CLAIMS

1. A method for detecting performance of an aircraft based on a customized message, comprising:

collecting data reflecting operation status of the aircraft;

generating the customized message based on the collected data, wherein, the customized message is configured to include one or more main parameters related to the operation status of the aircraft;

storing or transmitting the customized message; and

detecting the performance of the aircraft based on the customized message.

2. A method according to claim 1, wherein, the customized message further includes one or more auxiliary parameters related to correction of the main parameters.

3. A method according to claim 2, wherein, the step of generating further comprising:

obtaining values of the main parameters and auxiliary parameters at one or more timings in response to a trigger condition.

4. A method according to claim 3, further comprising:

converting the values of the main parameters and auxiliary parameters into values under a specified condition.

5. A method according to claim 4, further comprising:

correcting the values of the main parameters according to the values of the auxiliary parameters.

6. A method according to claim 3, wherein, the main parameters of the customized message are determined by the following steps:

obtaining multiple parameters related to the operation status of the aircraft;

determining multiple main parameters according to respective physical implications indicated by the multiple parameters;

calculating correlations between the multiple main parameters; and

removing one or more of the multiple main parameters based on the correlations between the multiple main parameters.

7. A method according to claim 3, wherein, the main parameters of the customized message is determined by the following steps:

obtaining multiple parameters related to the operation status of the aircraft;

associating the multiple parameters with failure events of the aircraft to determine the multiple main parameters;

calculating correlations between the multiple main parameters; and

removing one or more of the multiple main parameters based on the correlations between the multiple main parameters.

8. A method according to claim 7, wherein, the step of associating comprising:

calculating correlations between the multiple parameters and the failure events of the aircraft through data mining.

9. A method according to claim 3, further comprising:

starting a first process which is used to monitor whether the trigger condition is met.

10. A method according to claim 3, further comprising:

starting a second process which is used to monitor whether a condition of generating the customized message is met; and

starting a third process which is used to collect the values of the main parameters and

auxiliary parameters required by the customized message;

wherein, the customized message is generated using the values of the main parameters and auxiliary parameters collected in the third process, when the second process determines that the condition of generating the customized message is met.

11. A method according to claim 10, further comprising:

starting the second process and the third process by the first process.

12. A method according to claim 11, wherein, the first process is configured to determine whether the aircraft is in a takeoff stage, climbing stage or descending stage;

the second process is configured to determine whether an outlet temperature of precoolers of left and right engines is higher than 220°C or lower than 155°C and maintains for more than 5 seconds;

the third process collects the outlet temperature of the precoolers of the left and right engines at every second.

13. A method according to claim 12, further comprising:

generating a customized bleed air message,

wherein, main parameters of the customized bleed air message include a period in which the outlet temperature of precoolers of the left and right engines is higher than 220°C or lower than 155°C, and a maximum value or a minimum value of the outlet temperature of the precoolers of the left and right engines; and

auxiliary parameters of the customized bleed air message include an altitude of the aircraft and an ambient temperature.

14. A method according to claim 1, wherein, the customized message is a customized message other than a system message.

15. A method according to claim 1, wherein, the customized message is generated using the ACMS of Airbus or the AHM of Boeing.

16. A method according to claim 1, wherein, the step of storing and transmitting comprising:

storing the customized message in a nonvolatile storage memory of an aircraft data system or transmitting the customized message by the ACARS or ATN.

17. A method according to claim 10, wherein, a trigger condition of the customized message or a condition to generate the message is changeable.

18. A method according to claim 17, wherein, the trigger condition of the customized message is configured to generate the customized message at each flight.

19. A method according to claim 18, wherein, the step of detecting comprising:

collecting the customized messages of multiple flights; and

detecting the performance of the aircraft based on an actual physical model, a feature evolution model or an intelligent model through using the customized messages of multiple flights.

20. A method for maintaining an aircraft, comprising:

detecting performance of the aircraft using the method in any one of claims 1-19; and

maintaining the aircraft in response to a failure of the aircraft; or

arranging the aircraft to be maintained in an appropriate time in response to a decline of the performance of the aircraft.

