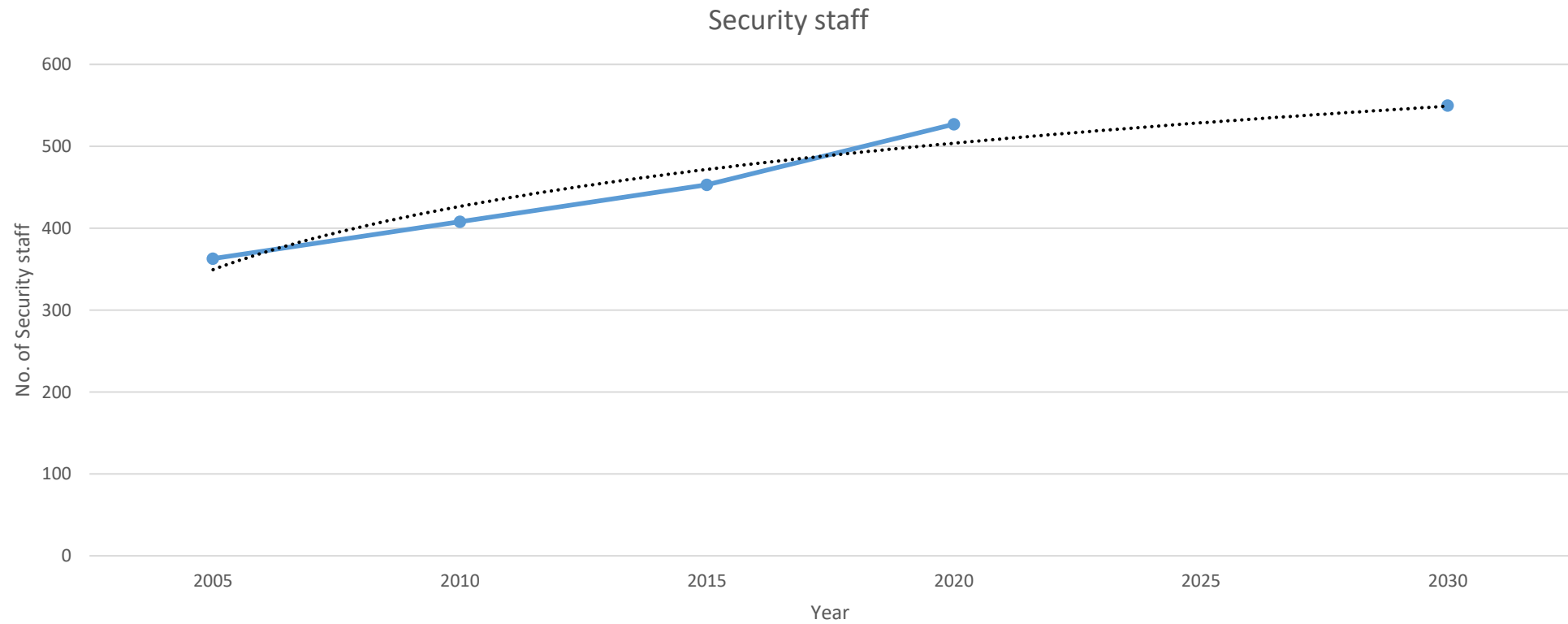


Cargo Operations staff – Method 2: Based on the number of aircraft

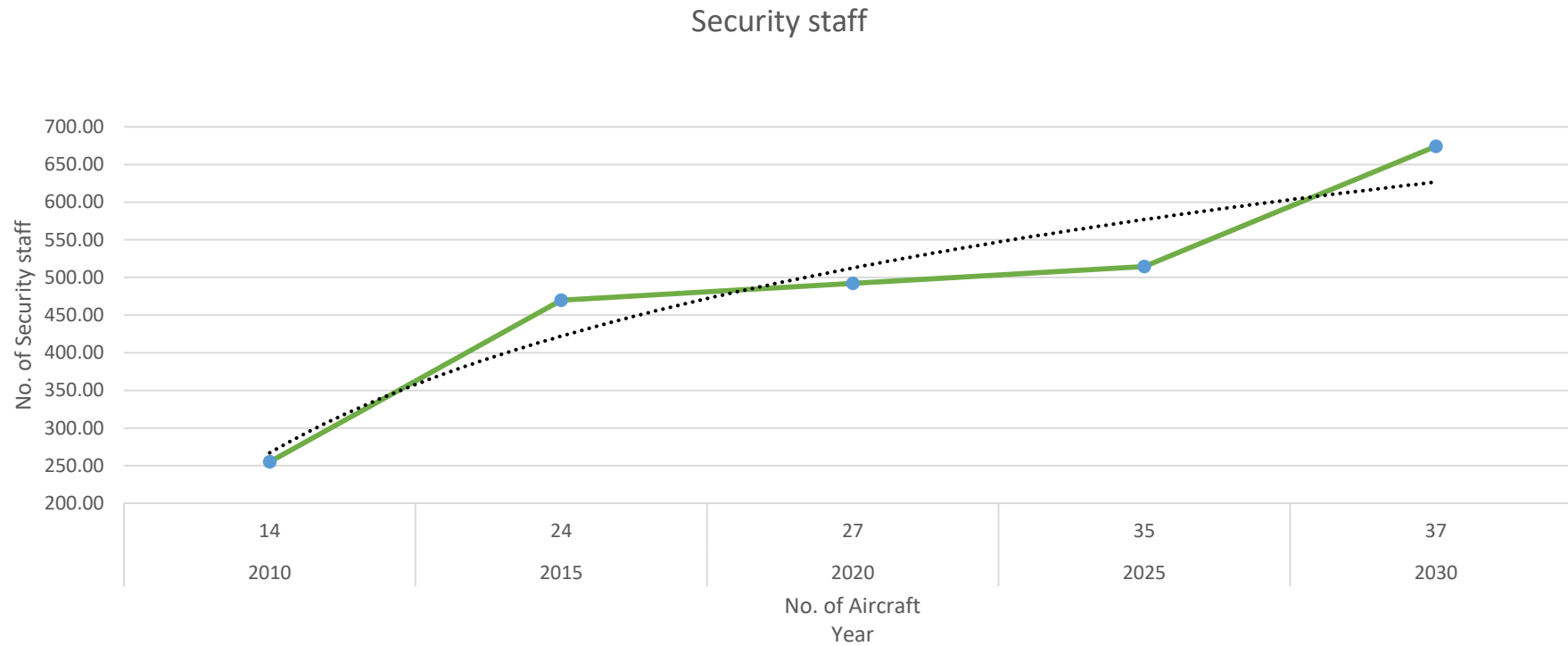


Security staff – Method 1:

