## SUMMARY

The illustrative embodiments of the present disclosure provide a method of using a configuration software part for an aircraft. A processor unit on the aircraft identifies software parts for the aircraft from a list of approved software parts for an approved software configuration for the aircraft in the configuration software part. The approved software configuration for the aircraft is identified in the configuration software part and the configuration software part is stored on the aircraft. The processor unit on the aircraft determines whether the software parts identified in the configuration software part are on the aircraft, and should be used for the aircraft for particular conditions, wherein the configuration software part comprises: an identification certificate; information for identifying a plurality of approved software configurations for the aircraft; the list of approved software parts for the aircraft for each of the plurality of approved software configurations; and configuration rules identifying conditions in which the each of the plurality of approved software configurations is approved for the aircraft. The method further comprises the step of integrity checking, by an integrity checker configured to validate the integrity of software parts before the software parts are loaded on the aircraft; wherein the configuration software part is used by the integrity checker to prevent the software parts that are not for an approved software configuration from being loaded on the aircraft, even when such software parts pass other integrity checks performed by the integrity checker.

The illustrative embodiments of the present disclosure also provide an apparatus comprising a storage device on an aircraft, a configuration software part for the aircraft, and a configuration manager on the aircraft. The configuration software part for the aircraft is stored in the storage device on the aircraft. The configuration software part identifies an approved software configuration for the aircraft and comprises a list of approved software parts for the approved software configuration for the aircraft. The configuration manager on the aircraft is configured to identify software parts from the list of approved software parts in the configuration software part stored in the storage device on the aircraft and determine whether the software parts identified in the list of approved software parts in the configuration software part are on the aircraft, and should be used for the aircraft for particular conditions, wherein the configuration software part

comprises: an identification certificate; information identifying a plurality of approved software configurations for the aircraft; the list of approved software parts for the aircraft for each of the plurality of approved software configurations; and configuration rules identifying conditions in which the each of the plurality of approved software configurations is approved for the aircraft. The apparatus further comprises an integrity checker configured to validate the integrity of software parts before the software parts are loaded on the aircraft; wherein the configuration software part is adapted for used by the integrity checker to prevent the software parts that are not for an approved software configuration from being loaded on aircraft , even when such software parts pass other integrity checks performed by the integrity checker.

The illustrative embodiments of the present disclosure also provide a method of providing a configuration software part for an aircraft. A processor unit receives, from a manufacturer of the aircraft, a manufacturer identification certificate, information identifying an approved manufacturer software configuration for the aircraft, a list of approved manufacturer software parts for the aircraft for the approved manufacturer software configuration, and cryptographic values for the approved manufacturer software parts. The processor unit also receives, from an operator of the aircraft, an operator identification certificate, information identifying an approved operator software configuration for the aircraft, a list of approved operator software parts for the aircraft for the approved operator software configuration, and cryptographic values for the approved operator software parts. The processor unit combines the manufacturer identification certificate, the information identifying the approved manufacturer software configuration

**CLAIMS:**

What is claimed is:

1. A method of using a configuration software part for an aircraft, comprising:

identifying, by a processor unit on the aircraft, software parts for the aircraft from a list of approved software parts for an approved software configuration for the aircraft in the configuration software part, wherein the approved software configuration for the aircraft is identified in the configuration software part and the configuration software part is stored on the aircraft; and

determining, by the processor unit on the aircraft, whether the software parts identified in the configuration software part are on the aircraft and should be used for the aircraft for particular conditions, wherein the configuration software part comprises:

an identification certificate;

information for identifying a plurality of approved software configurations for the aircraft;

the list of approved software parts for the aircraft for each of the plurality of approved software configurations; and

configuration rules identifying conditions in which the each of the plurality of approved software configurations is approved for the aircraft; and

integrity checking, by an integrity checker configured to validate the integrity of software parts before the software parts are loaded on the aircraft; wherein the configuration software part is used by the integrity checker to prevent the software parts that are not for an approved software configuration from being loaded on the aircraft, even when such software parts pass other integrity checks performed by the integrity checker.

2. The method of claim 1, wherein the configuration software part is part of an actual software configuration of the aircraft.

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3. The method of claim 1 or 2, wherein the configuration software part comprises a number of supplier portions and an operator portion.

4. The method of any one of claims 1 to 3 further comprising:

identifying, by the processor unit on the aircraft, an actual software configuration of the aircraft; and

determining, by the processor unit on the aircraft, whether the actual software configuration matches the approved software configuration for the aircraft identified in the configuration software part.

5. The method of any one of claims 1 to 4 further comprising, in response to a determination that the software parts are not on the aircraft:

obtaining the software parts by the processor unit on the aircraft; and

storing the software parts on the aircraft by the processor unit on the aircraft.

