GAME EVALUATION TESTING REPORT

Game: The Falcon Huntress – HTML5 (Desktop & Mobile)

Client release: 1.0.1

Game server version: 1.0.0

RNG version: 3.5.0

Reference regulation:

Isle of Man Gambling Supervision Commission

The Online Gambling (Systems Verification) (No. 2) Regulations 2007

(The Online Gambling Regulation Act 2001)

January 19, 2018

QUINEL M Limited
Marina Court, Flat 8, Triq Giuseppe Cali', XBX 1421 Ta'Xbiex - Malta
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INTRODUCTION

The findings reported in this summary are the results of a broader set of documents and testing activities results archived in Quinel M's facilities. It is intended that the requester declares that:

- Any Hardware provided or described for analysis and testing is configured identically to hardware in commercial use
- Game software/ function provided for the testing and code review is declared by the customer to have the same behaviour to the software/code in commercial use
- Functionality made by the software in automatic test mode has a realistic behaviour

and that

- all the files and modules,
- the database schemas and all the specific programming resources,
- all the parameters contained into any databases and/or configuration file

that have been subject to the audit process guarantee the same behaviour of what is going to be published/deployed according to this audit results.

The Recipient, by accepting and using this Report, declares to be aware and accept unconditionally all the terms and conditions set forth. If the Applicant and / or the Recipient does not agree on the terms and conditions set forth, Quinel M Ltd reserves the right to cancel the certification provided with this Report, it follows therefore that the Recipient would have to immediately hand all copies of this Report to Quinel M Ltd and would not be able to use them.

Any copy of this compliance report and calibration certificates must also include the page number and total number of pages.

Copy of this test report cannot be reproduced except in full, without written approval of the laboratory.

A) Audit ID

IoM_THK007GAM_The Falcon Huntress_rev. 1

B) Reference regulation

Isle of Man Gambling Supervision Commission
The Online Gambling (Systems Verification) (No. 2) Regulations 2007
(The Online Gambling Regulation Act 2001)

C) Test methods

QIVI001 – Visual inspection
QISI001 – Software source inspection method
QIAF001 – Accounting functionalities
QIMT001 – Mathematical analysis

D) Auditor / Test lab

Quinel M. LTD
Marina Court, Flat 8,
Triq Giuseppe Cali'
XBX 1421 Ta'Xbiex – Malta
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E) Audit subject / Scope

Description: Compliance of the following test items (games):

Test Item	*Game Name*	*Version*	*Interface*
G001	The Falcon Huntress	Client release: 1.0.1 Server version: 1.0.0; RNG: 3.5.0	HTML5 (Desktop & Mobile)

Receipt date:
31/03/2017 – first submission for testing against current regulation as per Section (B)
Inspection date:
08/01/2018 - 19/01/2018

Note: Compliance of the RNG used by the test item was certified through report with ID: "*IoM THK001RNG_R001 RNG_rev 1*" issued and signed by Quinel M. LTD on June 21st, 2016.

F) Requester

Thunderkick Malta LTD
Level 5, The Mall Complex,
Floriana, Malta

G) Owner/Producer of the system/software

Tabrake AB
EKBACKSVÄGEN 59 A, 184 32 Åkersberga,
Stockholms Iän - Sweden

H) Companies and organizations involved in the process

Producer(s): Ref. to Section G)

Requester: Ref. to Section F)

Licensee/Operator: N.A.

I) Individuals involved in the process

On the Requester side: Mr. Sven Grip, Mr. Stéphane Redon, Mr. Johnny Aspelin, Mr. Daniel Gjörwell, Ms. Jeanette Karlsson

On the Producer(s) / Integrator(s) side: same as for Requester

On the Licensee/Operator side: N.A.

J) Processes, rules and parameters of the games / Limitation of use

Rules of the games/test are reported with details into Annex II.
Game(s) / Test item(s) use(s) Jackpot: N
Here follows the theoretical payout of the test items:

Test Item	*Test Item / Game name*	*Theor. RTP [%]*
G001	The Falcon Huntress	96.1%

K) Protocols and specifications of the gaming system

Both games (server-side logic) and platform are developed entirely with the Java Language.

Game was provided through the following URLs on a QA environment:
- https://quinel.thunderkick.com/games/ (player's interface)
- https://qa-int-backoffice.thunderkick.com/ (Back office / Admin interface)
- http://ext-qa-gameservice.thunderkick.com/ (Runtime game configuration)

The QA environment used for RNG testing relies on a Linux environment hosted by Amazon's cloud services and runs on Oracle Java JDK 1.7.0_09, Apache Tomcat application server 7.0.42

Live environment is reachable at the following IPs (primary site, secondary site omitted):
Game traffic: 37.114.73.113
API: 37.114.73.114
Back office 37.114.73.115
Firewall 37.114.73.120
Live environment servers are running Linux "Ubuntu 12.04.5 LT; Precise Pangolin", with Oracle Java JDK 1.7.0_51, Apache Tomcat application server 7.0.50.