Based on employment figures for years 2005 to 2018

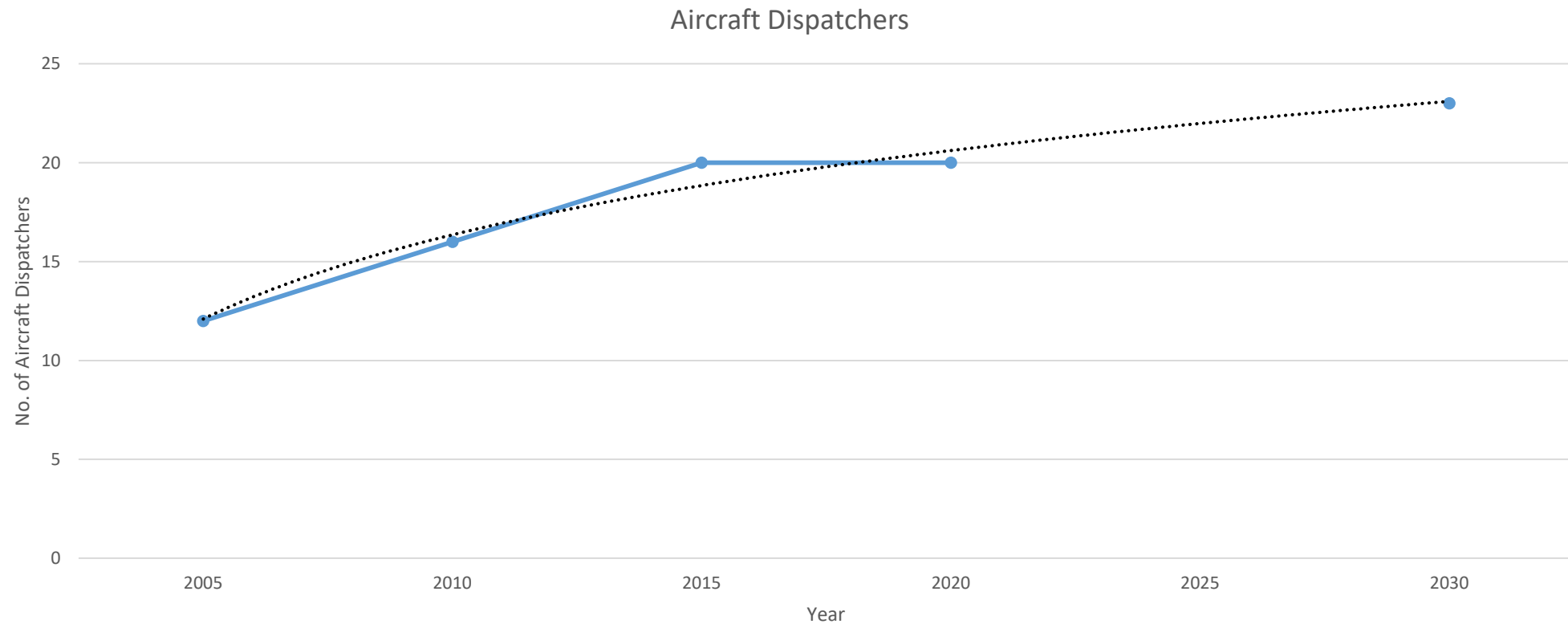


Security staff – Method 2: Based on the number of aircraft



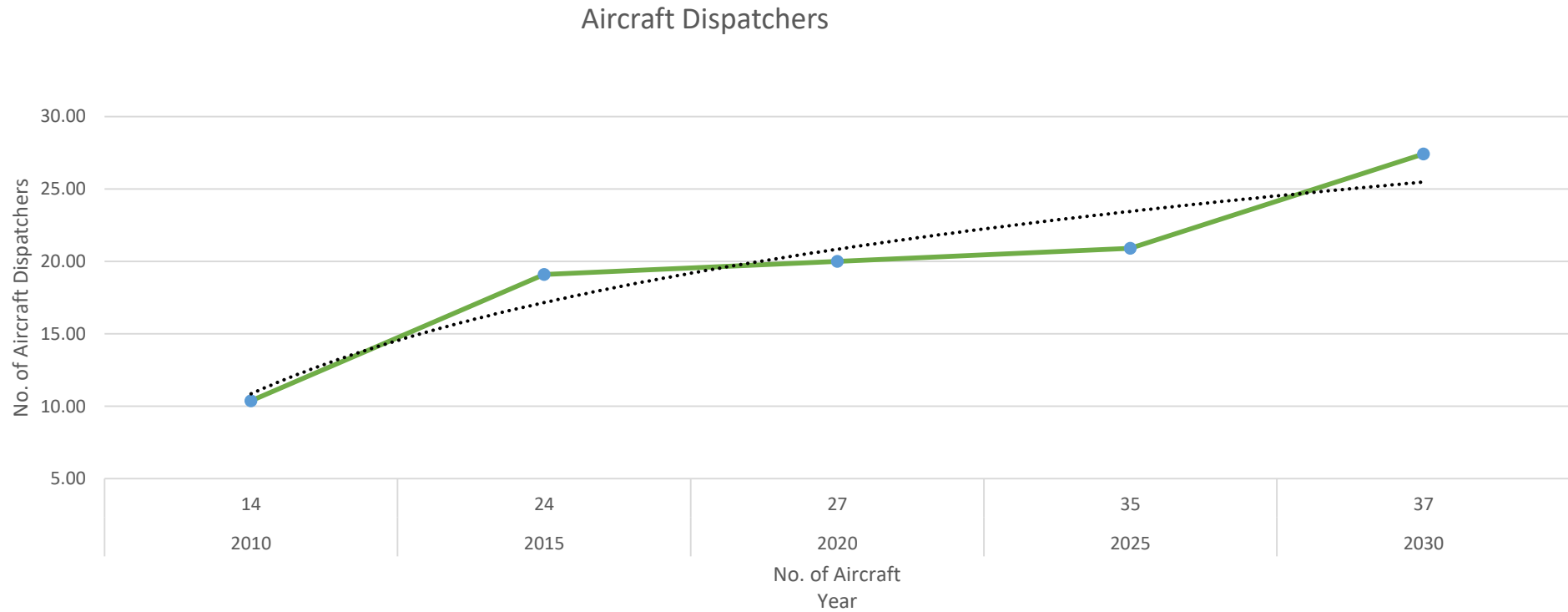
