4 Annex

4.1 Annex 1: Questionnaires to pilots

4.1.1 Confidence rate in GPS

EMBRY-RIDDLE Aeronautical University DAYTONA BEACH, FLORIDA

Confidence rate in GPS

ÉCOLE DE L'AIR & DE L'ESPACE SALON-DE-PROVENCE

Full Name ____________ Age ______ Level of expertise ____________

Total flight time ______ Number of hours flown on Cessna 172 ______

How do you assess GPS proficiency ?

○ 1- not competent	○ 2	○ 3
○ 4	○ 5	○ 6- very competent

How do you judge the veracity of GPS ?

○ 1- unreliable	○ 2	○ 3
○ 4	○ 5	○ 6- very reliable

Do you know how GPS works?

○ 1- not really	○ 2	○ 3
○ 4	○ 5	○ 6- I know all its operations

Do you know the risks of using GPS ?

○ 1- not really	○ 2	○ 3
○ 4	○ 5	○ 6-absolutely

How confident do you think you are in the GPS?

○ Total Mistrust
○ Ignorance
○ Minimum Confidence
○ Average Confidence
○ High Confidence
○ Blind Confidence

Thank you for taking the time to complete it

4.1.2 Workload analysis

Workload analysis

EMBRY-RIDDLE Aeronautical University DAYTONA BEACH, FLORIDA

ÉCOLE DE L'AIR & DE L'ESPACE SALON-DE-PROVENCE

Full Name ____________________ Age _______ Level of expertise _______________

Total flight time _______ Number of hours flown on Cessna 172 _______

Score from 0 to 100

Mental load: To what extent did the use of GPS require significant mental and cognitive effort?

0: not at all- 100: a lot ____________________

Physical load: Did you experience physical fatigue from using the GPS ?

0: not at all - 100: a lot ____________________

Time load: Did you feel time pressure to process GPS information in flight?

0: not really - 100: a lot ____________________

Perceived performance: How well do you think you used GPS to navigate despite the interference?

0: poor performance- 100: very good ____________________

Overall effort: How much effort did you have to put into understanding and using GPS?

0: not much- 100: a lot of effort ____________________

Frustration: Did you experience frustration or annoyance when using GPS?

