



ANALYSIS OF THE EFFECT OF MAINTENANCE AND CALIBRATION ON THE PERFORMANCE OF THE LOCALIZER EQUIPMENT

Feti Fatonah, Lilis Kurnianingsih, Taruna Jaya

Curug Indonesian Aviation Polytechnic , Directorate Navigation Flight

Email: feti_fatonah@yahoo.co.id, taruna_jaya@yahoo.com

ABSTRACT

To support aviation safety, equipment facilities are needed that are able to provide information, guidance, and signs so that aircraft are safe from the time they take off until they land. So that the risk of landing failure can be minimized, equipment is needed that can guide the aircraft to land correctly and safely (Supriyadi, 2012). One of the navigation aids is the Instrument Landing System (ILS). An instrument landing system (ILS) is an instrument landing tool (non-visual) that assists pilots in carrying out aircraft approach and landing procedures at an airport. ILS provides information that is accurate enough so that pilots can make landings in all weather conditions. This really helps airports in carrying out their services, so that air traffic activities can run safely and smoothly. There are three information components of the ILS system, namely: Localizer Transmitter as a guide to the right/left of the runway axis/axle, Glide Slope Transmitter as a guide to the landing angle on the runway axis. Marker Beacon (Inner, Middle, Outer Marker Beacon) which is located at a certain distance from the threshold as a horizontal distance guide to the runway threshold. In aviation navigation services, Localizer equipment must be ready to operate and maintained, so maintenance and reporting procedures are required which have been specified in the Guidelines for Maintenance and Reporting of Aviation Electronics and Electrical Facilities Equipment. Apart from maintenance, navigation aids require calibration to ensure that the performance of the Localizer navigation aids is in good condition and can provide a good angle for landing in accordance with the provisions of the Instructions and Procedures for Carrying Out Calibration of Flight Facilities and Procedures. The method used in this research is a quantitative method. Based on the results of the F test, all independent variables, namely maintenance, and calibration, simultaneously or together influence the performance of the localizer equipment. This is proven by the calculated F result of $24.403 > F$ table 3.18 and a significance value of $0.000 < 0.05$.

Keywords : maintenance; calibration ; navigation; performance; localizer

INTRODUCTION

Indonesia is one of the countries that has its airport most in the world. Impact presence the airport is very felt the benefits for public because it can move from One island to island in just a matter of hours. In every airport found various facility support aviation like facilities communications , facilities navigation and facilities supervision (surveillance) (Mahieu et al., 2019). To get work results Optimal equipment is required exists various checking equipment within a certain period of time , whether daily , weekly , monthly or annually , which is intended to create safety in the world of aviation so that it can reduce number transportation accidents _ air (Agustini & Sudhana, 2014).

In support safety flight , required facility capable equipment _ give information , guidance and signs so that the plane flew safely since leaving until doing landing . So risk failure landings can be scaled down , as necessary equipment that can guide airplanes do _ landing correctly and safely (Supriyadi et al., 2012).

One _ equipment help navigation is the Instrument Landing System (ILS) (Merkisz et al., 2017). Instrument Landing System (ILS) is tool landing instruments (non-visual) that assist the pilot in carrying out procedure approach and landing plane somewhere _ airport . ILS is intended to make things easier aviator stage approach to the runway during bad weather and limited visibility (Santosa et al., 2021). ILS delivers enough information _ accurate so the pilot can do it landing in everything condition weather (Gates, 2023). This really helps the airport in doing so the service , so activity Then cross Air can flow safely and smoothly (Price & Forrest, 2016). There are three components of information from ILS system , namely : Localizer Transmitter as a guide right / left from axis / base , Glide Slope Transmitter as a guide corner landing on the axis runway (Veneruso et al., 2023). Marker Beacons (Inner, Middle, Outer Marker Beacon) located at a distance certain from threshold as a guide horizontal distance to the runway threshold .