Aircraft Dispatchers – Method 1:

Based on employment figures for years 2005 to 2018



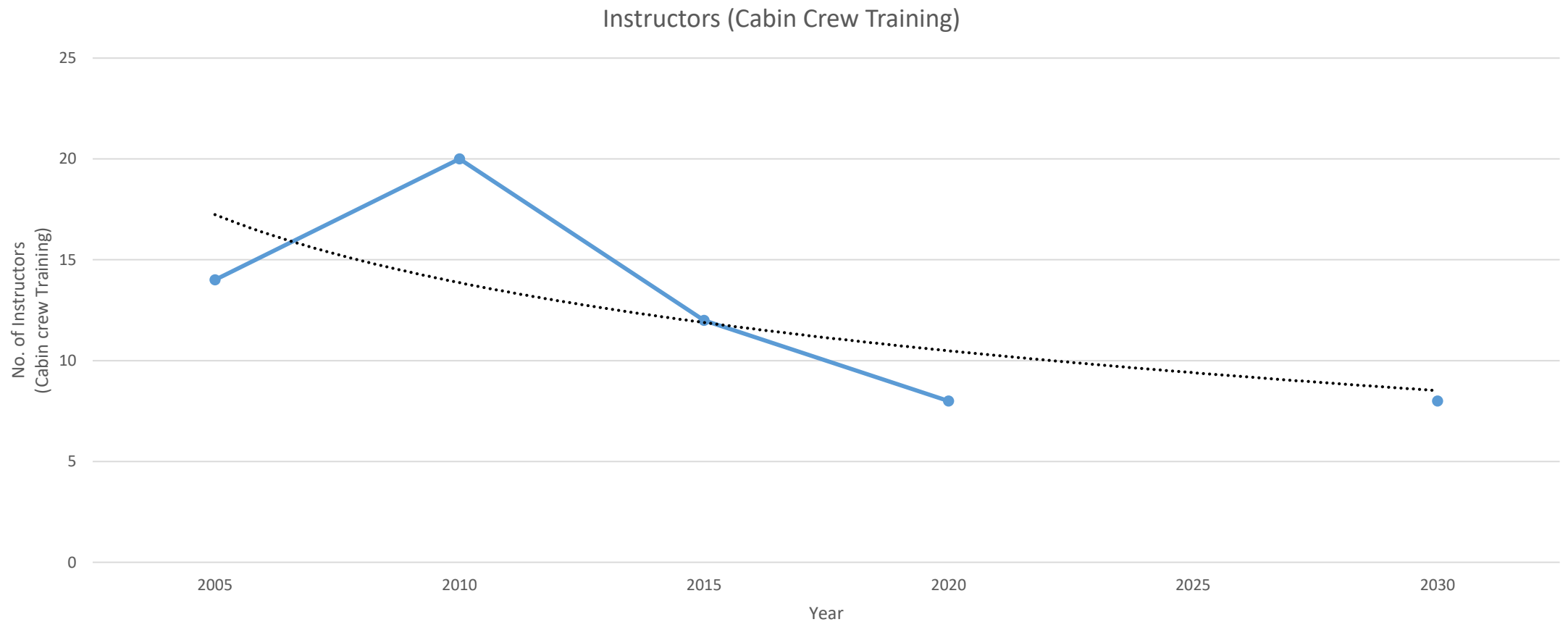
Aircraft Dispatchers – Method 2:

Based on the number of aircraft

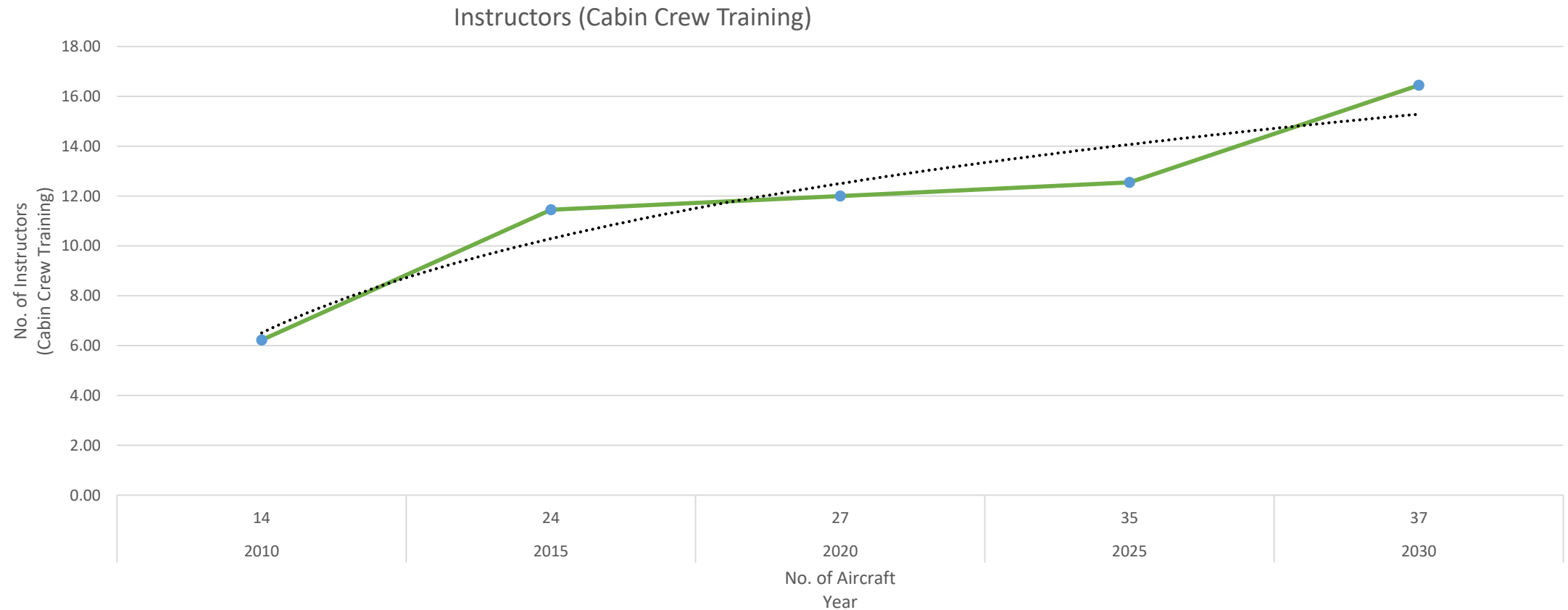


Instructors (Cabin Crew Training) – Method 1:

