

# SMART CONTRACT

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## Security Audit Report

Project: AstroPup Coin  
Website: [www.astropupcoin.com](http://www.astropupcoin.com)  
Platform: Ethereum  
Language: Solidity  
Date: May 9th, 2023

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# Introduction

EtherAuthority was contracted by the AstroPup Coin team to perform the Security audit of the AstroPup Coin smart contract code. The audit has been performed using manual analysis as well as using automated software tools. This report presents all the findings regarding the audit performed on May 9th, 2023.

**The purpose of this audit was to address the following:**

- Ensure that all claimed functions exist and function correctly.
- Identify any security vulnerabilities that may be present in the smart contract.

## Project Background

- AstroPup Coin is an ERC20 token built on the Ethereum blockchain.
- AstroPup Coin is built using the latest versions of OpenZeppelin smart contracts, ensuring a high level of security and compliance.
- AstroPup Coin uses a burn mechanism to decrease the token supply over time, potentially increasing the value of remaining tokens. The initial burn rate is set to 1%, but can be modified to adapt to market conditions.

## Audit scope

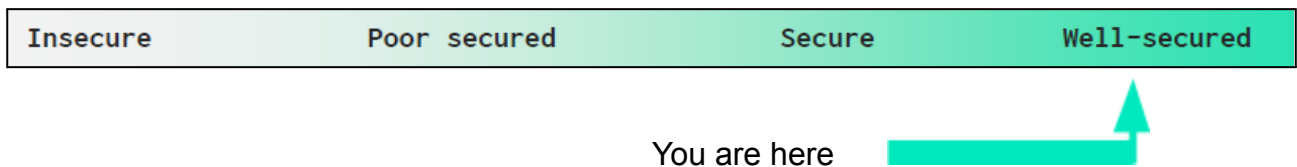
|                            |  |
|----------------------------|--|
| <b>Name</b>                | <b>Code Review and Security Analysis Report for AstroPup Coin Smart Contract</b> |
| <b>Platform</b>            | <b>Ethereum / Solidity</b>   |
| <b>File</b>                | AstroPup.sol   |
| <b>File MD5 Hash</b>       | 143C43BE0550CD5E639572F2FF8C4D77   |
| <b>Smart Contract Code</b> | <a href="#">0x96eAff5BedF18566B18fCe71C2323b69C795623</a>                        |
| <b>Audit Date</b>          | May 9th, 2023  |
| <b>Revision Date</b>       | May 10th, 2023   |

## Claimed Smart Contract Features

| Claimed Feature Detail  | Our Observation  |
|---|--|
| <p><b>Tokenomics:</b></p> <ul style="list-style-type: none"><li>• Name: AstroPup Coin</li><li>• Symbol: ASPC</li><li>• Decimals: 18</li><li>• The burn rate is set to 1%</li><li>• Total Supply: 69 Billion</li></ul>   | <p><b>YES, This is valid.</b></p>  |
| <p><b><u>Owner Specifications:</u></b></p> <ul style="list-style-type: none"><li>• Triggers stopped state.</li><li>• Returns to normal state.</li><li>• Set a burn percentage.</li><li>• Current owner can transfer ownership of the contract to a new account.</li><li>• Deleting ownership will leave the contract without an owner, removing any owner-only functionality.</li></ul> | <p><b>The ownership is renounced. and thus the smart contract is 100% decentralized.</b></p> |

# Audit Summary

According to the standard audit assessment, Customer`s solidity based smart contracts are **“Well Secured”**. The project owner also completed the KYC with EtherAuthority which can be verified [at here](#).



We used various tools like Slither, Solhint and Remix IDE. At the same time this finding is based on critical analysis of the manual audit.

All issues found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the Audit overview section. General overview is presented in AS-IS section and all identified issues can be found in the Audit overview section.

**We found 0 critical, 0 high, 0 medium and 2 low and some very low level issues.**

**We confirm that All severity issues are solved in the revised smart contract.**

**Investors Advice:** Technical audit of the smart contract does not guarantee the ethical nature of the project. Any owner controlled functions should be executed by the owner with responsibility. All investors/users are advised to do their due diligence before investing in the project.