0: not really- 100: absolutely ____________________

Thank you for taking the time to complete it

4.2 Annex 2: FlyWithLua Scripts

4.2.1 First scenario: KAPF- KFMY

```lua
-- Affichage du message dans la console FlyWithLua
logMsg("Chargement du script : plusieurs boutons de spoofing")

-- Variables activations
local spoofing_active = {DEUX = false, TROIS = false, QUATRE = false,
    SEPT = false, UN = false, SIX = false, CINQ = false }

-- Stockage des valeurs originales
local original_values = {
    DEUX = get("sim/cockpit/radios/gps_dme_dist_m"),
    TROIS = get("sim/cockpit/radios/gps_course_degtm"),
    QUATRE = get("sim/cockpit/radios/obs_mag"),
    SEPT = get("sim/cockpit/autopilot/heading_mag"),
    UN = get("sim/cockpit/radios/gps_dme_time_secs"),
    SIX = get("sim/cockpit/radios/gps_dme_dist_m"),
    CINQ = get("sim/cockpit/radios/gps_dme_time_secs")
}

-- Valeurs spoofees initiales
local spoof_values = {DEUX = 2 , TROIS = 348, QUATRE = 348, SEPT = 90.0,
     UN = 1, SIX = 23.5, CINQ = 6*60}
-- Facteurs de variation
local variation = {DEUX = -0.0002, TROIS = 0.001, QUATRE = 0.001, SEPT =
     -0.001, UN = -0.0001, SIX = -0.0008, CINQ = -0.01}

-- Fonction principale executee en continu
function spoof_gps()
    -- Verifier si au moins un parametre GPS est active
    local gps_override = spoofing_active.DEUX or spoofing_active.TROIS
        or spoofing_active.QUATRE or spoofing_active.SEPT or
        spoofing_active.UN or spoofing_active.SIX or spoofing_active.CINQ
    set("sim/operation/override/override_gps", gps_override and 1 or 0)

    -- Mise a jour des valeurs uniquement si le parametre est active
    if spoofing_active.DEUX then
        spoof_values.DEUX = spoof_values.DEUX + variation.DEUX
        if spoof_values.DEUX < 0 then
            spoof_values.DEUX = 0
        end
        set("sim/cockpit/radios/gps_dme_dist_m", spoof_values.DEUX)
    end
    if spoofing_active.TROIS then
        spoof_values.TROIS = ((spoof_values.TROIS + variation.TROIS) %
            360 + 360) % 360
        if spoof_values.TROIS > 357 then
            spoof_values.TROIS = 357
        end
        set("sim/cockpit/radios/gps_course_degtm", spoof_values.TROIS)
    end
    if spoofing_active.QUATRE then
        spoof_values.QUATRE = spoof_values.QUATRE + variation.QUATRE
        if spoof_values.QUATRE > 357 then
            spoof_values.QUATRE = 357
```

```
        end
        set("sim/cockpit/radios/obs_mag", spoof_values.QUATRE)
    end
    if spoofing_active.SEPT then
        spoof_values.SEPT = spoof_values.SEPT + variation.SEPT
        set("sim/cockpit/autopilot/heading_mag", spoof_values.SEPT)
    end
    if spoofing_active.UN then
        spoof_values.UN = spoof_values.UN + variation.UN
        if spoof_values.UN < 0 then
            spoof_values.UN = 0
        end
        set("sim/cockpit/radios/gps_dme_time_secs", spoof_values.UN)
    end
    if spoofing_active.SIX then
        spoof_values.SIX = spoof_values.SIX + variation.SIX
        if spoof_values.SIX < 0 then
            spoof_values.SIX = 0
        end
        set("sim/cockpit/radios/gps_dme_dist_m", spoof_values.SIX)
    end
    if spoofing_active.CINQ then
        spoof_values.CINQ = spoof_values.CINQ + variation.CINQ
        if spoof_values.CINQ < 0 then
            spoof_values.CINQ = 0
        end
        set("sim/cockpit/radios/gps_dme_time_secs", spoof_values.CINQ)
    end
end
do_every_frame("spoof_gps()")

-- Fonction activation/desactivation
function toggleSpoofing(parameter)
    spoofing_active[parameter] = not spoofing_active[parameter]

    if not spoofing_active[parameter] then
        -- Retablir uniquement la valeur desactivee, sans toucher aux autres
        if parameter == "DEUX" then set("sim/cockpit/radios/gps_dme_dist_m", original_values.DEUX) end
        if parameter == "TROIS" then set("sim/cockpit/radios/gps_course_degtm", original_values.TROIS) end
        if parameter == "QUATRE" then set("sim/cockpit/radios/obs_mag", original_values.QUATRE) end
        if parameter == "SEPT" then set("sim/cockpit/autopilot/heading_mag", original_values.SEPT) end
        if parameter == "UN" then set("sim/cockpit/radios/gps_dme_time_secs", original_values.UN) end
        if parameter == "SIX" then set("sim/cockpit/radios/gps_dme_dist_m", original_values.SIX) end
        if parameter == "CINQ" then set("sim/cockpit/radios/gps_dme_time_secs", original_values.CINQ) end
    end

    logMsg("Spoofing " .. parameter .. (spoofing_active[parameter] and " ACTIVE" or " DESACTIVE"))
end
```

```lua

-- Interface utilisateur
function draw_spoofing_buttons()
    for param, active in pairs(spoofing_active) do
        if imgui.Button((active and "Desactiver " or "Activer ") ..
           param) then
            toggleSpoofing(param)
        end
    end
end

-- Creation fenetre avec les boutons
spoofing_window = float_wnd_create(300, 200, 1, true)
--float_wnd_set_title(spoofing_window, "Spoofing GPS")
float_wnd_set_imgui_builder(spoofing_window, "draw_spoofing_buttons")

logMsg("Script charge : plusieurs boutons prets a l'emploi")
```