Localizer ie transmitter that can form signal azimuth/ direction guidance , so that pilots can position the plane to straightness midline extension _ runway (center line runway). Reach Radiation (coverage) reaches 25 Nautical Miles (45Km). Localizer emits frequency carrier (CSB = Carrier Side Band) which is modulated with the signal 90Hz and 150 Hz guidelines (SBO = Side Band Only). This is what causes it second signal the have difference modulation is equal to zero (DDM = Difference Depth of Modulation) on the center line runway up _ the extension.

In service navigation flights , Localizer equipment must be in operational condition , maintained as well as well maintained , then required procedure maintenance and reporting that has been done set out in the Guidelines Maintenance and Reporting Equipment Facility Aviation Electronics and Electricity .

Apart from maintenance, tools help navigation need calibration to be sure performance tool Localizer navigation is in good condition and can deliver nice angle to do _ landing in accordance with the provisions Instructions and Procedures for Implementation calibration Facilities and Procedures Aviation .

Previous research was conducted by Feti Fatonah with the title Measurement Methods Localizer Equipment at Airports (Case Study of Sam Ratulangi Airport - Manado) in 2014 states that calibration have influence positive and significant on equipment performance . Besides that,

Previous research was also conducted by Hana Fatihah with the title Performance Analysis of the DVOR VRB-53D Landing Aid with Accuracy Periodization Calibration During the COVID-19 Pandemic at AirNav Batam Branch in 2022 stated that there is influence positive and significant about implementation calibration on the performance of DVOR equipment . Next is Iwan Nauli's research (Daulay et al., 2013) stated that preventive maintenance and corrective maintenance simultaneous influential on the Mean Time Between Failures (MTBF) of equipment , which means that maintenance has an effect positive and significant on equipment performance .

Problem Formulation

Formulation The problems in this research include :

1. Does maintenance have an effect? on equipment performance Localizer ?
2. Is calibration influential on the performance of Localizer equipment ?

Research Objectives and Benefits

This research aims to find out There is or not influence maintenance and calibration factors to equipment tool help Localizer navigation . And to find out performance tool help Localizer navigation via ground inspection data as an alternative if not implemented calibration in accordance with applicable regulations , so you can find out the effect will be happened .

The benefit of this research is that the results of the study can later be used as a reference and input for future research come and also as input to take policy on industry flight in order increase quality service navigation flight .

METHOD

Public Company Organizing Institution Service Navigation Indonesian Aviation (Perum LPPNPI) or known as AirNav Indonesia is A company that provides kite scouting Then cross flights within Indonesian territory, one branch AirNav Indonesia is located in Yogyakarta. in running service navigation flight that's one of them need Localizer equipment . Localizer equipment located in AirNav The Yogyakarta branch was installed in 2012 with the Normarc brand type NM 7013 which works at a frequency of 109.1 MHz with the IJOG ident.

B. Population and Sample

1. Population

In this research , the population used is data related to Localizer equipment at the LPPNPI Jogjakarta Branch and BBKFP. Data from Technician implementing navigation _ maintenance equipment , users in this case ATC and airlines as well Management Airnav branch Yogyakarta . Data is also taken from Implementation Calibration .

2. Sample

In this research , the sample used is a questionnaire spread amounting to approximately 60 respondents , distributed to Technicians , ATC and management Airnav Yogyakarta branch , as well as Pilot as a user , the number of returnees is 54 , so researcher using a sample of 54.

C. Data Collection Techniques

In this research , technique data collection will be carried out is as follows :

1. Literature Study

This data collection technique is carried out to find base necessary theory and collect _ information relevant to the subject the problems studied . The data source used is: ICAO

documents , annexes , journals , statutes , regulations and sources _ written otherwise. Apart from that, studies were also carried out literature done to add information that can support research , both from literature books , journals nor previous research .

2. Observation Field

Observation field done by observation in a way directly to Perum LPPNPI Jogjakarta Branch and BBKFP to obtain data. Field study done to find out condition actual implementation calibration and maintenance are carried out on time according to KP 85 OF 2014 AND SKEP 157 OF 2003.

