We claim:

1. A method for monitoring performance of an aircraft auxiliary power unit APU lubricant cooler, comprising:

acquiring APU messages within a time period;

obtaining the operation parameters of the APU lubricant cooler according to the APU messages, the operation parameters including lubricant temperature OTA and load compressor inlet temperature LCIT;

obtaining a revised lubricant temperature OT by:

revised lubricant temperature OT=lubricant temperature OTA–load compressor inlet temperature LCIT; and

determining whether the performance of the APU lubricant cooler is in stable phase, decline phase or malfunction phase according to change trend of the revised lubricant temperature OT with respect to time, the determining comprising:

in response to the change trend is less than a threshold value of decline, determining the performance of the APU lubricant cooler is in stable phase;

in response to the change trend is greater than the threshold value of decline and less than a threshold value of malfunction, determining the performance of the APU lubricant cooler is in decline phase; and

in response to the change trend is greater than the threshold value of malfunction, determining the performance of the APU lubricant cooler is in malfunction phase; and

determining stable change trend of the revised lubricant temperature OT with respect to time when the APU lubricant cooler is in stable phase;

wherein, the threshold value of the decline phase is around 1.5-2.5 times than the stable change trend, and the threshold value of malfunction is around 5-7 times than the stable change trend.

2. The method of claim 1, wherein, the decline phase further comprises serious decline phase, and a threshold value of serious decline is between the threshold values of the decline and malfunction, in response to the change trend is greater than the threshold value of the serious decline and less than the threshold value of malfunction, determining the performance of the APU lubricant cooler is in serious decline phase; wherein the method further comprises:

determining the stable change trend of the revised lubricant temperature OT with respect to time when the APU oil lube cooler is in stable phase;

wherein, the threshold value of the serious decline is around 2.5-5 times than the stable change trend.

3. The method of claim 1, further comprising: the time is time since installation TSR of APU.

4. The method of claim 1, wherein the time period is about 5-10 days.

5. The method of claim 1, wherein about 20-30 APU messages are obtained within the time period.

6. The method of claim 1, wherein the APU messages are triggered to obtain the operation parameters when an APU load is at its peak.

7. The method of claim 1, wherein a plurality of the APU messages are triggered to obtain the operation parameters in a same APU load.

8. The method of claim 1, further comprising:

in response to the lubricant temperature OTA exceeding a first threshold, issuing a warning signal.

9. The method of claim 1, further comprising:

in response to the revised lubricant temperature OT exceeding a second threshold, issuing a warning signal.

10. The method of claim 1, further comprising:

calculating an average value AVG and a deviation index δ of the revised lubricant temperature OT within the time period;

determining a revised lubricant temperature OT_{next} obtained according to the next message related to APU; and

in response to the revised lubricant temperature OT_{next} being greater than AVG+nδ or less than AVG−nδ, determining whether a subsequent revised lubricant temperature OT_{next+1} obtained according to a follow-up next message related to APU is equal or greater than AVG+nδ or less than AVG−nδ; and

in response to a number of times for consecutive revised lubricant temperature obtained according to consecutive message related to APU being equal or greater than AVG+nδ or less than AVG−nδ and exceeding a predetermined number Z, issuing a warning;

wherein n is 2-5, and Z is 3-5.

11. The method of claim 10, in response to that the revised lubricant temperature OT_{next} obtained according to the next message related to APU is greater than AVG+nδ or less than AVG−nδ, recalculating the average value AVG and deviation index δ of the revised lubricant temperature OT.

12. The method of claim 10, in response to the number of times for consecutive revised lubricant temperature obtained according to consecutive messages related to APU is equal or greater than AVG+nδ or less than AVG−nδ and exceeds the predetermined number Z, recalculating the average value AVG and deviation index δ of the revised lubricant temperature OT.

13. The method of claim 10, wherein the deviation index δ is standard deviation.

14. The method of claim 10, wherein the value of n is 2 or 3.

15. According to the method of claim 10, wherein the value of Z is 3.

16. According to the method of claim 10, further comprising:

in response to the revised lubricant temperature obtained according to the message related to APU is greater than AVG+nδ continuously and exceeding the predetermined number Z, issuing a warning of lubricant cooler.

17. The method of claim 10, further comprising:

response to the revised lubricant temperature obtained according to the message related to APU is greater than AVG-nδ continuously and exceeding the predetermined number Z, issuing a warning of sensor.

18. The method of claim 1, further comprising:

estimating a time when a lubricant sensor encounter a malfunction.

19. A device for monitoring performance of a lubricant cooler in aircraft auxiliary power unit APU, comprising a processor and a memory for storing computer readable instructions for instructing the processor implementing the following units:

a message acquiring and analyzing unit, configured to acquire APU messages within a time period, and obtain the operation parameters of the APU lubricant cooler, the operation parameters includes: time since installation TSR of APU, lubricant temperature OTA and load compressor inlet temperature LCIT;

a temperature revised unit, configured to obtain revised temperature of lubricant OT:

revised temperature of lubricant OT=lubricant temperature OTA–load compressor inlet temperature LCIT; and

a performance monitoring unit, configured to determine that the performance of the APU lubricant cooler is in stable phase, decline phase, serious decline phase or malfunction phase according to change trend of the revised lubricant cooler OT against the time since installation (TSR) of APU determined by:

in response to the change trend being less than a threshold value of decline, determining the performance of the APU lubricant cooler is in stable phase;

in response to the change trend being greater than the threshold value of decline and less than a threshold value of malfunction, determining the performance of the APU lubricant cooler is in decline phase; and

in response to the change trend being greater than the threshold value of malfunction, determining the performance of the APU lubricant cooler is in malfunction phase; and

determining stable change trend of the revised lubricant temperature OT with respect to time when the APU lubricant cooler is in stable phase;

wherein, the threshold value of the decline phase is around 1.5-2.5 times the stable change trend, and the threshold value of malfunction is around 5-7 times the stable change trend.

20. A device for monitoring performance of a lubricant cooler in aircraft auxiliary power unit APU, comprising:

a processor; and

a memory linked with the processor, which stores computer-readable codes;

the computer-readable codes run in the processor to execute the following steps:

acquiring APU messages within a time period;

obtaining the operation parameters of the APU lubricant cooler, the operation parameters includes: time since installation TSR of APU, lubricant temperature OTA and load compressor inlet temperature LCIT;

revised temperature of lubricant OT is obtained by:

revised temperature of lubricant OT=lubricant temperature OTA−load compressor inlet temperature LCIT;

determining that the performance of the APU lubricant cooler is in stable phase, decline phase, serious decline phase or malfunction phase according to change trend of the revised lubricant cooler OT against the time since installation (TSR) of APU, the determining comprising:

in response to the change trend being less than a threshold value of decline, determining the performance of the APU lubricant cooler is in stable phase;

in response to the change trend being greater than the threshold value of decline and less than a threshold value of malfunction, determining the performance of the APU lubricant cooler is in decline phase; and

in response to the change trend being greater than the threshold value of malfunction, determining the performance of the APU lubricant cooler is in malfunction phase; and

determining stable change trend of the revised lubricant temperature OT with respect to time when the APU lubricant cooler is in stable phase;

wherein, the threshold value of the decline phase is around 1.5-2.5 times the stable change trend, and the threshold value of malfunction is around 5-7 times the stable change trend.