4.2.2 Second scenario: KTPA 3 NM approach

```lua
-- Affichage du message dans la console FlyWithLua
logMsg("Chargement du script : plusieurs boutons de spoofing")

-- Variables activations
local spoofing_active = {UN = false}

-- Stockage des valeurs originales
local original_values = {
    UN = get("sim/cockpit2/gauges/indicators/airspeed_kts_pilot")
}

-- Valeurs spoofees initiales
local spoof_values = {UN = 100}

-- Facteurs de variation
local variation = {UN = 0.02}

-- Fonction principale executee en continu
function spoof_gps()
    -- Mise a jour des valeurs uniquement si le parametre est active
    if spoofing_active.UN then
        spoof_values.UN = spoof_values.UN + variation.UN
        if spoof_values.UN > 130 then
            spoof_values.UN = 130
        end
        set("sim/cockpit2/gauges/indicators/airspeed_kts_pilot",
            spoof_values.UN)
        set("sim/flightmodel/position/indicated_airspeed", spoof_values.
            UN)
    end
end

do_every_frame("spoof_gps()")

-- Fonction activation/desactivation
function toggleSpoofing(parameter)
    spoofing_active[parameter] = not spoofing_active[parameter]

    if not spoofing_active[parameter] then
        -- Retablir uniquement la valeur desactivee, sans toucher aux
            autres
        if parameter == "UN" then
            set("sim/cockpit2/gauges/indicators/airspeed_kts_pilot",
                original_values.VI)
            set("sim/flightmodel/position/indicated_airspeed",
                original_values.VI)
        end
    end

    logMsg("Spoofing " .. parameter .. (spoofing_active[parameter] and "
        ACTIVE" or " DESACTIVE"))
end

-- Interface utilisateur
function draw_spoofing_buttons()
```

```
    for param, active in pairs(spoofing_active) do
        if imgui.Button((active and "Desactiver " or "Activer ") ..
            param) then
            toggleSpoofing(param)
        end
    end
end

-- Creation une fenetre avec les boutons
spoofing_window = float_wnd_create(300, 200, 1, true)
--float_wnd_set_title(spoofing_window, "Spoofing GPS")
float_wnd_set_imgui_builder(spoofing_window, "draw_spoofing_buttons")

logMsg("Script charge : plusieurs boutons prets a l emploi")
```

4.2.3 Third scenario: KDAB- KOMN

```lua
-- Affichage du message dans la console FlyWithLua
logMsg("Chargement du script : plusieurs boutons de spoofing avec vitesse")

-- Variables activations
local spoofing_active = { UN = false, DEUX = false}

-- Stockage des valeurs originales
local original_values = {
    VI = get("sim/cockpit2/gauges/indicators/airspeed_kts_pilot")
}

-- Valeurs spoofees initiales
local spoof_values = { UN = 100, DEUX = 60}

-- Facteurs de variation
local variation = { UN = -0.008, DEUX = -0.05}

-- Fonction principale executee en continu
function spoof_gps()
    -- Mise a jour des valeurs uniquement si le parametre est active
    if spoofing_active.UN then
        spoof_values.UN = spoof_values.UN + variation.UN
        if spoof_values.UN < 65 then
            spoof_values.UN = 65
        end
        set("sim/cockpit2/gauges/indicators/airspeed_kts_pilot", spoof_values.UN)
        set("sim/flightmodel/position/indicated_airspeed", spoof_values.UN)
    end
    if spoofing_active.DEUX then
        spoof_values.DEUX = spoof_values.DEUX + variation.DEUX
        if spoof_values.DEUX < 1 then
            spoof_values.DEUX = 0
        end
        set("sim/cockpit2/gauges/indicators/airspeed_kts_pilot", spoof_values.DEUX)
        set("sim/flightmodel/position/indicated_airspeed", spoof_values.DEUX)
    end
end

do_every_frame("spoof_gps()")

--Fonction activation/desactivation
function toggleSpoofing(parameter)
    spoofing_active[parameter] = not spoofing_active[parameter]

    if not spoofing_active[parameter] then
        -- Retablir uniquement la valeur desactivee, sans toucher aux autres
        if parameter == "UN" or parameter == "DEUX" then
            set("sim/cockpit2/gauges/indicators/airspeed_kts_pilot", original_values.VI)
```

```lua
            set("sim/flightmodel/position/indicated_airspeed", original_values.VI)
        end
    end

    logMsg("Spoofing " .. parameter .. (spoofing_active[parameter] and " ACTIVE" or " DESACTIVE"))
end

-- Interface utilisateur
function draw_spoofing_buttons()
    for param, active in pairs(spoofing_active) do
        if imgui.Button((active and "Desactiver " or "Activer ") .. param) then
            toggleSpoofing(param)
        end
    end
end

-- Creation une fenetre avec les boutons
spoofing_window = float_wnd_create(300, 200, 1, true)
--float_wnd_set_title(spoofing_window, "Spoofing GPS")
float_wnd_set_imgui_builder(spoofing_window, "draw_spoofing_buttons")

logMsg("Script charge : plusieurs boutons prets a l'emploi avec fluctuation de la vitesse")
```