Simulation environment for game testing used a virtualized server with the same Linux distribution "Ubuntu 12.04.5 LT; Precise Pangolin" with Oracle Java JDK 1.7.0_76 – no application server was required.

The difference between the Java JDK is negligible considered the change log and that the source code inspection couldn't find any specific binding to those releases nor dependencies on system APIs. Same considerations apply with regards to differences between QA and Live environment.

L) Security of the system

N.A.

M) Critical modules

Refer to the contents of Section R)

N) Evaluation performed

Refer to the Annex I for a full detailed list of requirements tested.
Refer to the Annex II the game's rules and screenshots.

O) Testing activities applied

- Fairness of the game and associated rules
- Requirements of the player's interface
- Source code inspection
- Mathematical calculation of the Payout

P) Additional information

None

Q) Setup and application/system architecture

Refer to Section K)

R) Product Tested

The tests were performed on the files listed below:

SHA1:	*Critical*	*Test Item*	*File name*
d5e01a5f41deae3b63b46b2ccb7125278e3ebc29	Yes	N.A. (*)	gp-rng\...\MersenneTwister32.java
ea8940a1cd7d561eb944c42f101ddfcd7cce2ec7	Yes	N.A. (*)	gp-rng-api\...\RandomNumberGenerator.java
16cf1a15b733c99c43172d05439c87d782e68a88	Yes	G001	gp-game-s1-g15.json
cd8107682915603c1e09cb8d189e1eda6e14b97a	Yes	G001	gp-game-s1-g15-core-1.0.0-RELEASE.jar
f2dcd4e8ed46eb5653d99ff54f60c4e4047ad4ec	Yes	All	rng-implementation\gp-rng-3.5.0-RELEASE.jar
ea01386be069745202580bd50c3de32c33f3553f	Yes	All	rng-interface\gp-rng-api-3.5.0-RELEASE.jar

(*) RNG main source code files.

S) CERTIFICATION

Date: January 19, 2018
Requester: Thunderkick Malta LTD
Level 5, The Mall Complex,
Floriana, Malta

Total Number of Pages: **17**

QUINEL M LTD certifies that the games / test items identified at section E)

"**The Falcon Huntress**" HTML5 (Desktop & Mobile)

Client release: 1.0.1
Server version: 1.0.0
RNG version: 3.5.0

comply with the Online Gambling (Systems Verification) (No. 2) Regulations 2007 of Isle of Man Gambling Supervision Commission (The Online Gambling Regulation Act 2001).

Refer to the Annex I report for the full list of requirements satisfied.

T) CONDITIONS

None.

U) CONCLUSIONS

QUINEL M. certifies that the test items submitted comply with the Technical Standards requested, therefore recommends the Isle of Man Gambling Supervision Commission to approve the games for production use.

Date: January 19, 2018
Signed:

Davide De Nobile – Laboratory Technical Director
(QUINEL M)

