WHAT IS CLAIMED IS:

1. A method for detecting blockage of holes (12) in a component, the method comprising:

capturing thermographic data of the component and the holes (12) as a fluid (20) is pulsed toward the holes (12);

temporally processing the thermographic data to calculate temporal scores for the corresponding holes (12);

spatially processing the thermographic data to calculate spatial scores for the corresponding holes (12); and

calculating composite scores associated with the holes (12) based on the temporal scores and based on the spatial scores,

wherein the composite scores represent a likelihood that the corresponding holes (12) are open, blocked, or partially blocked.

2. The method of claim 1, wherein the component is a turbine blade (10) and the holes (12) are cooling holes (12) through which a cooling fluid (20) flows to cool the turbine blade (10) during operation of the turbine blade (10).

3. The method of claim 1, wherein the fluid (20) is pulsed toward the holes (12) on a repeated periodic basis.

4. The method of claim 1, further comprising:

creating a normalized image of the holes (12) based on temporally processing the thermographic data.

5. The method of claim 1, wherein the temporal score is calculated for each of several pixels associated with the holes (12).

6. The method of claim 1, wherein the temporal scores are calculated for the holes (12) based on a signal to noise ratio of the thermographic data.

7. The method of claim 1, wherein the temporal scores are calculated for the holes (12) based on detrended values of the thermographic data.

8. The method of claim 1, wherein the temporal scores are calculated for the holes (12) based on squared values of the detrended thermographic data.

9. The method of claim 1, wherein temporally processing the thermographic data includes:

detrending and squaring time domain signals (500, 502, 504) of the thermographic data for the holes (12);

applying a highpass filter to the thermographic data that is detrended and squared; and

calculating a signal to noise ratio of the thermographic data after the highpass filter is applied.

10. The method of claim 1, wherein the spatial scores are calculated based on a fraction of pixels in the thermographic data associated with each of the holes (12) having at least a designated temperature response within a designated area around the hole.

11. The method of claim 1, wherein the composite score for each of the holes (12) is calculated as one or more of: an average or a median of the spatial score for the hole and one or more an average or median of a portion of the temporal scores for the hole.

12. The method of claim 1, wherein the composite score for each of the holes (12) is compared with a designated threshold for the hole to determine whether the hole is open, blocked, or partially blocked.

13. The method of claim 1, further comprising opening one or more of the holes (12) that is determined to be blocked or partially blocked.

~~14. The method of claim 1, further comprising:~~

~~obtaining a thermographic frame (400) from the thermographic data;~~

~~obtaining a reference image representative of hole locations in the component or another component;~~

~~aligning the thermographic frame (400) with the reference image by spatially transforming an orientation of the thermographic frame (400) to match an orientation of the reference image; and~~

~~identifying locations of the holes (12) in the component using the thermographic frame (400) that has been spatially transformed.~~

~~15. An inspection system (200) comprising:~~

~~a thermographic sensor (206) configured to capture thermographic data of a component having holes (12) as a fluid (20) is pulsed toward the holes (12); and~~

~~one or more processor (208) configured to temporally process the thermographic data to calculate temporal scores for the corresponding holes (12), spatially process the thermographic data to calculate spatial scores for the corresponding holes (12), and calculate composite scores associated with the holes (12) based on the temporal scores and based on the spatial scores,~~

~~wherein the composite scores represent a likelihood that the corresponding holes (12) are open, blocked, or partially blocked.~~

1. A method for detecting blockage of holes in a component, the method comprising:

capturing thermographic data of the component and the holes as a fluid is pulsed toward the holes;

temporally processing the thermographic data to calculate temporal scores for the corresponding holes;

spatially processing the thermographic data to calculate spatial scores for the corresponding holes; and

calculating composite scores associated with the holes based on the temporal scores and based on the spatial scores,

wherein the composite scores represent a likelihood that the corresponding holes are open, blocked, or partially blocked.

