

A System For Optimising Runway Capacity On An Airport Runway And A Method Thereof

Cross-Reference to Related Applications

[0001] The present application claims the benefit of Singapore Patent Application No. 10202009789R filed on 1 October 2020, which is incorporated by reference herein.

Technical Field

[0002] The present invention relates to a system for optimising runway capacity on an airport runway and a method thereof.

Background

[0003] As air transport industry expands rapidly in recent decades, the air traffic in some of the busiest airports is very high. It is known that a busy airport can handle about 380,000 flights per year or about 1,000 flights per day. In order to regulate the air traffic to avoid any disasters, the International Civil Aviation Organisation (ICAO) has laid down vertical and horizontal minimum distance separation standards to facilitate the safe navigation of aircraft in controlled airspace, such as an aerodrome. The horizontal minimum distance separation standard between succeeding and arriving aircraft pairs is typically 2.5 nautical miles to 3 nautical miles on the same final approach, i.e. within 10 nautical miles from the runway threshold. When the aircraft is approaching the runway, it flies along a “final approach” of its flight path before reaching the landing zone.

[0004] While the separation standards are provided as guidelines to ensure safe navigation of aircraft, it may be possible to reduce the minimum distance between aircraft to achieve the same safety threshold as there are usually safety factors incorporated into the establishment of the minimum safety distance. Therefore, the separation standards may not be practicable in airports with high traffic. If the airport is able to reduce the minimum distances without compromising safety, the airport would be able to increase the handling rate of the aircraft and throughput.

[0005] Therefore, it is important to have a solution to optimise the runway capacity of airports.

Summary

[0006] According to various embodiments, method for optimising runway capacity on an airport runway is provided. The method includes monitoring an area of interest along a final approach flight path of one or more aircraft via a visible light camera and a thermal camera, detecting a first aircraft when it enters the area of interest, generating a first set of flight parameters of the first aircraft, detecting a second aircraft when it enters the area of interest, generating a second set of flight parameters of the second aircraft, and analysing the first set of flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft and the second aircraft to optimise the runway capacity of the airport runway.

[0007] According to various embodiments, monitoring the area of interest may include capturing a plurality of visible light images and a plurality of thermal images of the area of interest over a period of time using the visible light camera and the thermal camera respectively.

[0008] According to various embodiments, detecting the first aircraft may include identifying the first aircraft in the plurality of visible light images and the plurality of thermal images.

[0009] According to various embodiments, the first set of flight parameters may be generated by processing the plurality of visible light images and the plurality of thermal images.

[0010] According to various embodiments, detecting the second aircraft may include identifying the second aircraft in the plurality of visible light images and the plurality of thermal images.

[0011] According to various embodiments, the second set of flight parameters may be generated by processing the plurality of visible light images and the plurality of thermal images.

[0012] According to various embodiments, the plurality of visible light images and the plurality of thermal images may be processed at an interval of time.

[0013] According to various embodiments, the method may further include tracking the movement of the first aircraft and the second aircraft along the final approach of the flight path.

[0014] According to various embodiments, the method may further include storing the first set of flight parameters and the second set of flight parameters at a time interval.

[0015] According to various embodiments, a system for optimising runway capacity on an airport runway is provided. The system includes a thermal camera adapted to monitor an area of interest along a final approach flight path of the aircraft and capture a thermal image of the area of interest, a visible light camera adapted to monitor the area of interest and capture a visible light image of the area of interest, a processor in communication with the thermal camera and the visible light camera, a memory in communication with the processor for storing instructions executable by the processor, wherein the processor is configured to monitor an area of interest along a final approach flight path of one or more aircraft via the visible light camera and the thermal camera, detect a first aircraft when it enters the area of interest, generate a first set of flight parameters of the first aircraft, detect a second aircraft when it enters the area of interest, generate a second set of flight parameters of the second aircraft, analyse the first set of flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft and the second aircraft to optimise the runway capacity of the airport runway.

[0016] According to various embodiments, to monitor the area of interest, the processor may be configured to capture a plurality of visible light images and a plurality of thermal images of the area of interest over a period of time using the visible light camera and the thermal camera respectively.

[0017] According to various embodiments, to detect the first aircraft, the processor may be configured to identify the first aircraft in the plurality of visible light images and the plurality of thermal images.

[0018] According to various embodiments, the first set of flight parameters may be generated by processing the plurality of visible light images and the plurality of thermal images.