4.3 Annex 3: Pilot Confidence Analysis in their GPS

The analysis of variance (ANOVA) was developed in the early 20th century by Ronald Fisher, a British statistician. This is a statistical model used to demonstrate similarities or differences in specific aspects of the demographic study. This calculation method is on:

- The calculation of intra-group variance measures changes within each group.
- The inter-group variance calculation measures the differences between the means of groups. From these values, it is possible to calculate the statistic F, obtained by dividing the inter-group variance by the intra-group variance. Thus, it is possible to calculate the probability, p-value, of obtaining an F as large or larger if the first hypothesis is true.

Thus, an ANOVA test will make it possible to reject the null hypothesis (H_0) if the calculated statistic F is greater than the critical value F_{critical}, determined from a distribution table F with a certain threshold of significance α (often 5% or 10%) and the appropriate degrees of freedom.

4.3.1 ANOVA for pilots' confidence in their GPS based on their expertise

This ANOVA test, carried out using a factor on Excel using the Table 7 will allow to see whether there is a relationship between the level of confidence of the pilots in their GPS and their expertise. Thus, the assumptions that will be established are:

$$H_0: \text{ there is no significant difference in confidence between the levels.}$$
$$H_1: \text{ there is a significant difference in confidence between levels.}$$

Excel features allow an ANOVA test at a 10% threshold factor. The analysis is presented in the Table 8.

Level 1	Level 2	Level 3
4	4	5.5
3.5	5.25	5.75
4.75	6	5.5
5.25	4.75	5
4	5.25	4.75
4.25	4	4.25
-	5	5.75
-	4.25	4.5
-	4.25	4.75
-	4.5	-
-	4.75	-
-	5.5	-
-	4.5	-
-	4.5	-
-	5.5	-

Table 7: Confidence rates of pilots according to their level.

Group	Sample Size	Sum	Mean	Variance
Level 1	6	25.75	4.29	0.39
Level 2	15	72.00	4.80	0.36
Level 3	9	45.75	5.08	0.31

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	p-value	F crit
Between Groups	2.26	2	1.13	3.23	0.0551	2.51
Within Groups	9.45	27	0.35			
Total	11.72	29				

Table 8: ANOVA test done on Excel to see the influence of pilots' expertise on their GPS confidence rate.

The ANOVA test allows to reject the null hypothesis (H_0). Indeed, $F = 3.23 > F_{\text{critical}} = 2.51$, so this rejects H_0 with a threshold of 0.10. This threshold is based on the size of the pilot sample and the number of pilots per level.

4.3.2 Pearson correlation matrix to see the influence of GPS risk knowledge on confidence rate

The correlation matrix allows to relate different numerical variables using the Pearson's correlation coefficient (r):

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2}\sqrt{\sum(Y_i - \bar{Y})^2}}$$

Where:

- X_i and Y_i are the values of the variables X and Y,
- $\bar{X}$ and $\bar{Y}$ are the averages of the variables X and Y.

The coefficient r varies between:

-1 (strong negative correlation, when one variable increases and the other decreases proportionally),

0 (no correlation),

$+1$ (strong positive correlation, when one variable increases and the other also increases proportionally).