2. The method of claim 1, wherein the component is a turbine blade and the holes are cooling holes through which a cooling fluid flows to cool the turbine blade during operation of the turbine blade.

3. The method of claim 1, wherein the fluid is pulsed toward the holes on a repeated periodic basis.

4. The method of claim 1, further comprising:

creating a normalized image of the holes based on temporally processing the thermographic data.

5. The method of claim 1, wherein the temporal score is calculated for each of several pixels associated with the holes.

6. The method of claim 1, wherein the temporal scores are calculated for the holes based on a signal to noise ratio of the thermographic data.

7. The method of claim 1, wherein the temporal scores are calculated for the holes based on detrended values of the thermographic data.

8. The method of claim 1, wherein the temporal scores are calculated for the holes based on squared values of the detrended thermographic data.

9. The method of claim 1, wherein temporally processing the thermographic data includes:

detrending and squaring time domain signals of the thermographic data for the holes;

applying a highpass filter to the thermographic data that is detrended and squared; and

calculating a signal to noise ratio of the thermographic data after the highpass filter is applied.

10. The method of claim 1, wherein the spatial scores are calculated based on a fraction of pixels in the thermographic data associated with each of the holes having at least a designated temperature response within a designated area around the hole.

11. The method of claim 1, wherein the composite score for each of the holes is calculated as one or more of: an average or a median of the spatial score for the hole and one or more an average or median of a portion of the temporal scores for the hole.

12. The method of claim 1, wherein the composite score for each of the holes is compared with a designated threshold for the hole to determine whether the hole is open, blocked, or partially blocked.

13. The method of claim 1, further comprising opening one or more of the holes that is determined to be blocked or partially blocked.

14. The method of claim 1, further comprising:

obtaining a thermographic frame from the thermographic data;

obtaining a reference image representative of hole locations in the component or another component;

aligning the thermographic frame with the reference image by spatially transforming an orientation of the thermographic frame to match an orientation of the reference image; and

identifying locations of the holes in the component using the thermographic frame that has been spatially transformed.

15. An inspection system comprising:

a thermographic sensor configured to capture thermographic data of a component having holes as a fluid is pulsed toward the holes; and

one or more processors configured to temporally process the thermographic data to calculate temporal scores for the corresponding holes, spatially process the thermographic data to calculate spatial scores for the corresponding holes, and calculate composite scores associated with the holes based on the temporal scores and based on the spatial scores,

wherein the composite scores represent a likelihood that the corresponding holes are open, blocked, or partially blocked.

16. The system of claim 15, wherein the one or more processors are configured to calculate the temporal scores for the holes based on a signal to noise ratio of the thermographic data.

17. The system of claim 15, wherein the one or more processors are configured to calculate the spatial scores based on a fraction of pixels in the thermographic data associated with each of the holes having at least a designated temperature response within a designated area around the hole.

18. A method for detecting blockage of cooling holes in a turbine blade, the method comprising:

capturing thermographic data of the turbine blade and the cooling holes as a fluid is pulsed toward the cooling holes;

temporally processing the thermographic data to calculate temporal scores for the corresponding cooling holes;

spatially processing the thermographic data to calculate spatial scores for the corresponding cooling holes; and

calculating composite scores associated with the cooling holes based on the temporal scores and based on the spatial scores,

wherein the composite scores represent a likelihood that the corresponding cooling holes are open, blocked, or partially blocked.

19. The method of claim 18, wherein temporally processing the thermographic data includes:

detrending and squaring time domain signals of the thermographic data for the cooling holes;

applying a highpass filter to the thermographic data that has been detrended and squared; and

calculating a signal to noise ratio of the thermographic data that has been squared and detrended and after the highpass filter is applied.

20. The method of claim 18, wherein the spatial scores are calculated based on a fraction of pixels in the thermographic data associated with each of the cooling holes having at least a designated temperature response within a designated area around the cooling hole.

21. The method of claim 18, further comprising opening one or more of the cooling holes that is determined to be blocked or partially blocked.