3. Interview

We zoomed several times with technicians at Adi Sucipto Airport in Jogjakarta and did it studies directly in order to find problems to get for more information , go to Adi Sucipto Airport Jogyakarta for 2 days .

4. Questionnaire / Survey

Questionnaires / surveys are carried out by means of distributed a list of questions for respondents to answer , we carried out questionnaire / survey to 60 respondents technicians , ATC, Management at Adi Sucipto Airport Jogjakarta, Airnav Jogjakarta Branch and Airplane. And those who returned were 54 .

RESULTS AND DISCUSSION

Data Analysis

Analysis The quantitative method used is statistical methods with SPSS (Connolly, 2007). This analysis is carried out by doing taking sample through sheet questionnaire that has been shared in a way random to technicians , management and users as many as 54 respondents , in this case what is meant by users are Pilots and ATC. Based on the validity test that has been carried out carried out , can be summarized in the table following :

Table 4 . 3 Recapitulation Results Test Validity

	r count	r table	Information
X1.1	0.823	0.2262	Valid
X1.2	0.800	0.2262	Valid
X1.3	0.766	0.2262	Valid
X1.4	0.752	0.2262	Valid
X1.5	0.808	0.2262	Valid
X2.1	0.725	0.2262	Valid
X2.2	0.674	0.2262	Valid
X2.3	0.670	0.2262	Valid
X2.4	0.600	0.2262	Valid
X2.5	0.578	0.2262	Valid

Y1	0.787	0.2262	Valid
Y2	0.681	0.2262	Valid
Y3	0.869	0.2262	Valid
Y4	0.756	0.2262	Valid
Y5	0.707	0.2262	Valid

Based on table above , can be taken conclusion that all items have calculated r value > r table , then all items are declared valid and can be used as a reference in research .

Reliability Test

(Sugiyono, 2010) stated that the reliability test is the extent to which the measurement results are used the same object , will produce the same data. Reliability test is used in the analysis statistics research to find out how much consistent questionnaire used in research so that questionnaire can be used to measure variable research , even If study carried out with the same questionnaire or questionnaire repeatedly. According to (R. Juliandi, 2017) in determining question items in the reliable criteria category The test is as follows :

1. When mark coefficient Cronbach alpha is more than 0.6 then instrument declared reliable or trustworthy .
2. When mark coefficient Cronbach alpha is less than 0.6 then instrument declared unreliable or untrustworthy .

Reliability Statistics

Cronbach's Alpha	N of Items
.842	5

Figure 4.4 X1 Reliability Test Results

Based on above , reliability test output variable X1 is known that the value N of Items contains The number of question items on the questionnaire is 5 with a value Cronbach's alpha is 0.842, so it can be taken conclusion that all question items for the maintenance variable (X1) is reliable or consistent and can be used reference for doing it research .

Reliability Statistics

Cronbach's Alpha	N of Items
.653	5

Figure 4.5 X2 Validity Test Results

Based on above , reliability test output variable X2 is known that the value N of Items contains The number of question items on the questionnaire is 5 with a value Cronbach's alpha

is 0.653, so it can be taken conclusion that all question items for variables calibration (X₂) is reliable or consistent and can be used reference for doing it research .

Reliability Statistics

Cronbach's Alpha	N of Items
.774	5

Figure 4.6 Y Validity Test Results

Based on above , reliability test output variable Y is known that the value N of Items contains The number of question items on the questionnaire is 5 with a value Cronbach's alpha is 0.774, so it can be taken conclusion that all question items for the performance variable (Y) are reliable or consistent and can be used reference for doing it research .

Test Assumptions Classic

Test assumptions classic done to be sure that the resulting regression model is the best in terms of accuracy estimates , unbiased and consistent (A. Juliandi, 2014).