## Technical Quick Stats

| Main Category        | Subcategory                                   | Result |
|----------------------|---|--------|
| Contract Programming | Solidity version not specified                | Passed |
|                      | Solidity version too old                      | Passed |
|                      | Integer overflow/underflow                    | Passed |
|                      | Function input parameters lack of check       | Passed |
|                      | Function input parameters check bypass        | Passed |
|                      | Function access control lacks management      | Passed |
|                      | Critical operation lacks event log            | Passed |
|                      | Human/contract checks bypass                  | Passed |
|                      | Random number generation/use vulnerability    | N/A    |
|                      | Fallback function misuse                      | Passed |
|                      | Race condition                                | Passed |
|                      | Logical vulnerability                         | Passed |
|                      | Features claimed                              | Passed |
|                      | Other programming issues                      | Passed |
| Code Specification   | Function visibility not explicitly declared   | Passed |
|                      | Var. storage location not explicitly declared | Passed |
|                      | Use keywords/functions to be deprecated       | Passed |
|                      | Unused code                                   | Passed |
| Gas Optimization     | "Out of Gas" Issue                            | Passed |
|                      | High consumption 'for/while' loop             | Passed |
|                      | High consumption 'storage' storage            | Passed |
|                      | Assert() misuse                               | Passed |
| Business Risk        | The maximum limit for mintage not set         | Passed |
|                      | "Short Address" Attack                        | Passed |
|                      | "Double Spend" Attack                         | Passed |

Overall Audit Result: **PASSED**

## Code Quality

This audit scope has 1 smart contract. Smart contract contains Libraries, Smart contracts, inherits and Interfaces. This is a compact and well written smart contract.

The libraries in the AstroPup Coin are part of its logical algorithm. A library is a different type of smart contract that contains reusable code. Once deployed on the blockchain (only once), it is assigned a specific address and its properties / methods can be reused many times by other contracts in the AstroPup Coin.

The AstroPup Coin team has not provided scenario and unit test scripts, which would have helped to determine the integrity of the code in an automated way.

Code parts are well commented on in the smart contracts. Ethereum's NatSpec commenting style is used, which is a good thing.

## Documentation

We were given an AstroPup Coin smart contract code in the form of a file. The hash of that code is mentioned above in the table.

As mentioned above, code parts are **well** commented. So it is easy to quickly understand the programming flow as well as complex code logic. Comments are very helpful in understanding the overall architecture of the protocol.

Another source of information was its official website: <https://www.astropupcoin.com> which provided rich information about the project architecture and tokenomics.

## Use of Dependencies

As per our observation, the libraries are used in this smart contract infrastructure that are based on well known industry standard open source projects.

Apart from libraries, its functions are not used in external smart contract calls.



# AS-IS overview

## Functions

| Sl. | Functions            | Type     | Observation       | Conclusion |
|-----|----------------------|----------|-------------------|------------|
| 1   | constructor          | write    | Passed            | No Issue   |
| 2   | name                 | read     | Passed            | No Issue   |
| 3   | symbol               | read     | Passed            | No Issue   |
| 4   | decimals             | read     | Passed            | No Issue   |
| 5   | totalSupply          | read     | Passed            | No Issue   |
| 6   | balanceOf            | read     | Passed            | No Issue   |
| 7   | transfer             | write    | Passed            | No Issue   |
| 8   | allowance            | read     | Passed            | No Issue   |
| 9   | approve              | write    | Passed            | No Issue   |
| 10  | transferFrom         | write    | Passed            | No Issue   |
| 11  | increaseAllowance    | write    | Passed            | No Issue   |
| 12  | decreaseAllowance    | write    | Passed            | No Issue   |
| 13  | _transfer            | internal | Passed            | No Issue   |
| 14  | _mint                | internal | Passed            | No Issue   |
| 15  | _burn                | internal | Passed            | No Issue   |
| 16  | _approve             | internal | Passed            | No Issue   |
| 17  | _spendAllowance      | internal | Passed            | No Issue   |
| 18  | _beforeTokenTransfer | internal | Passed            | No Issue   |
| 19  | _afterTokenTransfer  | internal | Passed            | No Issue   |
| 20  | whenNotPaused        | modifier | Passed            | No Issue   |
| 21  | whenPaused           | modifier | Passed            | No Issue   |
| 22  | paused               | read     | Passed            | No Issue   |
| 23  | _requireNotPaused    | internal | Passed            | No Issue   |
| 24  | _requirePaused       | internal | Passed            | No Issue   |
| 25  | _pause               | internal | Passed            | No Issue   |
| 26  | _unpause             | internal | Passed            | No Issue   |
| 27  | onlyOwner            | modifier | Passed            | No Issue   |
| 28  | owner                | read     | Passed            | No Issue   |
| 29  | _checkOwner          | internal | Passed            | No Issue   |
| 30  | renounceOwnership    | write    | access only Owner | No Issue   |
| 31  | transferOwnership    | write    | access only Owner | No Issue   |
| 32  | _transferOwnership   | internal | Passed            | No Issue   |
| 33  | burn                 | write    | Passed            | No Issue   |
| 34  | burnFrom             | write    | Passed            | No Issue   |
| 35  | pause                | write    | access only Owner | No Issue   |
| 36  | unpause              | write    | access only Owner | No Issue   |
| 37  | setBurnPercentage    | write    | Passed            | Fixed      |
| 38  | _beforeTokenTransfer | internal | Passed            | No Issue   |
| 39  | _transfer            | internal | Passed            | Fixed      |