Using Excel, it is then possible to establish this correlation table. That one is presented in Table 9. It can therefore be stated that there is a significant and positive correlation of 0.707 between the pilot's confidence in their GPS and their knowledge of the risk presented by the latter.

	GPS_risks	**Confidence_rate**
GPS_risks	1	0.70716438
Confidence_rate	0.70716438	1

Table 9: Pearson correlation matrix between pilot level, GPS risk knowledge, and GPS confidence rate

4.4 Annex 4: Analysis of pilot attention report on A, N and G

4.4.1 Linear regression between attention ratios on A and pilot response time

The analysis aims to determine whether a linear relationship exists between the average attention ratio on element A and the response time of pilots in GPS spoofing scenarios. Specifically, the study seeks to determine whether changing attention to a visual element can explain or predict changes in reaction time.
The principle of simple linear regression is used to model the relationship between:

- a dependent variable (here: the reaction time, denoted Y),
- an independent variable (here: the attention ratio on element A, denoted X).

The objective is to determine whether Y can be approximated from a line of the form:

$$Y = aX + b,$$

where:

- a is the slope coefficient: it indicates how much the reaction time varies for a unit of variation in the attention ratio,
- b is the intercept: it represents the theoretical reaction time when the attention ratio is zero.

For this purpose, all the data are grouped in Table 10 and 11 below. An Excel analysis will allow obtaining the main statistical elements to be analyzed and presented in another table.

Average reaction time	**Average on A**	**Average on N**	**Average on G**
27.67	56.82	26.52	16.67
30.17	65.56	23.33	11.11
32.00	34.72	16.67	48.61
34.33	39.26	18.52	42.22
34.67	79.44	15.00	5.56
35.17	45.15	15.15	39.70
40.00	57.36	18.33	24.31
41.00	65.15	15.15	19.70
41.50	78.79	21.21	0.00
43.67	79.92	11.74	8.33
45.33	93.33	6.67	0.00
47.33	64.04	19.30	16.67
47.83	86.67	6.67	6.67
48.67	84.92	9.52	5.56
49.00	94.44	0.00	5.56
50.17	34.72	20.83	44.44
51.50	53.33	12.50	34.17
53.17	87.50	8.33	4.17
54.17	100.00	0.00	0.00
55.33	58.79	15.15	26.06
56.00	69.44	8.33	22.22
57.00	91.67	0.00	8.33
57.33	83.33	0.00	16.67
58.00	78.57	11.90	9.52
58.33	49.13	15.15	35.71
62.67	100.00	0.00	0.00
70.67	72.38	27.62	0.00
General Average	**70.71**	**12.96**	**16.34**

Table 10: Average reaction time according to the average attention ratios in the three scenarios on A, N, and G.

Regression Statistics	
Multiple R	0.3625
R Square	0.1314
Adjusted R Square	0.1004
Standard Error	9.9832
Observations	30

ANOVA	**df**	**Sum of Squares**	**Mean Square**	**F**	**F Critical value**
Regression	1	422.2514	422.2514	4.2367	0.0489
Residual	28	2790.6042	99.6644	–	–
Total	29	3212.8556	–	–	–

	Coefficients	**Standard Error**	**t Stat**	**P-value**	**Lower 95%**	**Upper 95%**
Intercept	33.3137	6.7540	4.9324	3.34e-5	19.4787	47.1488
Mean A	0.1893	0.0920	2.0583	0.0490	0.0009	0.3777

Table 11: Linear regression analysis between average reaction time and average attention ratio on A, obtained by Excel.

The coefficient analysis indicates that the coefficient of the variable *Mean A* is positive: this suggests that the more time the pilot spends looking at element A, the longer his reaction time. The p-value ($p = 0.0489$) indicates that this result is statistically significant at the 5% threshold. Furthermore, the 95% confidence interval does not contain zero, which reinforces the reliability of the result.
Thus, these results show a direct and significant relationship between the attention given to a visual element of the flight interface (element A) and the time taken by the pilot to react to an anomaly. This relationship is positive, meaning that the more the pilot focuses on this element, the longer his reaction time will be.