[0019] According to various embodiments, to detect the second aircraft, the processor may be configured to identify the second aircraft in the plurality of visible light images and the plurality of thermal images.

[0020] According to various embodiments, the second set of flight parameters may be generated by processing the plurality of visible light images and the plurality of thermal images.

[0021] According to various embodiments, the plurality of visible light images and the plurality of thermal images may be processed at an interval of time.

[0022] According to various embodiments, the processor may be further configured to control the visible light camera and the thermal camera to track the movement of the first aircraft and the second aircraft along the final approach of the flight path.

[0023] According to various embodiments, the system may further include a flight parameter database in communication with the processor, wherein the processor may be configured to store the first set of flight parameters and the second set of flight parameters at a time interval in the flight parameter database.

Brief Description of Drawings

[0024] Fig. 1 shows a schematic diagram of an exemplary embodiment of a system 100 for optimising runway capacity on an airport runway.

[0025] Fig. 2 shows an exemplary embodiment of the system.

[0026] Fig. 3 shows an elevation view of a pair of aircraft in the final approach flight path.

[0027] Fig. 4 shows a flow diagram of an exemplary method for optimising runway capacity on an airport runway.

[0028] Fig. 5 shows a flow diagram of an exemplary method for capturing critical aircraft flight parameters.

[0029] Fig. 6 shows a flowchart of an exemplary method for generating minimal horizontal separation distance and/or the minimal horizontal flight separation distance.

Detailed Description

[0030] In the following examples, reference will be made to the figures, in which identical features are designated with like numerals.

[0031] Fig. 1 shows a schematic diagram of an exemplary embodiment of a system 100 for optimising runway capacity on an airport runway. System 100 includes a thermal camera 110 adapted to monitor an area of interest along a final approach flight path of an aircraft and capture a thermal image of the area of interest, a visible light camera 120 adapted to monitor the area of interest and capture a visible light image of the area of interest, a processor 132 in communication with the thermal camera 110 and the visible light camera 120, a memory 134 in communication with the processor 132 for storing instructions executable by the processor 132, wherein the processor 132 is configured to monitor the area of interest along the final approach flight path of one or more aircraft via the visible light camera 120 and the thermal camera 110, detect a first aircraft when it enters the area of interest, generate a first set of flight parameters of the first aircraft, detect a second aircraft when it enters the area of interest, generate a second set of flight parameters of the second aircraft, analyse the first set of flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft and the second aircraft to optimise the runway capacity of the airport runway.

[0032] By obtaining the minimum horizontal separation distance and minimum vertical separation distance between the first aircraft and the second aircraft, the system 100 enables

optimisation of the runway capacity of a runway. Observance of these separation distances, i.e. minimum vertical separation distance and/or minimum horizontal separation distance, ensures safe separation from the ground, from other aircraft and from protected airspace. System 100 may be able to detect the first aircraft and the second aircraft even under low visibility conditions.

[0033] System 100 may include a server comprising the processor 132, the memory 134, an I/O interface 136 configured to provide an interface between the processor 132 and peripheral interface modules, e.g. keyboard, mouse, touchscreen, display, etc. System 100 may include a communication module 138 configured to facilitate communication, wired or wirelessly, between the system 100 and other user devices, e.g. mobile devices, laptops, via the internet. System 100 may include a storage device 140 configured to store data. System 100 may include a display, e.g. monitor, touchscreen, for displaying signals, e.g. alert signal, to the operator.

[0034] System 100 may include an image processing module 134M (see Fig. 1) configured to process images 110T, 120T captured from the thermal camera 110 and the visible light camera 120. System 100 may include a thermal camera 110 operating module 134T containing operating parameters of the thermal camera 110 for operating the thermal camera 110. System 100 may include a visible light camera 120 operating module 134V containing operating parameters of the visible light camera 120 for operating the visible light camera 120. The modules 134T, 134V, 134M may be stored in the storage device 140 and loaded into the memory 134 to be processed by the processor 132. Upon capturing the thermal image and visible light image, the images may be transmitted to the processor 132 to be processed. Processor 132 may receive and process the thermal image and the visible light image to detect aircraft.

[0035] Fig. 2 shows an exemplary embodiment of the system 200. System 200 may include a set of cameras 210S, i.e. the visible light camera 220 and the thermal camera 210. The set of cameras 210S may be mounted rigidly on an actuator 250 adapted to move the set of cameras 210S. Set of cameras 210S may be controlled by the processor 132 by activating the actuator 250 to monitor and capture the aircraft 20 along the final approach flight path before landing on the runway.