## Severity Definitions

| Risk Level                                 | Description  |
|--|--|
| <b>Critical</b>                            | Critical vulnerabilities are usually straightforward to exploit and can lead to token loss etc.  |
| <b>High</b>                                | High-level vulnerabilities are difficult to exploit; however, they also have significant impact on smart contract execution, e.g. public access to crucial |
| <b>Medium</b>                              | Medium-level vulnerabilities are important to fix; however, they can't lead to tokens lose   |
| <b>Low</b>                                 | Low-level vulnerabilities are mostly related to outdated, unused etc. code snippets, that can't have significant impact on execution                       |
| <b>Lowest / Code Style / Best Practice</b> | Lowest-level vulnerabilities, code style violations and info statements can't affect smart contract execution and can be ignored.                          |

# Audit Findings

## Critical Severity

No Critical severity vulnerabilities were found.

## High Severity

No high severity vulnerabilities were found.

## Medium

No medium severity vulnerabilities were found.

## Low

(1) Used Wrong symbol to compare:

```
44     function _transfer(  
45         address from,  
46         address to,  
47         uint256 amount  
48     ) internal override {  
49         uint256 burnAmount = amount.mul(burnPercentage).div(100);  
50         uint256 remainingAmount = amount.sub(burnAmount);  
51         super._transfer(from, to, remainingAmount);  
52         if (burnAmount ] 0) {  
53             super._burn(from, burnAmount);  
54         }  
55     }  
56 }  
57
```

Used wrong symbol to compare greater than(>) in the if statement of \_transfer function to compare burn amount.

**Resolution:** We suggest using the > symbol.

**Status:** This is fixed in the revised code.

(2) Not able to set Burn Percentage:

```
26     }
27
28     function setBurnPercentage(uint256 newBurnPercentage) public onlyOwner {
29         require(
30             newBurnPercentage [= 100,
31                 "Burn percentage must be between 0 and 100."
32             );
33         burnPercentage = newBurnPercentage;
34     }
35 }
```

Used the wrong symbol to compare less than(<) in the required statement.

**Resolution:** We suggest using < symbol.

**Status:** This is fixed in the revised code.

### Very Low / Informational / Best practices:

(1) SafeMath Library:

SafeMath Library is used in this contract code, but the compiler version is greater than or equal to 0.8.0, Then it will be not required to use, solidity automatically handles overflow/underflow.

**Resolution:** Remove the SafeMath library and use normal math operators, It will improve code size, and less gas consumption.

**Status:** This is fixed in the revised code.

(2) Please use the latest compiler version when deploying contract:

This is not a severe issue, but we suggest using the latest compiler version at the time of contract deployment, which is 0.8.19 at the time of this audit. Using the latest compiler version is always recommended which prevents any compiler level issues.