ANNEX I – REQUIREMENTS SATISFIED

Schedule 1 **REQUIREMENTS WITH WHICH SYSTEMS MUST COMPLY FOR GAMING AND LOTTERIES**		
1.	The System must:	
(a)	follow the rules for Online Gambling published to the Participant or potential Participant prior to its placing any sums with the Operator for participation in Online Gambling; and	***PASS***
(b)	provide over specified periods no more than the house advantage (if any) agreed by the Commissioners with the Operator; and	***PASS***
(c)	integrate contingencies for loss of continuity of play; and	***PASS***
(d)	if utilised in any peer to peer game, ensure that over the specified periods that no one Player has any advantage over any other Player playing the same game	***N.A.***
2.	Both the gaming and financial transactions software must be congruent and secure.	***N.A.***
3.	The System must satisfy the following criteria for randomness for any Gaming or Lottery (save where different rules apply and have been approved by the Commissioners and published to the Participant or potential Participant prior to its participation), following Schneier:-	
	(a) the data must be randomly generated, passing appropriate statistical non static output results tests of randomness (e.g., Marsaglia's "Diehard" set of tests) uniformly distributed over the set range.	***PASS****
	(b) the data must be unpredictable, i.e. it must not be computationally feasible to predict what the next number will be, given complete knowledge of the algorithm or hardware generating the sequence, and all previously generated numbers; and	***PASS****
	(c) the series cannot reliably be reproduced, i.e. if the sequence generator is activated again with the same input (as exactly as humanly possible) it will produce two completely unrelated random sequences.	***PASS****
4.	The Operator must disclose the methodology of any random seeding and any seeding must be proven to result in an unpredictable output.	***PASS****
5.	The outcome of any Game or Lottery, as the case may be, and the return to the Participant, must be independent of the CPU, memory, disk or other components used in the computer or other device used by the Participant	***PASS***
6.	The Game or Lottery outcome, as the case may be, must not be affected by the effective bandwidth, link utilisation, bit error rate or other characteristic of the communications channel between the System and the computer or other device used by the Participant.	***PASS***
7.	The System must be able to display for each Game or Lottery, as the case may be, the following information on the current page or on a page directly accessible from the current page via a hyperlink: -	
	(a) the name and rules of the Game and/or Lottery;	***PASS***
	(b) restrictions on play;	***PASS***
	(c) instructions on how to play, including a pay-table for all prizes and special features;	***PASS***
	(d) the Participant's current account balance and currency or currencies utilised by the Participant to participate in the Game and/or Lottery;	***N.A.***
	(e) unit and total sums permitted to be played by a Participant in relation to the Online Gambling;	***PASS***
	(f) the return to the Participant, disregarding any exercise of skill by him; and,	***PASS***
	(g) pursuant to the testing of the System, the percentage of total sums returned	***PASS***

	to Participant in relation to all house Games or Lottery, as the case may be, offered by the Operator	
8.	All financial reports produced by the System must be readily reconcilable with Gaming or Lottery transaction reports (as relevant) and conversely. All such reports shall be freely available to the Commissioners.	***N.A.***
9.	The System must:-	
	(a) be capable of producing auditable and aggregated financial statements of Gaming and/or Lottery transactions (as relevant); and	***N.A.***
	(b) calculate accurately all excise of duty payable under the Act and other monies due to the Treasury under the Act.	***N.A.***
10.	The System must maintain information about all Games and/or Lotteries played, including: -	
(a)	the identity of the Participant;	***N.A.***
(b)	the time the game began;	***N.A.***
(c)	the balance on the Participant's account at the start of the Game or the start of the Participant's participation in the Lottery (as relevant);	***N.A.***
(d)	the sums placed by Participant placed in the Game (timestamped);	***N.A.***
(e)	the Game status (in progress, complete, etc);	***N.A.***
(f)	the result of the Game and/or Lottery (timestamped);	***N.A.***
(g)	the time the game ended;	***N.A.***
(h)	amount won or lost by the Participant	***N.A.***
(i)	the balance on the Participant's account at the end of the Game and/or Lottery (as relevant); and	***N.A.***
(j)	the currency or currencies utilised by the Participant.	***N.A.***
10.	The System must maintain information about significant events as follows: -	
	(a) large wins (as agreed by the Commissioners from time to time);	***N.A.***
	(b) transfers of funds (between Participants or between any Participant and the Operator) in excess of such amount as the Commissioners may from time to time direct by notice in writing to the Operator;	***N.A.***
	(c) material changes made by the Operator to Game and/or Lottery returns, disclosed under paragraph 7 above; and	***N.A.***
	(d) material fluctuations in theoretical/estimated statistical return to Participants (agreed with the Commissioners from time to time).	***N.A.***
11. Any variations to any of the requirements specified in this Schedule shall be submitted to the Authority for its approval by notice in writing.		

* the RNG was certified and identified into compliance Report ID: "*IoM THK001RNG_R001 RNG_rev 1*" issued and signed by Quinel M. LTD on June 21th, 2016.