4.4.2 ANOVA for average pilot response time based on expertise

An ANOVA test is performed to see if the level of the pilots has an influence on the reaction time they take to detect an anomaly. The results of these are exploited via Excel and presented in the Table 12.

Groups Statistics	
Number of Groups	3
Number of Samples	6
Line Labels Average	2
Line Labels Variance	1
Reaction Time Sum	141.2143
Reaction Time Average	47.0714
Reaction Time Variance	26.4643

ANOVA	**df**	**Sum of Squares**	**Mean Square**	**F**	**p-value**	**F Critical value**
Between Groups	1	3047.1505	3047.1505	221.8991	0.00011828	7.7086
Within Groups	4	54.9286	13.7321	–	–	–
Total	5	3102.0791	–	–	–	–

Table 12: ANOVA made on Excel to determine the influence of the level of pilots on reaction time

The results show a highly significant effect of the level of expertise on reaction time $F(1, 4) = 221.90$, $p < 0.001$.

4.5 Annex 5: Pilot reactions and decision-making processes

4.5.1 Chi^2 test: link between Pilot level and scenario conclusion

The Chi^2 test is used to verify whether there is a significant relationship between two categorical variables. It compares observed values (what is measured) with expected values (what would be expected if there were no link). These observed values are calculated using the formula:

$$\text{Expected value} = \frac{(\text{Total row}) \times (\text{Total column})}{\text{Total General}}$$

Chi^2 is then calculated as a result of obtaining these values by the formula:

$$\chi^2 = \sum \frac{(\text{Observed value} - \text{Expected value})^2}{\text{Expected value}}$$

The Chi^2 test performed here will allow us to verify if the level of the drivers influences their conclusion after a scenario. Excel then proposes a direct formula:

$$\text{p\_value} = \text{LOI.KHIDEUX}(\chi^2, \text{degree of freedom})$$

Where the degree of freedom is calculated by the formula:

$$\text{Degrees of freedom} = (\text{number of rows} - 1) \times (\text{number of columns} - 1).$$

That allows, after entering the tables of observed values, expected values, and calculation of χ^2, to check if there is a possible association between the elements filled in.
-If χ^2 calculated $>$ critical value, then the null hypothesis is rejected (there is a significant difference).
-If χ^2 calculated $\leq$ critical value, then the null hypothesis is accepted.
Or with the Excel formula, just compare the value shown at 0.05 (5%):
-If p-value ≤ 0.05, then the null hypothesis H_0 is rejected.
-If p-value > 0.05, then the null hypothesis H_0 is accepted.

In the case of the study carried out, the assumptions of the Chi^2 test are:

H_0 : There is no link between the level of the pilot and the conclusion drawn.

H_1 : There is a link between the level of the pilot and the conclusion drawn.

All elements of the statistical analysis are presented in the Table 13

Level	1	2	3	Total
1	6	18	3	27
2	25	24	5	54
3	22	9	0	31
Total	53	51	8	112

Level Expected	1	2	3	Total
1	12.7767857	12.2946429	1.9285714	27
2	25.5535714	24.5892857	3.8571429	54
3	14.6696429	14.1160714	2.2142857	31
Total	53	51	8	112

Level with Chi^2 calculation	1	2	3	Total
1	3.5943958	2.6475840	0.5952381	6.8372179
2	0.0119921	0.0141223	0.3386243	0.3647388
3	3.6629478	1.8542118	2.2142857	7.7314454
Total	7.2693357	4.5159182	3.1481482	14.933402

Statistical Results	
χ^2 Total	14.933402
Degree of freedom	4
p-value	0.00484136

Table 13: Chi^2 test between pilot level and scenario conclusion.

The p-value = 0.00484, therefore less than 0.05 (or even 0.01).This means that H_0 is rejected at a threshold of 5% (or even 1%).
Clear conclusion: There is a significant association between the level of the pilot (beginner/intermediate/advanced) and the conclusion he draws after the experience.