**Resolution:** We suggest using the latest compiler version 0.8.19.

**Status:** This is fixed in the revised code.

# Centralization

The ownership of the token smart contract is renounced with [this transaction hash](#).  
And thus the token smart contract has no centralized risk and the contract is 100% decentralized.

## Conclusion

We were given a contract code in the form of a file and we have used all possible tests based on given objects as files. We have observed 2 low severity issues and 2 informational severity issues in the token smart contract. We confirm that all severity issues are solved in the revised code. So, **it's good to go for the mainnet deployment**.

Since possible test cases can be unlimited for such smart contracts protocol, we provide no such guarantee of future outcomes. We have used all the latest static tools and manual observations to cover maximum possible test cases to scan everything.

Smart contracts within the scope were manually reviewed and analyzed with static analysis tools. Smart Contract's high-level description of functionality was presented in the As-is overview section of the report.

The audit report contains all found security vulnerabilities and other issues in the reviewed code.

The security state of the reviewed smart contract, based on standard audit procedure scope, is **“Well Secured”**.

# Our Methodology

We like to work with a transparent process and make our reviews a collaborative effort. The goals of our security audits are to improve the quality of systems we review and aim for sufficient remediation to help protect users. The following is the methodology we use in our security audit process.

## **Manual Code Review:**

In manually reviewing all of the code, we look for any potential issues with code logic, error handling, protocol and header parsing, cryptographic errors, and random number generators. We also watch for areas where more defensive programming could reduce the risk of future mistakes and speed up future audits. Although our primary focus is on the in-scope code, we examine dependency code and behavior when it is relevant to a particular line of investigation.

## **Vulnerability Analysis:**

Our audit techniques included manual code analysis, user interface interaction, and whitebox penetration testing. We look at the project's web site to get a high level understanding of what functionality the software under review provides. We then meet with the developers to gain an appreciation of their vision of the software. We install and use the relevant software, exploring the user interactions and roles. While we do this, we brainstorm threat models and attack surfaces. We read design documentation, review other audit results, search for similar projects, examine source code dependencies, skim open issue tickets, and generally investigate details other than the implementation.

## **Documenting Results:**

We follow a conservative, transparent process for analyzing potential security vulnerabilities and seeing them through successful remediation. Whenever a potential issue is discovered, we immediately create an Issue entry for it in this document, even though we have not yet verified the feasibility and impact of the issue. This process is conservative because we document our suspicions early even if they are later shown to not represent exploitable vulnerabilities. We generally follow a process of first documenting the suspicion with unresolved questions, then confirming the issue through code analysis, live experimentation, or automated tests. Code analysis is the most tentative, and we strive to provide test code, log captures, or screenshots demonstrating our confirmation. After this we analyze the feasibility of an attack in a live system.

## **Suggested Solutions:**

We search for immediate mitigations that live deployments can take, and finally we suggest the requirements for remediation engineering for future releases. The mitigation and remediation recommendations should be scrutinized by the developers and deployment engineers, and successful mitigation and remediation is an ongoing collaborative process after we deliver our report, and before the details are made public.



# Disclaimers

## EtherAuthority.io Disclaimer

EtherAuthority team has analyzed this smart contract in accordance with the best industry practices at the date of this report, in relation to: cybersecurity vulnerabilities and issues in smart contract source code, the details of which are disclosed in this report, (Source Code); the Source Code compilation, deployment and functionality (performing the intended functions).