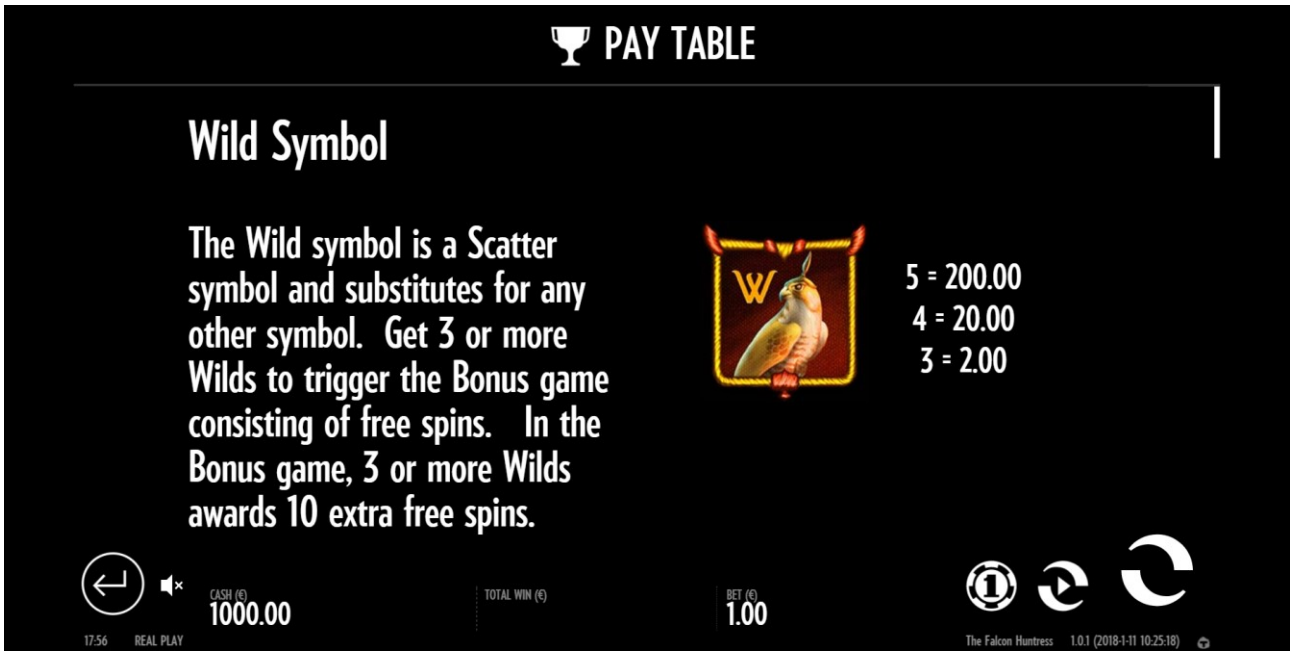
ANNEX II – Game rules and Paytables

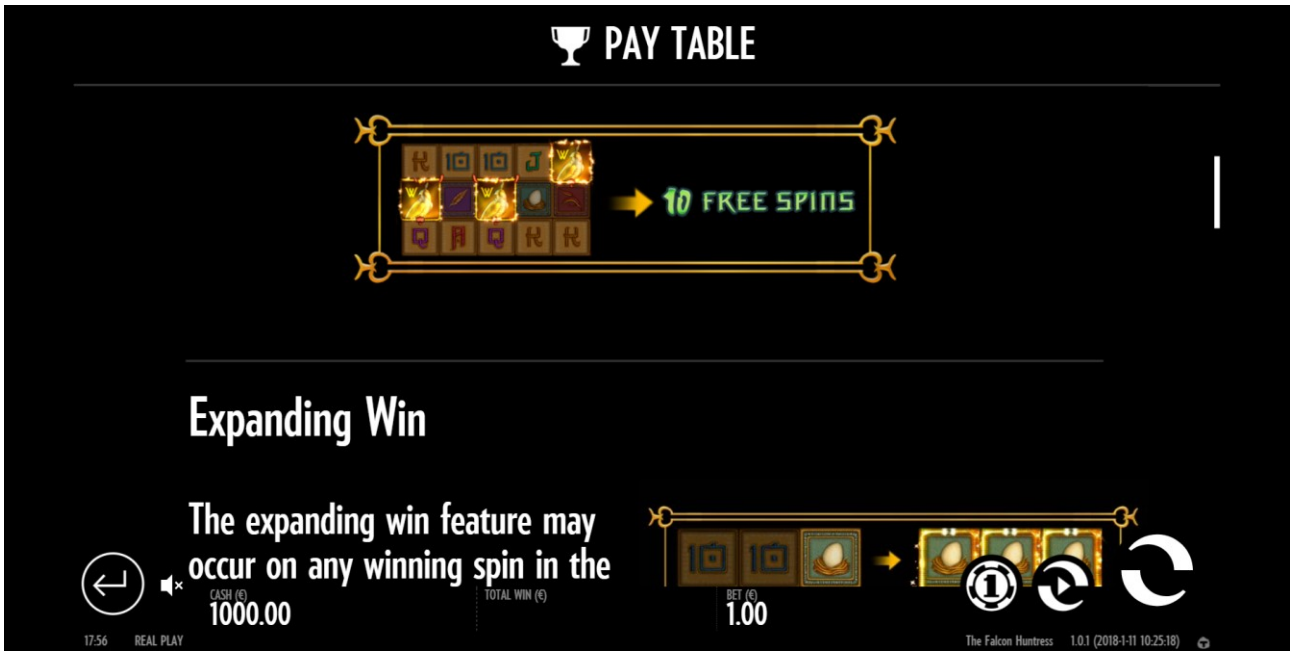
Processes, rules and parameters of the games