Based on employment figures for years 2005 to 2018

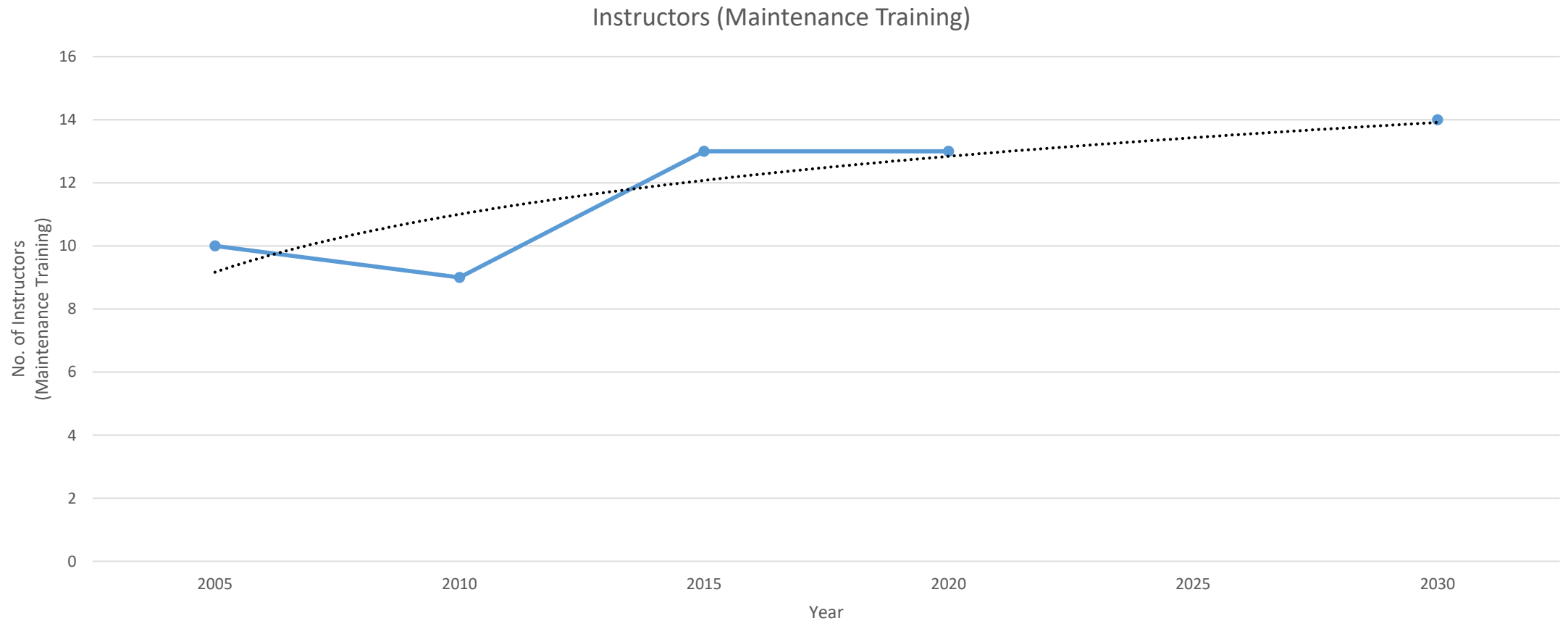


Instructors (Cabin Crew Training) – Method 2: Based on the number of aircraft

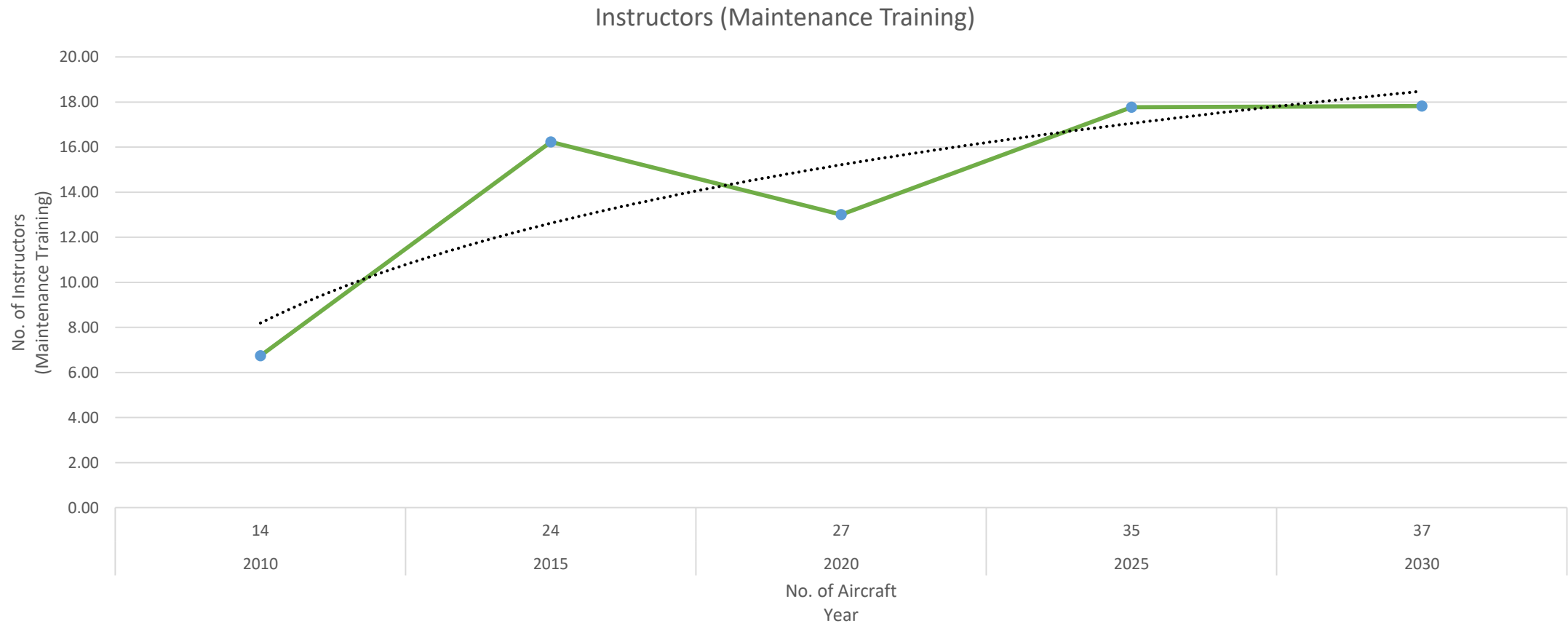


Instructors (Maintenance Training) – Method 1:

Based on employment figures for years 2005 to 2018

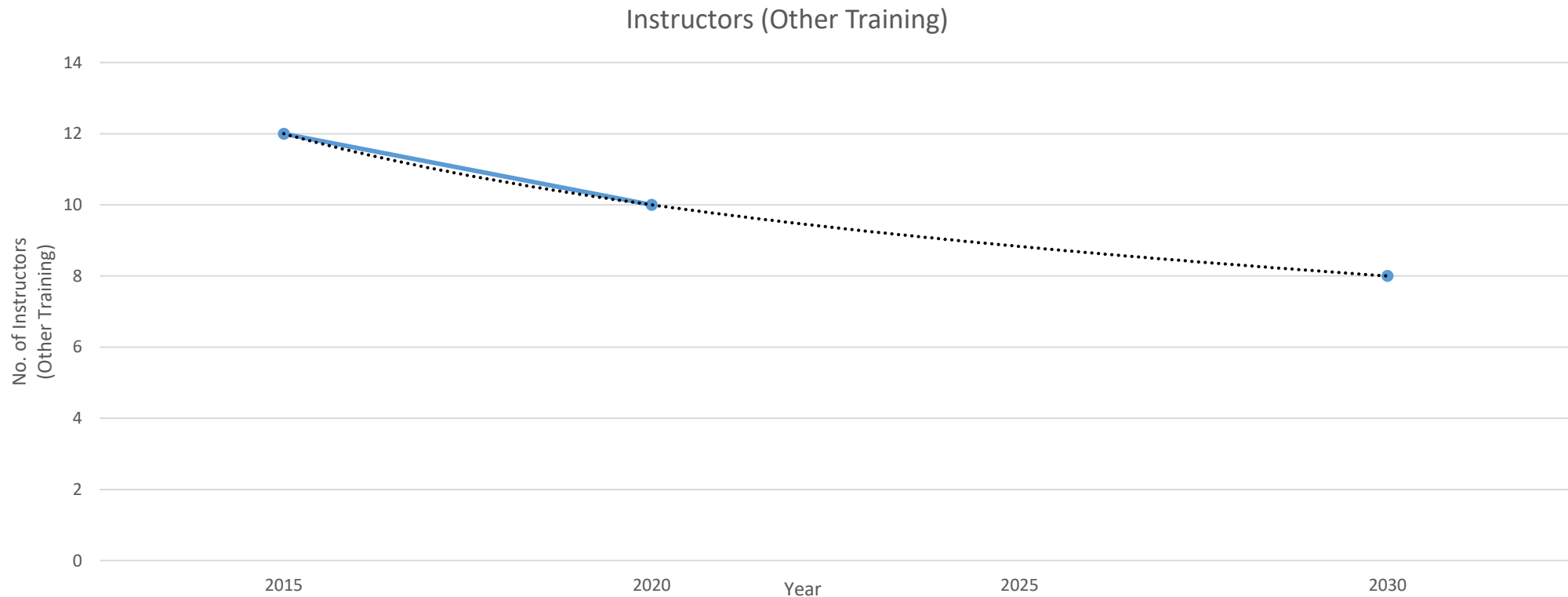


Instructors (Maintenance Training) – Method 2: Based on the number of aircraft



Instructors (Other Training) – Method 1:

Based on employment figures for years 2005 to 2018



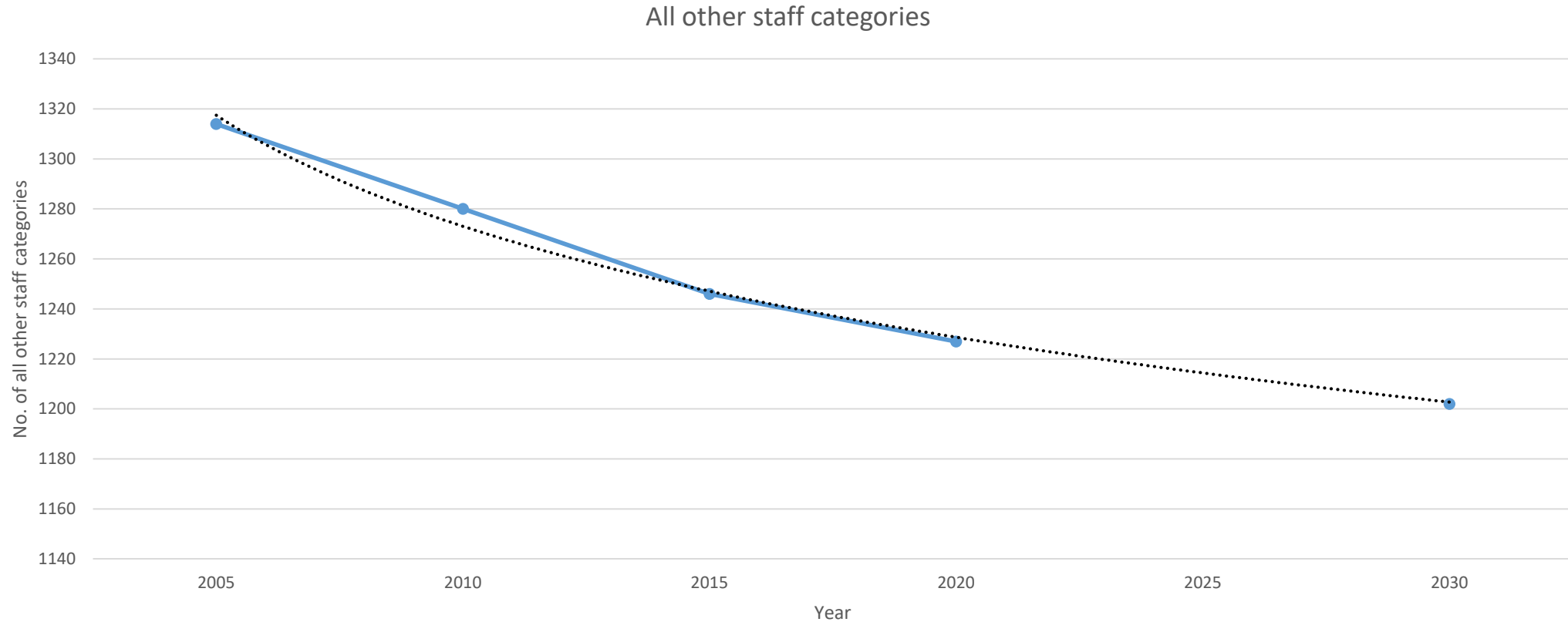
Instructors (Other Training) – Method 2:

Based on the number of aircraft

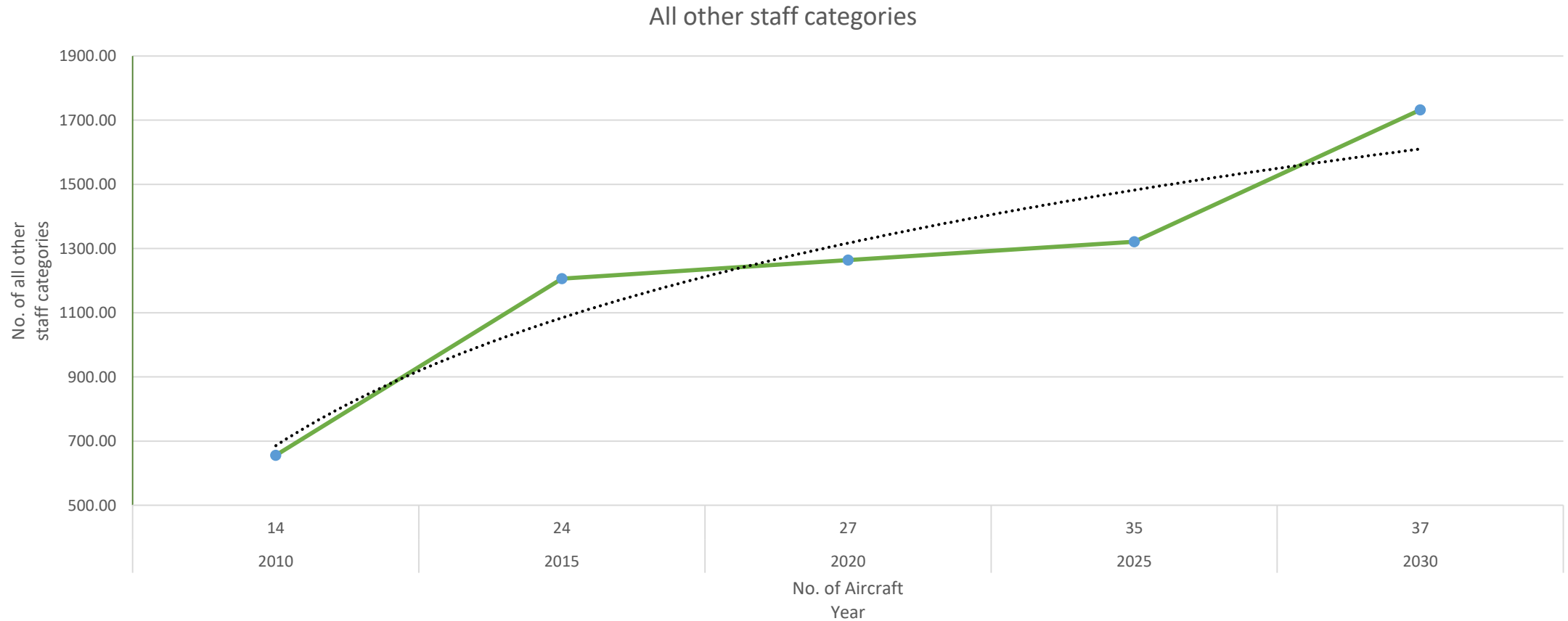


All other staff categories – Method 1:

Based on employment figures for years 2005 to 2018



All other staff categories – Method 2: Based on the number of aircraft



	Predicted 2030 (Method 01)	Predicted 2030 (Method 02)	Mean value	2030 Forecasted numbers (P)	Retirements and resignations until year 2030	Current Figure	Required number to be Trained and Qualified (Q)
AML	210	240	225	253	104	181	176
Cabin Crew	1360	1557	1459	1493	949	1210	1232
Flight Crew	380	429	368	395	221	325	291
Flight Dispatchers	29	21	25	26	52	28	50
ATC	91	126	109	142	39	82	99
ASO	21	-	21	26	39	23	42
Managers	325	375	350	350	325	296	379
Executives	540	610	575	575	494	494	575
Other Engineers	24	40	32	32	65	31	66
Aircraft Technicians/Mechanics	500	620	560	595	195	463	327
Auditors/Inspectors	19	23	21	23	7	18	12
Airport Services staff	2050	2450	2250	2369	1781	1895	2255
Cargo Operations staff	335	450	393	413	221	348	286
Security staff	550	625	588	645	624	497	772
Aircraft Dispatchers	23	25	24	28	13	20	21
Instructors (Cabin Crew Training)	8	15	12	14	39	8	45
Instructors (Maintenance Training)	14	18	16	23	13	18	18
Instructors (Other Trainings)	8	14	11	11	13	10	14
All other staff categories	1202	1600	1401	1401	975	1228	1148

Extension of Analysis to All Organizations

- In the absence of data from other organizations, following assumptions are made to achieve a viable solution for forecasting the number of aviation professionals required for Sri Lanka by year 2030.
 - To reach 2030 forecasted numbers for Sri Lanka (R), a multiplication factor (S) on those numbers for the sample organization is used.
 - $S = \frac{\text{The current number of the given category of aviation professionals in Sri Lanka}}{\text{The number of aviation professionals in that category in the Sample Organization}}$
 - Then, 2030 Forecasted number for Sri Lanka (T) = $S \times P$
where P is the “2030 Forecasted numbers for the Sample Organization”

Extension of Analysis to All Organizations

- Example based on Flight Crew:

$$\begin{aligned} S (\text{Flight Crew}) &= \frac{\text{The current number of Flight Crew in Sri Lanka}}{\text{The number of Flight Crew in Sample Organization (SriLankan Airlines)}} \\ &= \frac{410^*}{325} \\ &= 1.26 \end{aligned}$$

- Note – *410 above is a probable figure used for further explanation only. This has to be replaced with the correct figure calculated with data from other organizations obtained through CAASL*

- 2030 Forecasted number of Flight Crew required for Sri Lanka (T)
= S (Flight Crew) X P (Flight Crew)
= 1.26 X 395
= 498

Extension of Analysis to All Organizations

- Furthermore, to reach the number to be trained and qualified by 2030 for Sri Lanka (U), 20% is added to the number required for Sri Lanka. This addition is to cater for:
 - Employment of trained staff in foreign organizations
 - Employment of trained staff in different trades
 - Then, the required number to be Trained and Qualified for Sri Lanka (U) = QXS + 20%
 - Example Based on Flight Crew:
$$\begin{aligned}U (\text{Flight Crew}) &= Q (\text{Flight Crew}) \times S (\text{Flight Crew}) + 20\% \\ &= 291 \times 1.26 + 20\% \\ &= 440\end{aligned}$$

The Numbers of Aviation Professionals Required for Sri Lanka by 2030

	2030 Forecasted numbers for the Sample Organization (P)	2030 Forecasted numbers for Sri Lanka (T = PXS)	Required number to be Trained and Qualified for the Sample Organization (Q)	Required number to be Trained and Qualified for Sri Lanka (U= QXS + 20%)
AML				
Cabin Crew				
Flight Crew	395	498	291	440
Flight Dispatchers				
ATC				
ASO				
Managers				
Executives				
Other Engineers				
Aircraft Technicians/Mechanics				
Auditors/Inspectors				
Airport Services staff				
Cargo Operations staff				
Security staff				
Aircraft Dispatchers				
Instructors (Cabin Crew Training)				
Instructors (Maintenance Training)				
Instructors (Other Trainings)				
All other staff categories				

Requirements to Continue the Analysis

- In order to complete the table given in previous slide, CAASL is requested to write to all CAASL approved organizations in Sri Lanka and provide the current numbers of various aviation professionals, to the subcommittee.
- If other organizations provide more categories of Aviation Professionals than those listed in the table, the analysis can be extended to those categories by following actions:
 - Select a sample organization.
 - Request more information (such as business plans and previous employment information) from that Organization and perform a detailed analysis to find out the numbers required for that Organization in 2030.
 - Derive the numbers required for Sri Lanka by extending the numbers calculated for the sample organization, as explained in previous slides.

THANK YOU