[0036] Actuator 250 may be a pan and tilt unit (PTU) adapted to pan and tilt the set of cameras 210S simultaneously so that the set of cameras 210S are able to have the same field of view and focus on the same area of interest. Actuator 250 may be adapted to pan the set of cameras 210S in the horizontal direction 210H and/or tilt the set of cameras 210S in the vertical direction 210V. Actuator 250 may be in communication with the processor 132 such that the processor 132 may be configured to remotely control the movement of the actuator 250 to pan and tilt the set of cameras 210S to detect and track the movement and position of the aircraft 20 flying within the final approach flight path for eventual landing on the runway. Actuator 250 may be installed on top of a support 252, e.g. a mast structure, which is typically located along the runway. Support may be located at a distance from the centreline of the runway so that it is possible for the set of cameras 210S to capture the aircraft 20.

[0037] Each set of cameras 210S may include the thermal camera 210 and the visible light camera 220, each having a field of view 210F, 220F and adapted to capture an area of interest. Both the field of views 210F, 220F of the visible light camera 220 and the thermal camera 210 may cover a specific area of interest of the final approach of the flight path. Area of interest may be at a portion of a final approach of the flight path, i.e. the area of interest may cover part of the final approach flight path. Visible light camera 220 may have a field of view which may overlap with the field of view of the thermal camera 210. Hence, as a result of the overlapping field of views, both the visible light camera 220 and the thermal camera 210 may detect the same area of interest. This would enable both the visible light camera 220 and the thermal camera 210 to acquire images of the selected area of interest.

[0038] System 200 may include a plurality of sets of cameras 210S spaced apart from each other along the runway 202. Each of the plurality of sets of cameras 310S may include the thermal camera 210 and the visible light camera 220.

[0039] Visible light camera 220 and the thermal camera 210 may perform continuous surveillance and monitoring of part of the final approach flight path. To do so, the system 200 may perform continuous surveillance and monitoring of a selected and pre-configured area of interest which corresponds to the field of views 210F, 220F of the respective visible light camera 220 and the thermal camera 210.

[0040] Fig. 3 shows an elevation view of a pair of aircraft 20A, 20B in the final approach flight path. As shown in Fig. 2, the horizontal separation distance 20H and vertical separation distance 20V between the pair of aircraft 20A, 20B flying along the final approach towards eventual landing on runway 202.

[0041] Upon detection of an aircraft 20 entering the final approach flight path, the processor 132 may control the actuator 250 to move the set of cameras to track the movement and position of the detected aircraft 20 as it flies along the final approach flight path, descend and eventually touchdown on the runway 202.

[0042] Thermal camera 210 detects the aircraft 20 by detecting the difference in thermal radiation level (or temperature) between the foreground, i.e. the aircraft 20, and the background, i.e. the surrounding. Thermal camera 210 operates in the infrared spectrum and does not require any ambient light to enable it to “see” the foreground. Thermal camera 210 may also be commonly known as infrared thermal camera 210. Thermal camera 210 may be a Mid Wave Infrared (MWIR) camera or a Long Wave Infrared (LWIR) camera. Thermal camera 210 provides the advantage to detect the foreground under very low visibility conditions and even under zero illumination conditions, i.e. total darkness. Hence, the thermal camera 210 provides the advantage of the ability to detect the aircraft 20 even under foggy weather conditions. Thermal camera 210 may capture and transmit images and video output in monochrome to the processor 132. Thermal camera 210 is entirely passive with no active transmissions or emissions, e.g. radio frequency, microwave, artificial illumination, infrared, laser and LIDAR, etc. As such, the thermal camera 210 offers the following advantages, e.g. no interference with existing airport systems/equipment and aircraft systems/equipment, no interference with future airport systems/equipment and aircraft systems/equipment, no licensing and approval of frequency/spectrum required from airport and frequency spectrum regulator.