4.5.2 Chi^2: link between Pilot level and main cognitive bias observed in the scenarios

For the influence of confirmation bias, all values used for analysis are presented in the Table 14 and the assumptions are:

H_0 : There is no link between the level of the pilot and the appearance of confirmation bias.
H_1 : There is a significant link between the level of the pilot and this bias.

Level	Yes	No	Total
1	4	3	7
2	9	5	14
3	6	3	9
Total	19	11	30

Level Expected	Yes	No	Total
1	4.4333	2.5667	7
2	8.8667	5.1333	14
3	5.7	3.3	9
Total	19	11	30

Level with Chi^2 calculation	Yes	No	Total
1	0.0424	0.0732	0.1155
2	0.0020	0.0035	0.0055
3	0.0158	0.0273	0.0431
Total	0.0602	0.1039	0.1640

Chi^2 Total	0.1640
Degree of freedom	2
p-value	0.9213

Table 14: Chi^2 test on the influence of pilot level on confirmation bias.

Observed Chi^2 value: 0.164
Degrees of freedom: 2
p-value: 0.921
Thus, this does not reject H_0.

For the influence of the overconfidence bias, all values used for the analyses are presented in the Table 15 and the assumptions are:

H_0 : There is no link between the level of the pilot and the overconfidence bias.
H_1 : There is a significant link.

Level	Yes	No	Total
1	4	3	7
2	5	9	14
3	0	9	9
Total	9	21	30

Level Expected	Yes	No	Total
1	4.433	2.567	7
2	8.867	5.133	14
3	5.7	3.3	9
Total	19	11	30

Level with Chi^2 calculation	Yes	No	Total
1	0.042	0.073	0.116
2	1.686	2.913	4.599
3	5.7	9.845	15.545
Total	7.429	12.831	20.260

Chi^2 Total	20.260
Degree of freedom	2
p-value	0.0000399

Table 15: Chi^2 test on the influence of the level of pilots on the bias of overconfidence.

Observed Chi^2 value: 20.26
Degrees of freedom: 2
p-value: 0.0000399
Thus, the p-value is much less than 0.05.H_0 can be rejected.

For the influence of the focus illusion bias, all values used for analysis are presented in the following Table 16, and the assumptions are:

H_0 : There is no link between the level of the pilot and the focusing bias.
H_1 : There is a significant link.

Level	**Yes**	**No**	**Total**
1	4	3	7
2	4	10	14
3	1	8	9
Total	9	21	30

Level Expected	**Yes**	**No**	**Total**
1	4.4333	2.5667	7
2	8.8667	5.1333	14
3	5.7	3.3	9
Total	19	11	30

Level with Chi^2 calculation	**Yes**	**No**	**Total**
1	0.0424	0.0732	0.116
2	2.671	4.614	7.285
3	3.875	6.694	10.569
Total	6.589	11.381	17.970

Chi^2 Total	17.970
Degree of Freedom	2
p-value	0.000125

Table 16: Chi^2 test on the influence of the level of pilots on the bias of the focusing illusion.

Observed Chi^2 value: 17.97
Degrees of freedom: 2
p-value: 0.000125
The p-value is much less than 0.05.H_0 can be rejected.

For the influence of the anchor bias, all values used for the analyses are presented in the Table 17 and the assumptions are:

H_0 : There is no link between the level of the pilot and the anchor bias.

H_1 : There is a significant link.

Level	**Yes**	**No**	**Total**
1	5	2	7
2	5	9	14
3	2	7	9
Total	12	18	30

Level Expected	**Yes**	**No**	**Total**
1	4.433	2.567	7
2	8.867	5.133	14
3	5.7	3.3	9
Total	19	11	30

Level with Chi^2 Calculation	**Yes**	**No**	**Total**
1	0.072	0.125	0.198
2	1.686	2.913	4.599
3	2.402	4.148	6.550
Total	4.160	7.186	11.347

Chi^2 Total	11.35
Degree of Freedom	2
p-value	0.0034

Table 17: Chi^2 test on the influence of the level of pilots on the anchor bias.

Observed Chi^2 value: 11.35
Degrees of freedom: 2
p-value: 0.0034
The p-value is less than 0.05. H_0 can be rejected.