CLAIMS

The invention claimed is:

1. A method for detecting performance of an aircraft based on a customized message, comprising:

collecting data reflecting operation status of the aircraft;

generating the customized message based on the collected data, wherein, the customized message includes one or more main parameters related to the operation status of the aircraft and one or more auxiliary parameters related to correction of the main parameters, wherein said generating further comprises obtaining values of the main parameters and the auxiliary parameters at one or more timings in response to a trigger condition;

storing or transmitting the customized message;

detecting the performance of the aircraft based on the customized message;

starting a first process which is used to monitor whether the trigger condition is met;

starting a second process which is used to monitor whether a condition of generating the customized message is met; and

starting a third process which is used to collect the values of the main parameters and the auxiliary parameters required by the customized message;

wherein, the customized message is generated using the values of the main parameters and auxiliary parameters collected in the third process, when the second process determines that the condition of generating the customized message is met; and

wherein the second process and the third process are started by the first process.

2. A method according to claim 1, further comprising: converting the values of the main parameters and the auxiliary parameters into values under a specified condition.

3. A method according to claim 2, further comprising: correcting the values of the main parameters according to the values of the auxiliary parameters.

4. A method according to claim 1, wherein, the main parameters of the customized message are determined by the following steps:

obtaining multiple parameters related to the operation status of the aircraft;

determining multiple main parameters according to respective physical implications indicated by the multiple parameters;

calculating correlations between the multiple main parameters; and

removing one or more of the multiple main parameters based on the correlations between the multiple main parameters.

5. A method according to claim 1, wherein, the main parameters of the customized message is determined by the following steps:

obtaining multiple parameters related to the operation status of the aircraft;

associating the multiple parameters with failure events of the aircraft to determine the multiple main parameters;

calculating correlations between the multiple main parameters; and

removing one or more of the multiple main parameters based on the correlations between the multiple main parameters.

6. A method according to claim 5, wherein, the step of associating comprising:

calculating correlations between the multiple parameters and the failure events of the aircraft through data mining.

7. A method according to claim 1, wherein, the first process is configured to determine whether the aircraft is in a takeoff stage, climbing stage or descending stage;

the second process is configured to determine whether an outlet temperature of precoolers of left and right engines is higher than 220.degree. C. or lower than 155.degree. C. and maintains for more than 5 seconds;

the third process collects the outlet temperature of the precoolers of the left and right engines at every second.

8. A method according to claim 7, further comprising:
generating a customized bleed air message,
wherein, main parameters of the customized bleed air message include a period in which the outlet temperature of precoolers of the left and right engines is higher than 220.degree. C. or lower than 155.degree. C., and a maximum value or a minimum value of the outlet temperature of the precoolers of the left and right engines; and
auxiliary parameters of the customized bleed air message include an altitude of the aircraft and an ambient temperature.

9. A method according to claim 1, wherein, the customized message is a customized message other than a system message.

10. A method according to claim 1, wherein, the customized message is generated using the ACMS of Airbus or the AHM of Boeing.

11. A method according to claim 1, wherein, the step of storing and transmitting comprising:
storing the customized message in a nonvolatile storage memory of an aircraft data system or transmitting the customized message by the ACARS or ATN.

12. A method according to claim 1, wherein, a trigger condition of the customized message or a condition to generate the message is changeable.

13. A method according to claim 12, wherein, the trigger condition of the customized message is configured to generate the customized message at each flight.

14. A method according to claim 13, wherein, the step of detecting comprising:
collecting the customized messages of multiple flights; and
detecting the performance of the aircraft based on an actual physical model, a feature evolution model or an intelligent model through using the customized messages of multiple flights.

15. A method for maintaining an aircraft, comprising:
detecting performance of the aircraft using the method in claim 1; and
maintaining the aircraft in response to a failure of the aircraft; or
arranging the aircraft to be maintained in an appropriate time in response to a decline of the performance of the aircraft.