Normality Test

normality test is a statistical test used to determine How spread a data (Qomusuddin & Romlah, 2021). If the data is normally distributed , it can be stated that sample data can be used because has represent existing population (Mishra et al., 2019). _ In research, data is declared normal if mark significance (sig.) is more than 0.05. Based on the normality test that has been carried out done so The output results obtained are as follows :

Figure 4.7 Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual	
N		54	
Normal Parameters ^{a,b}	Mean	.0000000	
	Std. Deviation	2.20796522	
Most Extreme Differences	Absolute	.065	
	Positive	.043	
	Negative	-.065	
Test Statistic		.065	
Asymp. Sig. (2-tailed) ^c		.200 ^d	
Monte Carlo Sig. (2-tailed) ^e	Sig.	.813	
	99% Confidence Interval	Lower Bound	.803
		Upper Bound	.823

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.
- d. This is a lower bound of the true significance.
- e. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

Based on table above can be seen that mark significance of 0.200, which means it is bigger from 0.05. Then it can be taken conclusion that the data is normally distributed , so condition normality in regression tests has fulfilled .

Autocorrelation Test

According to Singgih Santoso (2012:241), " the purpose of the autocorrelation test is to find out whether in a linear regression model there is correlation between error disturbance in period t with errors in period t- 1 (previous)". If it happens correlation , then named there is an autocorrelation problem . To find out happened or not autocorrelation can be carried out by the Durbin Watson test, if Durbin Watson value (d) is less than dL value or greater of (4-dL) then there is autocorrelation . If d value lies between dU and (4-dU) then do not exist autocorrelation .

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.699 ^a	.489	.469	2.251	1.849

a. Predictors: (Constant), Kalibrasi, Maintenance

b. Dependent Variable: Performance

Figure 4.8 Autocorrelation Test Results

In table above can be seen that Durbin Watson value is 1.849. Based on Durbin Watson's table is known mark dU is 1.6383 and the dL value is 1.4851. So it can be concluded that the Durbin-Watson Value (d) is greater from the upper limit (dU) which is 1.6383 and less than (4-du) $4 - 1.6383 = 2.3617$, so there is no problem or symptom autocorrelation . Thus _ so analysis multiple linear regression for hypothesis testing The above research can be carried out or continued .

Heteroscedasticity Test

Heteroscedasticity Test aims to test whether in the regression model happen inequality variation from residual value of a observation to another observation . If residual value one observations to other observations are permanent, then called homoscedasticity , however if residual value one observation to other observation is different then called heteroscedasticity . The ideal regression model should not occur symptom heteroscedasticity . In this research to detect whether there is or not symptom heteroscedasticity is using the Glejser test . As for the basics taking the decision is as follows :

1. When mark significance (Sig.) is greater than 0.05, then it doesn't happen symptom heteroscedasticity in regression models .
2. When mark significance (Sig.) is smaller rather than 0.05, then happen symptom heteroscedasticity in regression models .

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.930	2.149		-1.364	.179
	Maintenance	.103	.071	.195	1.455	.152
	Kalibrasi	.111	.067	.222	1.659	.103

a. Dependent Variable: ABs_RES

Figure 4.9 Heteroscedasticity Test Results

Based on the output table above is known mark The significance (Sig.) for the Maintenance variable (X1) is 0.152. Meanwhile, value significance (Sig.) for the variable Calibration (X2) is 0.103. Because of value significance second the above variables are greater of 0.05 then according to the basics taking the decision in the glejser test , can be concluded that didn't happen symptom heteroscedasticity in regression models .

Multicollinearity Test

multicollinearity test is used to find out what is the regression model in the research found exists correlation (relationship strong) between variable free or independent variable . A good regression model should not occur correlation between variable free , or none symptom multicollinearity . Regression model stated that it does not exist symptom multicollinearity if tolerance value more than 0.10 or VIF value less than 10.0.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10.504	3.664		2.867	.006		
	Maintenance	.768	.121	.637	6.366	.000	1.000	1.000
	Kalibrasi	-.316	.114	-.277	-2.766	.008	1.000	1.000

a. Dependent Variable: Performance

Figure 4.10 Multicollinearity Test Results

Based on table on is known that The VIF value for the maintenance (X1) and calibration (X2) variables is 1,000, meanwhile the tolerance value is 1,000 for both variable free that . VIF value in both variable less than 10.0 and the second tolerance value variable is more than 0.10 then this does not happen symptom multicollinearity in regression models .