G001: The Falcon Huntress - Desktop

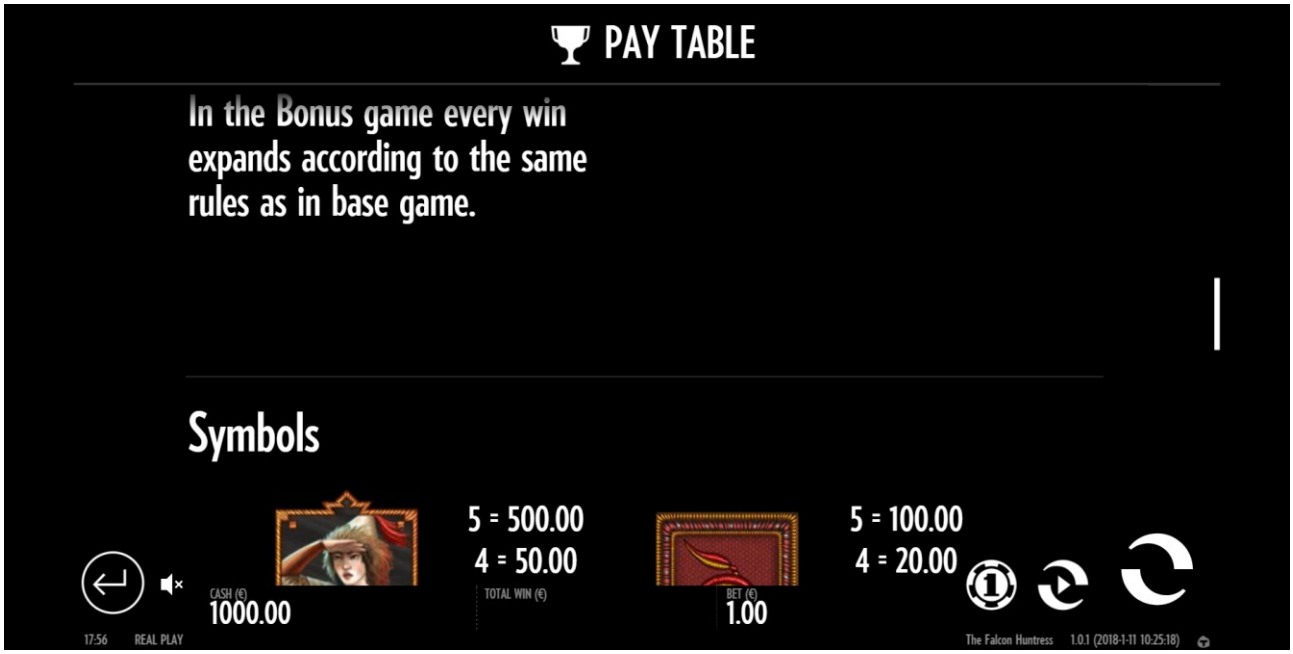
G001: The Falcon Huntress – Mobile

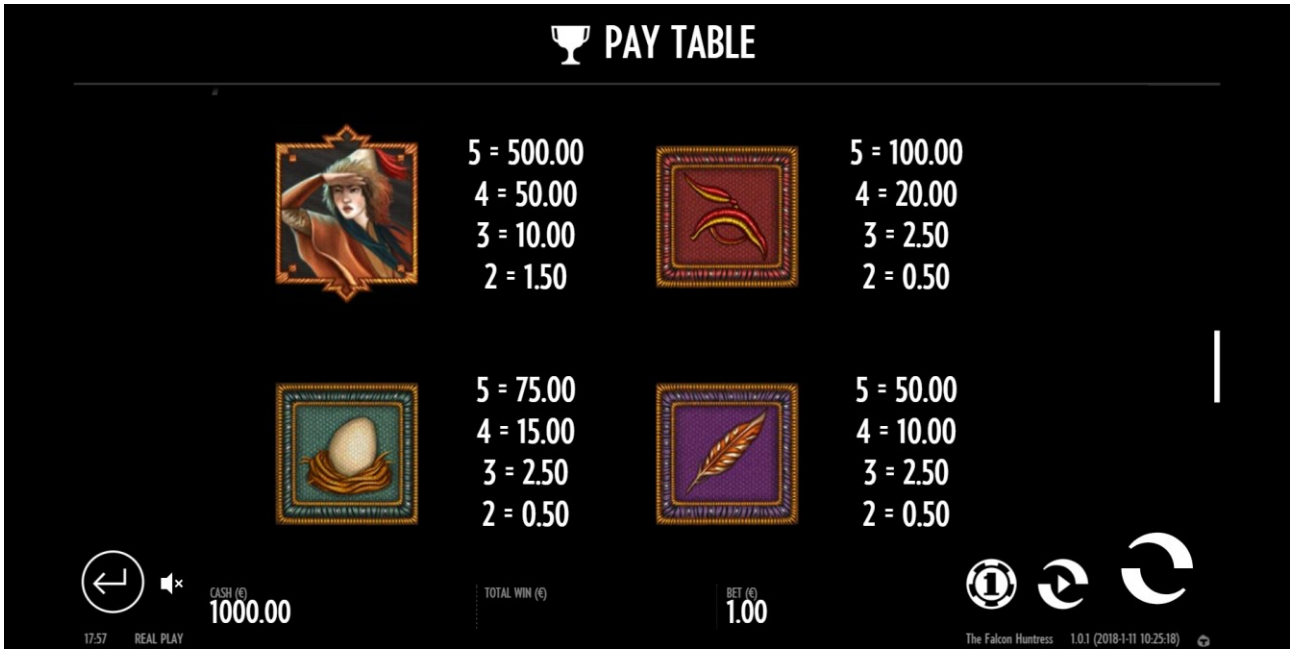
G001: The Falcon Huntress – Pay table and rules