6. The method of any one of claims 1 to 5 further comprising:

identifying, by the processor unit on the aircraft, the software parts on the aircraft;

determining, by the processor unit on the aircraft, whether the software parts are identified in the list of approved software parts for the approved software configuration for the aircraft in the configuration software part; and

removing the software parts from the aircraft, by the processor unit on the aircraft, in response to a determination that the software parts are not identified in the list of approved software parts.

7. An apparatus, comprising:

a storage device on an aircraft;

a configuration software part for the aircraft stored in the storage device, wherein the configuration software part identifies an approved software configuration for the aircraft and comprises a list of approved software parts for the approved software configuration for the aircraft; and

a configuration manager on the aircraft configured to identify software parts from the list of approved software parts in the configuration software part stored in the storage device on the aircraft and determine whether the software parts identified in the list of approved software parts in the configuration software part are on the aircraft, and should be used for the aircraft for particular conditions, wherein the configuration software part comprises:

an identification certificate;

information identifying a plurality of approved software configurations for the aircraft;

the list of approved software parts for the aircraft for each of the plurality of approved software configurations; and

configuration rules identifying conditions in which the each of the plurality of approved software configurations is approved for the aircraft; and

an integrity checker configured to validate the integrity of software parts before the software parts are loaded on the aircraft; wherein the configuration software part is adapted for used by the integrity checker to prevent the software parts that are not for an approved software configuration from being loaded on aircraft , even when such software parts pass other integrity checks performed by the integrity checker.

8. The apparatus of claim 7, wherein the configuration software part is part of an actual software configuration of the aircraft.

9. The apparatus of claim 7 or 8, wherein the configuration software part comprises a number of supplier portions and an operator portion.

10. The apparatus of any one of claims 7 to 9, wherein the configuration manager is configured to:

identify an actual software configuration of the aircraft; and

determine whether the actual software configuration matches the approved software configuration for the aircraft identified in the configuration software part.

11. The apparatus of any one of claims 7 to 10, wherein the configuration manager is configured to obtain the software parts and store the software parts in the storage device in response to a determination that the software parts are not on the aircraft.

12. The apparatus of any one of claims 7 to 11, wherein the configuration manager is configured to:

identify software parts on the aircraft;

determine whether the software parts are identified in the list of approved software parts for the approved software configuration for the aircraft in the configuration software part; and

remove the software parts from the aircraft in response to a determination that the software parts are not identified in the list of approved software parts.

13. A method of providing a configuration software part for an aircraft, comprising:

receiving, by a processor unit, from a manufacturer of the aircraft, a manufacturer identification certificate, information identifying an approved manufacturer software configuration for the aircraft, a list of approved manufacturer software parts for the aircraft for the approved manufacturer software configuration, and cryptographic values for the approved manufacturer software parts;

receiving, by the processor unit, from an operator of the aircraft, an operator identification certificate, information identifying an approved operator software configuration for the aircraft, a list of approved operator software parts for the aircraft for the approved operator software configuration, and cryptographic values for the approved operator software parts;

combining, by the processor unit, the manufacturer identification certificate, the information identifying the approved manufacturer software configuration for the aircraft, the list of approved manufacturer software parts for the approved manufacturer software configuration, the cryptographic values for the approved manufacturer software parts, the operator identification certificate, the information identifying the approved operator software configuration for the aircraft, the list of approved operator software parts for the approved operator software configuration, and the cryptographic values for the approved operator software parts to form the configuration software part for the aircraft; and

providing the configuration software part for delivery to the aircraft by the processor unit.

14. The method of claim 13 further comprising:

receiving, by the processor unit, from the manufacturer of the aircraft, manufacturer configuration rules identifying first conditions in which each of a plurality of approved manufacturer software configurations is approved for the aircraft;

receiving, by the processor unit, from the operator of the aircraft, operator configuration rules identifying second conditions in which each of a plurality of approved operator software configurationsis approved for the aircraft; and

including, by the processor unit, the manufacturer configuration rules, information identifying the plurality of approved manufacturer software configurations, the operator configuration rules, and information identifying the plurality of approved operator software configurations in the configuration software part for the aircraft.

15. The method of claim 13 or 14 further comprising:

determining, by the processor unit, whether software parts identified in one of the list of approved manufacturer software parts and the list of approved operator software parts in the configuration software part is in a software part library for providing the software part to the aircraft; and

obtaining the software parts and storing the software parts in the software part library, by the processor unit, in response to a determination that the software parts are not in the software part library.

16. The method of any one of claims 13 to 15, wherein the configuration software part for the aircraft further comprises an identification of a number of previous configurations of the aircraft.

17. The method of claim 15 further comprising:

loading the configuration software part on the aircraft such that the configuration software part comprises a part of an actual software configuration of the aircraft;

using the configuration software part on the aircraft to manage the actual software configuration of the aircraft; and

using the configuration software part on the aircraft to manage software parts on the aircraft.

18. The method of claim 17, further comprising attaching a current identification certificate to a previous configuration software part stored on the aircraft.