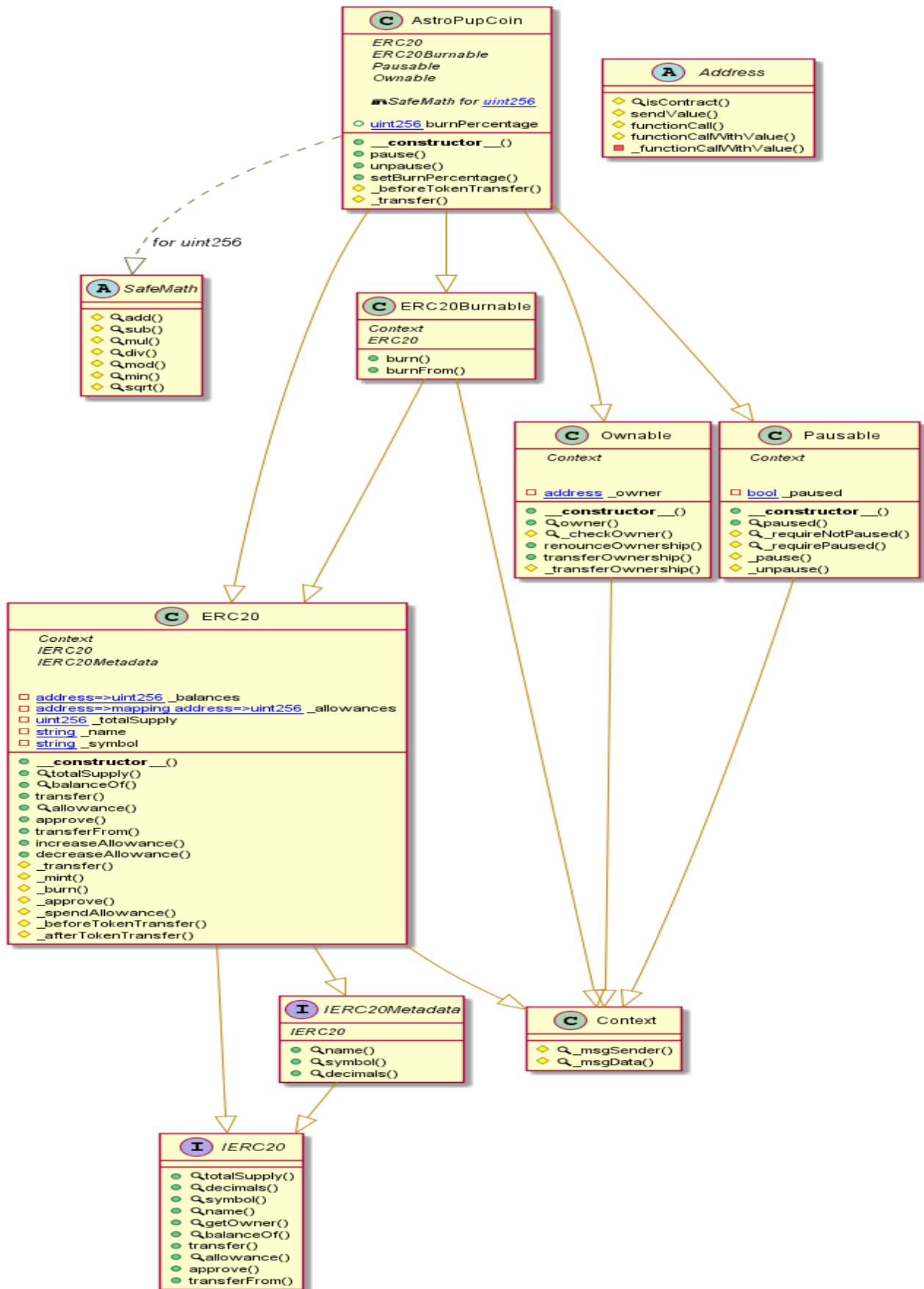
Due to the fact that the total number of test cases are unlimited, the audit makes no statements or warranties on security of the code. It also cannot be considered as a sufficient assessment regarding the utility and safety of the code, bugfree status or any other statements of the contract. While we have done our best in conducting the analysis and producing this report, it is important to note that you should not rely on this report only. We also suggest conducting a bug bounty program to confirm the high level of security of this smart contract.

## Technical Disclaimer

Smart contracts are deployed and executed on the blockchain platform. The platform, its programming language, and other software related to the smart contract can have their own vulnerabilities that can lead to hacks. Thus, the audit can't guarantee explicit security of the audited smart contracts.