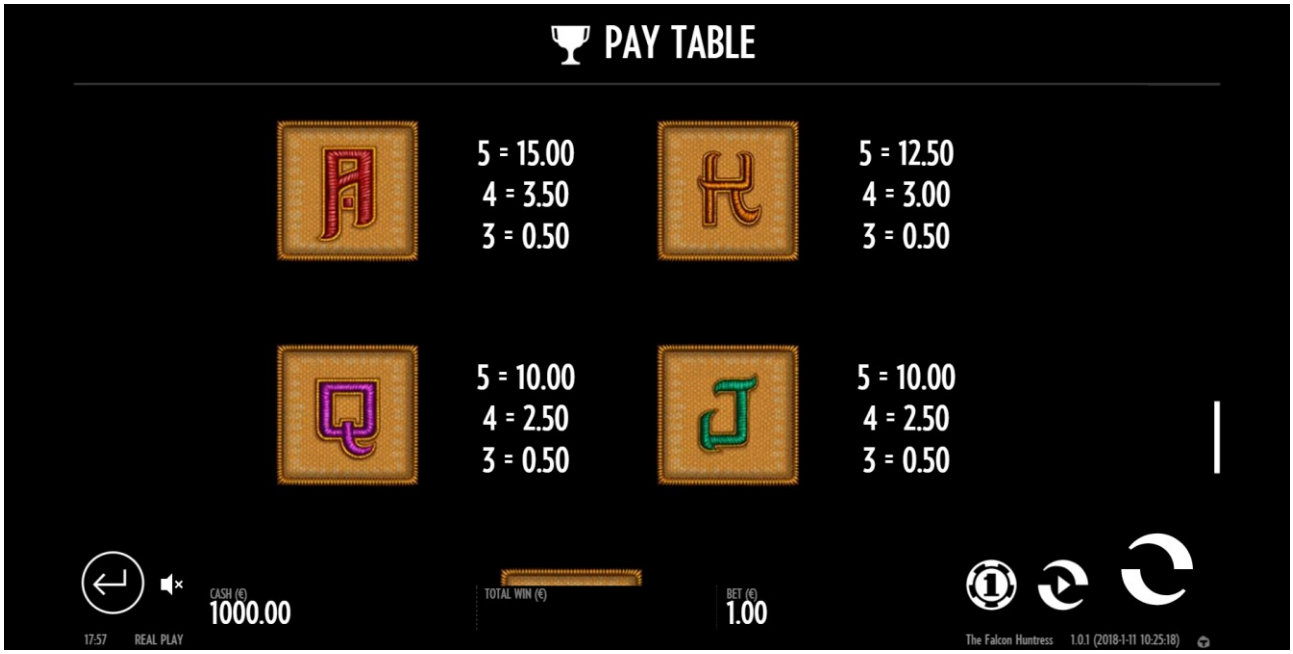


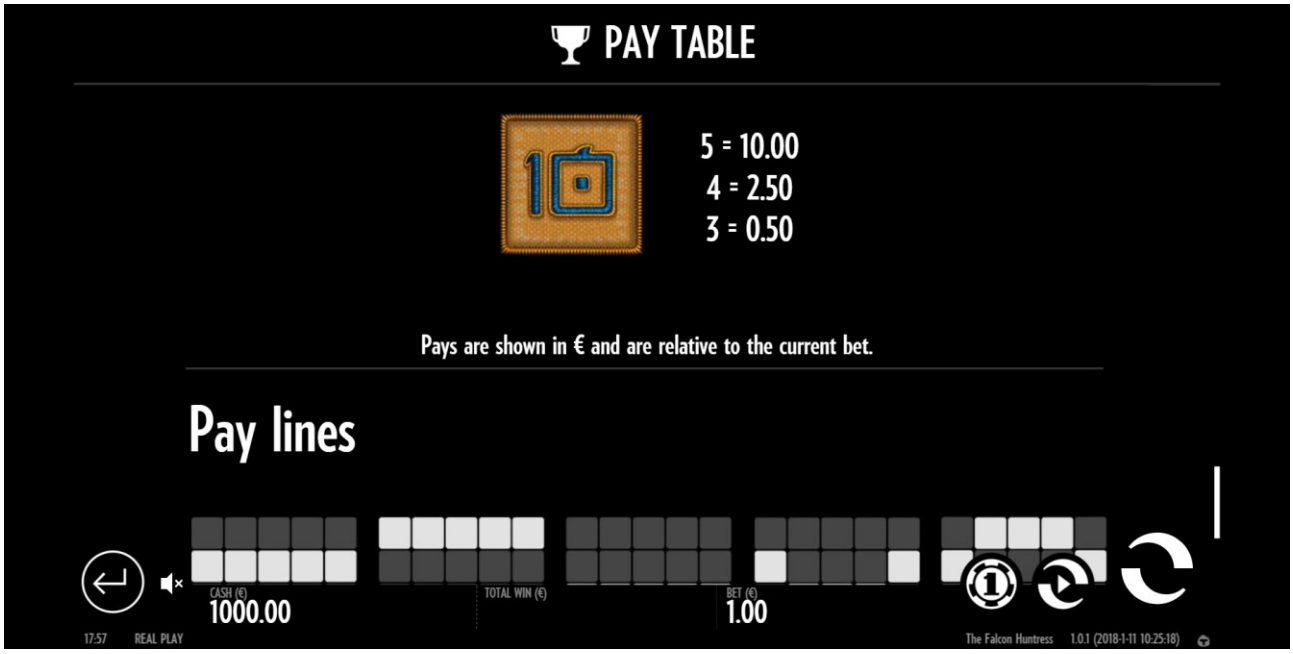


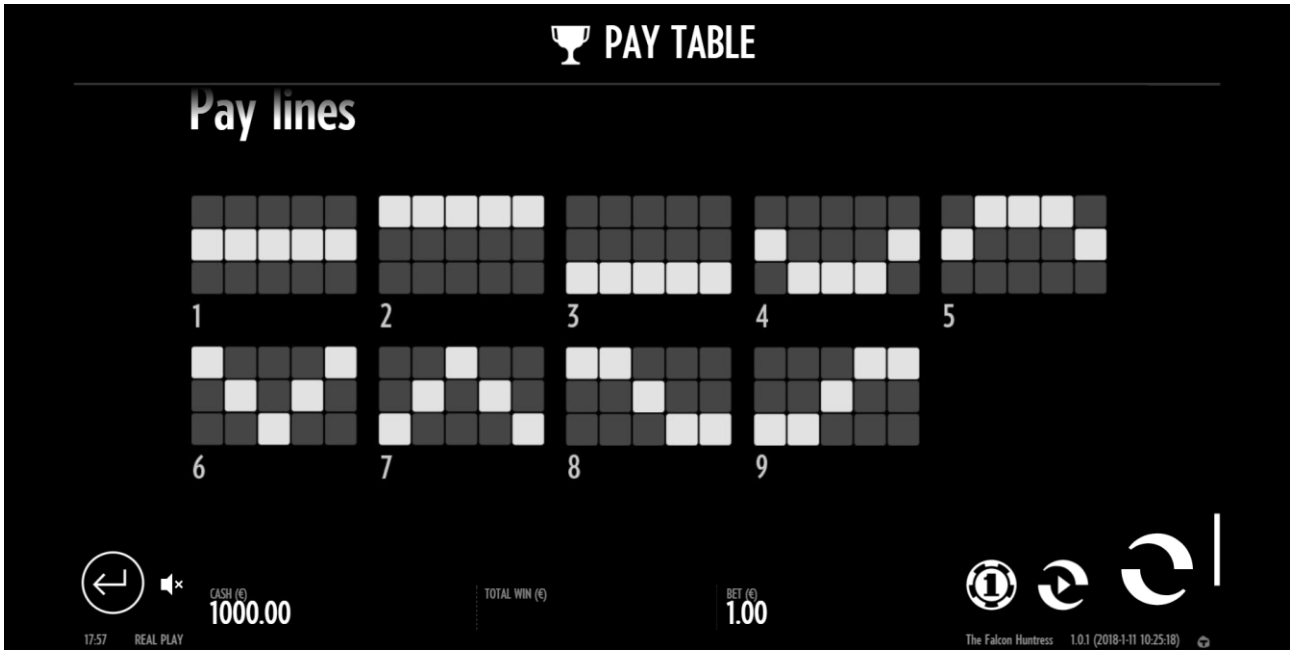
PAY TABLE
occur on any winning spin in the base game. When expanding all winning symbols will expand individually. Expansion only occurs once per symbol.
The wild symbol will never expand.
In the Bonus game every win
CASH (€)
1000.00
TOTAL WIN (€)
BET (€)
1.00
17:56
REAL PLAY
The Falcon Huntress 1.0.1 (2018-1-11 10:25:18)