Multiple Linear Regression

Analysis multiple linear regression is used to test the influence of two or more independent variables on One dependent variable . As for the formula equality multiple linear regression is as follows : $Y = a + b_1 X_1 + b_2 X_2$

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.504	3.664		2.867	.006
	Maintenance	.768	.121	.637	6.366	.000
	Kalibrasi	-.316	.114	-.277	-2.766	.008

a. Dependent Variable: Performance

Figure 4.11 Multiple Linear Regression Results

Based on output table above equations were found multiple linear regression as follows : $Y = 10.504 + 0.768 X_1 - 0.316 X_2$

From Eq above can be seen that mark the constant a is 10.504, which means if maintenance (X1) and calibration (X2) variables are not included into the study so performance value (Y) is 10.504%. The b1 coefficient value is 0.768 and is valuable positive , then for each addition of one mark maintenance variable (X1) then will increase mark the performance variable (Y) is 0.768 while maintaining mark calibration (X2). The b2 coefficient value is -0.316 and is valuable negative , then if mark calibration (X2) has increased by One value , then the performance value (Y) will be experience decline of 0.316 or 31.6%.

F Test (Simultaneous)

The F test is a coefficient test regression in a way together . This test is carried out to test significance the influence of several independent variables on dependent variable . If the calculated f value is more than table f value or value significance (sig.) is less than 0.05, then independent variable _ simultaneous (together) influence to dependent variable .

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	247.267	2	123.634	24.403	.000 ^b
	Residual	258.381	51	5.066		
	Total	505.648	53			

a. Dependent Variable: Performance
 b. Predictors: (Constant), Kalibrasi, Maintenance

Figure 4.12 F Test Results

In the SPSS output table above , it is known Sig value . is 0.000, then sig value . 0.000 < 0.05 so it can be concluded that maintenance (X1) and calibration (X2) have an effect in a way simultaneous to performance variable (Y).

As for based on SPSS output table , known that calculated F value amounting to 24.403 > F table 3.18, so it can be interpreted that maintenance (X1) and calibration (X2) are simultaneous influential on performance (Y).

In determining F value table can use formula F table = (k; n- k). The value "k" is amount variable independent in research , while "n" is the number respondents in research . This research was conducted using 2 variables independent and 54 respondents so The F table value can be seen in the table following .