# Appendix

## Code Flow Diagram - AstroPup Coin



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# Slither Results Log

## Slither Log >> AstroPup.sol

```
AstroPupCoin.setBurnPercentage(uint256) (AstroPup.sol#734-737) should emit an event for:
- burnPercentage = newBurnPercentage (AstroPup.sol#736)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#missing-events-arithmetic

Address.isContract(address) (AstroPup.sol#87-94) uses assembly
- INLINE ASM (AstroPup.sol#90-92)
Address._functionCallWithValue(address,bytes,uint256,string) (AstroPup.sol#133-155) uses assembly
- INLINE ASM (AstroPup.sol#147-150)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#assembly-usage

Address.functionCallWithValue(address,bytes,uint256,string) (AstroPup.sol#133-155) is never used and should be removed
Address.functionCall(address,bytes) (AstroPup.sol#103-105) is never used and should be removed
Address.functionCall(address,bytes,string) (AstroPup.sol#107-113) is never used and should be removed
Address.functionCallWithValue(address,bytes,uint256) (AstroPup.sol#115-121) is never used and should be removed
Address.functionCallWithValue(address,bytes,uint256,string) (AstroPup.sol#123-131) is never used and should be removed
Address.isContract(address) (AstroPup.sol#87-94) is never used and should be removed
Address.sendValue(address,uint256) (AstroPup.sol#96-101) is never used and should be removed
Context._msgData() (AstroPup.sol#192-195) is never used and should be removed
ERC20._mint(address,uint256) (AstroPup.sol#419-432) is never used and should be removed
SafeMath.add(uint256,uint256) (AstroPup.sol#8-13) is never used and should be removed
SafeMath.min(uint256,uint256) (AstroPup.sol#69-71) is never used and should be removed
SafeMath.mod(uint256,uint256) (AstroPup.sol#56-58) is never used and should be removed
SafeMath.mod(uint256,uint256,string) (AstroPup.sol#60-67) is never used and should be removed
SafeMath.sqrt(uint256) (AstroPup.sol#73-84) is never used and should be removed
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code

Pragma version^0.8.0 (AstroPup.sol#2) allows old versions
solc-0.8.0 is not recommended for deployment
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity

Low level call in Address.sendValue(address,uint256) (AstroPup.sol#96-101):
- (success) = recipient.call{value: amount}() (AstroPup.sol#99)
Low level call in Address._functionCallWithValue(address,bytes,uint256,string) (AstroPup.sol#133-155):
- (success,returndata) = target.call{value: weiValue}(data) (AstroPup.sol#141)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#low-level-calls

Redundant expression "this (AstroPup.sol#193)" inContext (AstroPup.sol#187-196)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#redundant-statements

AstroPupCoin (AstroPup.sol#716-753) does not implement functions:
- IERC20Metadata.decimals() (AstroPup.sol#212)
- IERC20.getOwner() (AstroPup.sol#166)
- IERC20Metadata.name() (AstroPup.sol#202)
- IERC20Metadata.symbol() (AstroPup.sol#207)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#unimplemented-functions
AstroPup.sol analyzed (10 contracts with 84 detectors), 23 result(s) found
```

# Solidity Static Analysis

## AstroPup.sol

### Gas & Economy

#### Gas costs:

Gas requirement of function AstroPupCoin.pause is infinite: If the gas requirement of a function is higher than the block gas limit, it cannot be executed. Please avoid loops in your functions or actions that modify large areas of storage (this includes clearing or copying arrays in storage)

Pos: 20:0:

#### Gas costs:

Gas requirement of function AstroPupCoin.unpause is infinite: If the gas requirement of a function is higher than the block gas limit, it cannot be executed. Please avoid loops in your functions or actions that modify large areas of storage (this includes clearing or copying arrays in storage)

Pos: 24:0:

### Miscellaneous

#### Constant/View/Pure functions:

AstroPupCoin.\_beforeTokenTransfer(address,address,uint256) : Potentially should be constant/view/pure but is not. Note: Modifiers are currently not considered by this static analysis.

[more](#)

Pos: 33:0:

#### Constant/View/Pure functions:

AstroPupCoin.\_transfer(address,address,uint256) : Potentially should be constant/view/pure but is not. Note: Modifiers are currently not considered by this static analysis.

[more](#)

Pos: 41:0:

# Solhint Linter

## AstroPup.sol

```
AstroPup.sol:2:1: Error: Compiler version ^0.8.0 does not satisfy the  
r semver requirement  
AstroPup.sol:15:1: Error: Explicitly mark visibility in function (Set  
ignoreConstructors to true if using solidity >=0.7.0)
```

### Software analysis result:

These software reported many false positive results and some are informational issues. So, those issues can be safely ignored.



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