PAY TABLE
In the Bonus game every win expands according to the same rules as in base game.
Symbols
5 = 500.00
4 = 50.00
5 = 100.00
4 = 20.00
CASH (€)
1000.00
TOTAL WIN (€)
BET (€)
1.00
17:56
REAL PLAY
The Falcon Huntress 1.0.1 (2018-1-11 10:25:18)


PAY TABLE
5 = 500.00
4 = 50.00
3 = 10.00
2 = 1.50
5 = 100.00
4 = 20.00
3 = 2.50
2 = 0.50
5 = 75.00
4 = 15.00
3 = 2.50
2 = 0.50
5 = 50.00
4 = 10.00
3 = 2.50
2 = 0.50
CASH (€)
1000.00
TOTAL WIN (€)
BET (€)
1.00
17:57
REAL PLAY
The Falcon Huntress 1.0.1 (2018-1-11 10:25:18)


PAY TABLE
5 = 15.00
4 = 3.50
3 = 0.50
5 = 12.50
4 = 3.00
3 = 0.50
5 = 10.00
4 = 2.50
3 = 0.50
5 = 10.00
4 = 2.50
3 = 0.50
CASH (€)
1000.00
TOTAL WIN (€)
BET (€)
1.00
17:57
REAL PLAY
The Falcon Huntress 1.0.1 (2018-1-11 10:25:18)


PAY TABLE
5 = 10.00
4 = 2.50
3 = 0.50
Pays are shown in € and are relative to the current bet.
Pay lines
CASH (€)
1000.00
TOTAL WIN (€)
BET (€)
1.00
17:57
REAL PLAY
The Falcon Huntress 1.0.1 (2018-1-11 10:25:18)


PAY TABLE
Pay lines
1
2
3
4
5
6
7
8
9
CASH (€)
1000.00
TOTAL WIN (€)
BET (€)
1.00
17:57
REAL PLAY
The Falcon Huntress 1.0.1 (2018-1-11 10:25:18)

Game Rules (1/11/2018)

Button	Function
	Click to start a game round. On desktop you may also press the space bar on your keyboard.
	Display bet settings.
	Display autoplay settings.
	Display game rules.
	Display paytable.
	Skip presentation.
	Toggles the sound on and off.
	Exit game.
	Exit current screen.
	Start feature (e.g Free Spins).

		Start feature (e.g Free Spins).
		Stop auto play session.

Note: The Falcon Huntress video slot is referred to as The Falcon Huntress, The Game or Game.

1. The Falcon Huntress is a video slot with 5 reels and 9 pay lines. The game features Expanding Win and a bonus game with free spins and retriggers. The theoretical return to player is 96,1%.

2. A game round is started with the action button and plays the game with the selected bet level.

3. No bets can be altered during a game round.

4. Auto play plays the game automatically for the number of game rounds selected in the auto play page.

5. All game payout and win combinations are paid out according to the pay table.

6. Only the highest win per pay line is paid out, if in sequence from leftmost to right and in combinations according to the pay table.

7. All pay line wins during a game round are added and presented at the end of the game round.

8. All wins are presented and paid out in the selected currency.

9. The Wild symbol is a Scatter symbol and substitutes for any other symbol.

10. The expanding win feature may occur on any winning spin in the base game.

When expanding all winning symbols will expand individually.

Expansion only occurs once per symbol.

The wild symbols will never expand.

In the Bonus game every win expands according to the same rules as in base game.

11. 3 or more scatter symbols trigger the Bonus game consisting of free spins.

12. In the Bonus game, 3 or more scatters trigger 10 extra free spins.

13. The bonus game is played with the same bet as the spin that triggered the bonus game.

14. In the event of game malfunction all affected bets and pays are rendered void.

END
OF
COMPLIANCE
REPORT