Titik Persentase Distribusi F untuk Probabilita = 0,05

df untuk penyebut (N2)	df untuk pembilang (N1)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
46	4.05	3.20	2.81	2.57	2.42	2.30	2.22	2.15	2.09	2.04	2.00	1.97	1.94	1.91	1.89
47	4.05	3.20	2.80	2.57	2.41	2.30	2.21	2.14	2.09	2.04	2.00	1.96	1.93	1.91	1.88
48	4.04	3.19	2.80	2.57	2.41	2.29	2.21	2.14	2.08	2.03	1.99	1.96	1.93	1.90	1.88
49	4.04	3.19	2.79	2.56	2.40	2.29	2.20	2.13	2.08	2.03	1.99	1.96	1.93	1.90	1.88
50	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.03	1.99	1.95	1.92	1.89	1.87
51	4.03	3.18	2.79	2.55	2.40	2.28	2.20	2.13	2.07	2.02	1.98	1.95	1.92	1.89	1.87
52	4.03	3.18	2.78	2.55	2.39	2.28	2.19	2.12	2.07	2.02	1.98	1.94	1.91	1.89	1.86
53	4.02	3.17	2.78	2.55	2.39	2.28	2.19	2.12	2.06	2.01	1.97	1.94	1.91	1.88	1.86
54	4.02	3.17	2.78	2.54	2.39	2.27	2.18	2.12	2.06	2.01	1.97	1.94	1.91	1.88	1.86
55	4.02	3.16	2.77	2.54	2.38	2.27	2.18	2.11	2.06	2.01	1.97	1.93	1.90	1.88	1.85
56	4.01	3.16	2.77	2.54	2.38	2.27	2.18	2.11	2.05	2.00	1.96	1.93	1.90	1.87	1.85
57	4.01	3.16	2.77	2.53	2.38	2.26	2.18	2.11	2.05	2.00	1.96	1.93	1.90	1.87	1.85
58	4.01	3.16	2.76	2.53	2.37	2.26	2.17	2.10	2.05	2.00	1.96	1.92	1.89	1.87	1.84
59	4.00	3.15	2.76	2.53	2.37	2.26	2.17	2.10	2.04	2.00	1.96	1.92	1.89	1.86	1.84
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.95	1.92	1.89	1.86	1.84
61	4.00	3.15	2.76	2.52	2.37	2.25	2.16	2.09	2.04	1.99	1.95	1.91	1.88	1.86	1.83
62	4.00	3.15	2.75	2.52	2.36	2.25	2.16	2.09	2.03	1.99	1.95	1.91	1.88	1.85	1.83
63	3.99	3.14	2.75	2.52	2.36	2.25	2.16	2.09	2.03	1.98	1.94	1.91	1.88	1.85	1.83
64	3.99	3.14	2.75	2.52	2.36	2.24	2.16	2.09	2.03	1.98	1.94	1.91	1.88	1.85	1.83
65	3.99	3.14	2.75	2.51	2.36	2.24	2.15	2.08	2.03	1.98	1.94	1.90	1.87	1.85	1.82
66	3.99	3.14	2.74	2.51	2.35	2.24	2.15	2.08	2.03	1.98	1.94	1.90	1.87	1.84	1.82
67	3.98	3.13	2.74	2.51	2.35	2.24	2.15	2.08	2.02	1.98	1.93	1.90	1.87	1.84	1.82
68	3.98	3.13	2.74	2.51	2.35	2.24	2.15	2.08	2.02	1.97	1.93	1.90	1.87	1.84	1.82
69	3.98	3.13	2.74	2.50	2.35	2.23	2.15	2.08	2.02	1.97	1.93	1.90	1.86	1.84	1.81
70	3.98	3.13	2.74	2.50	2.35	2.23	2.14	2.07	2.02	1.97	1.93	1.89	1.86	1.84	1.81
71	3.98	3.13	2.73	2.50	2.34	2.23	2.14	2.07	2.01	1.97	1.93	1.89	1.86	1.83	1.81
72	3.97	3.12	2.73	2.50	2.34	2.23	2.14	2.07	2.01	1.96	1.92	1.89	1.86	1.83	1.81
73	3.97	3.12	2.73	2.50	2.34	2.23	2.14	2.07	2.01	1.96	1.92	1.89	1.86	1.83	1.81
74	3.97	3.12	2.73	2.50	2.34	2.22	2.14	2.07	2.01	1.96	1.92	1.89	1.85	1.83	1.80
75	3.97	3.12	2.73	2.49	2.34	2.22	2.13	2.06	2.01	1.96	1.92	1.88	1.85	1.83	1.80
76	3.97	3.12	2.72	2.49	2.33	2.22	2.13	2.06	2.01	1.96	1.92	1.88	1.85	1.82	1.80
77	3.97	3.12	2.72	2.49	2.33	2.22	2.13	2.06	2.00	1.96	1.92	1.88	1.85	1.82	1.80
78	3.96	3.11	2.72	2.49	2.33	2.22	2.13	2.06	2.00	1.95	1.91	1.88	1.85	1.82	1.80
79	3.96	3.11	2.72	2.49	2.33	2.22	2.13	2.06	2.00	1.95	1.91	1.88	1.85	1.82	1.79
80	3.96	3.11	2.72	2.49	2.33	2.21	2.13	2.06	2.00	1.95	1.91	1.88	1.84	1.82	1.79
81	3.96	3.11	2.72	2.48	2.33	2.21	2.12	2.05	2.00	1.95	1.91	1.87	1.84	1.82	1.79
82	3.96	3.11	2.72	2.48	2.33	2.21	2.12	2.05	2.00	1.95	1.91	1.87	1.84	1.81	1.79
83	3.96	3.11	2.71	2.48	2.32	2.21	2.12	2.05	1.99	1.95	1.91	1.87	1.84	1.81	1.79
84	3.95	3.11	2.71	2.48	2.32	2.21	2.12	2.05	1.99	1.95	1.90	1.87	1.84	1.81	1.79
85	3.95	3.10	2.71	2.48	2.32	2.21	2.12	2.05	1.99	1.94	1.90	1.87	1.84	1.81	1.79
86	3.95	3.10	2.71	2.48	2.32	2.21	2.12	2.05	1.99	1.94	1.90	1.87	1.84	1.81	1.78
87	3.95	3.10	2.71	2.48	2.32	2.20	2.12	2.05	1.99	1.94	1.90	1.87	1.83	1.81	1.78
88	3.95	3.10	2.71	2.48	2.32	2.20	2.12	2.05	1.99	1.94	1.90	1.86	1.83	1.81	1.78
89	3.95	3.10	2.71	2.47	2.32	2.20	2.11	2.04	1.99	1.94	1.90	1.86	1.83	1.80	1.78
90	3.95	3.10	2.71	2.47	2.32	2.20	2.11	2.04	1.99	1.94	1.90	1.86	1.83	1.80	1.78

Table 4.4 F Distribution Table

t test (Partial)

The t test was carried out to find out is there is influence from independent variable or variable free to dependent variable or variables bound in a way partial or individually . __ Basis for taking The decision on the t test is as follows :

1. If value significance (sig.) < probability 0.05 then There is influence variable free (X) against variable bound (Y).
2. If value significance (sig.) > probability 0.05 then it doesn't exist influence variable free (X) against variable bound (Y).

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.504	3.664		2.867	.006
	Maintenance	.768	.121	.637	6.366	.000
	Kalibrasi	-.316	.114	-.277	-2.766	.008

a. Dependent Variable: Performance

Figure 4.13 t test results

In the output table above, it is known that the significance (sig.) of the maintenance variable (X1) is 0.000. Then the sig value < 0.05 , so it can be concluded that the maintenance variable (X1) has an effect in a way Partial on performance (Y).

Based on output table above, value significance (sig.) of the variable calibration (X2) is 0.008, so it can be known that sig value < 0.05 and can be concluded that calibration (X2) has an effect in a way Partial on performance (Y).

R2 test (Coefficient Determination)

Coefficient determination serves to find out percentage big influence variable independent to variable dependent .

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.699 ^a	.489	.469	2.251

a. Predictors: (Constant), Kalibrasi, Maintenance

Figure 4.14 Coefficient Test Results Determination

In table on is known that The R-Square value is 0.489 or 48.9% which means that maintenance variable (X1) and variables calibration (X2) automatically simultaneously (together) influence performance variable (Y) was 48.9%. Whereas amounting to the remaining 51.1% influenced by other variables not examined in this study .

CONCLUSION

From research and discussion then it can be taken conclusion as follows : Variable X1 (maintenance) has significant influence and can improve mark variable Y (performance) of localizer equipment . Variable X2 (calibration) has a significant effect and can improve mark variable Y (performance) of localizer equipment . Variable free namely maintenance and calibration in a way Simultaneously or together , it affects localizer equipment performance by 48.9%. Whereas amounting to the remaining 51.1% influenced by other variables not examined in this study .

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