[0043] Unlike the thermal camera 210, the visible light camera 220 operates within the visible spectrum of light and hence requires some minimum amount of ambient visible spectrum light to enable it to “see” the aircraft 20. Visible light camera 220 is not able to detect the aircraft 20 when the visibility conditions are too poor or under zero illumination conditions. For example,

the visible light camera 220 is also not able to detect the aircraft 20 when the visibility condition (above the runway surface) is very poor or in the presence of fog (above the runway surface). Visible light camera 220 is able to capture and transmit full colour and high-resolution images/video, e.g. Full HD (FHD) or 4K Ultra HD (4K UHD) resolution. The colour images in high resolution enables reliable and accurate visual verification and confirmation of the detected aircraft 20 by an operator, as well as reliable and accurate recognition of the aircraft 20 by the system 200. Therefore, the combined use of both the visible light camera 220 and the thermal camera 210 enables the system 200 to operate under very low visibility conditions, e.g. foggy weather conditions, to enable the system 200 to detect the aircraft 20 accurately and reliably. Visible light camera 220 is configured to capture and output visible light image 220M in colour and high resolution to the processor 132. Visible light camera 220 does not require any transmission of infrared illumination, visible spectrum illumination or laser illumination to operate. Being passive, the system 200 provides the advantage that it does not pose any hazard or cause any interference to other airport systems and/or aircraft systems, e.g. for aircraft landing/taking-off from the runway 202. System 200 provides the following advantages, no interference with existing airport systems/equipment and aircraft systems/equipment, no interference with future airport systems/equipment and aircraft systems/equipment, no licensing and approval of frequency/spectrum required from airport and frequency spectrum regulator.

[0044] Fig. 4 shows a flow diagram of an exemplary method 1000 for optimising runway capacity on an airport runway 202. The method 1000 includes monitoring an area of interest along a final approach flight path of one or more aircraft 20 via the visible light camera 120 and the thermal camera in block 1010, detecting a first aircraft 20A when it enters the area of interest in block 1020, generating a first set of flight parameters of the first aircraft 20A in block 1030, detecting a second aircraft 20B when it enters the area of interest in block 1040, generating a second set of flight parameters of the second aircraft 20B in block 1050, and analysing the first set of flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft 20A and the second aircraft 20B to optimise the runway capacity of the airport runway 202 in block 1060.

[0045] System 100 may be configured to monitor the area of interest. To monitor the area of interest, the system 100 may be configured to capture a plurality of visible light images and a plurality of thermal images of the area of interest over a period of time. Plurality of visible light images and the plurality of thermal images acquired by both the visible light camera 120 and the thermal camera 110 may be processed by the image processing module 134M. This would enable the detection and surveillance of the aircraft 20 flying within the final approach flight path. To detect a first aircraft 20A, the system 100 may be configured to identify the first aircraft 20A in the plurality of visible light images and the plurality of thermal images. Image processing module 134M may be configured to recognise the aircraft 20 using image recognition model. Once the first aircraft 20A is detected in the area of interest, the system 100 identifies that the first aircraft 20A has entered the area of interest. System 100 may track the movement of the aircraft 20 along the final approach of the flight path. Based on the plurality of visible light images and the plurality of thermal images with the first aircraft 20A and the runway 202, the image processing module 134M may generate a first set of flight parameters, e.g. position, altitude, trajectory, speed, angle of descent, distance to runway threshold, etc. for the first aircraft 20A. System 100 may detect a second aircraft 20B entering the area of interest. To detect a second aircraft 20B, the system 100 may be configured to identify the second aircraft 20B in the plurality of visible light images and the plurality of thermal images. Image processing module 134M may be configured to recognise the second aircraft 20B using image recognition model. Once the second aircraft 20B is detected in the area of interest, the system 100 identifies that the second aircraft 20B has entered the area of interest. System 100 may track the movement of the second aircraft 20B along the final approach of the flight path. Based on the plurality of visible light images and the plurality of thermal images with the second aircraft 20B and the runway 202, the image processing module 134M may generate a second set of flight parameters, e.g. position, altitude, trajectory, speed, angle of descent, distance to runway threshold, etc. for the second aircraft 20B. System 100 may generate the set of flight parameters for each subsequent aircraft that enters the area of interest.

[0046] System 100 may include a flight parameter database 242 in communication with the processor 132. Processor 132 may be configured to store the first set of flight parameters and the second set of flight parameters at a time interval in the flight parameter database 242. System 100 may retrieve the first set of flight parameters and the second set of flight parameters from the flight parameter database 242 for analysis. Processor 132 may analyse the first set of

flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft 20A and the second aircraft 20B to optimise the runway capacity of the airport runway 202. System 100 may analyse the sets of flight parameters of a plurality of aircraft to obtain an optimal vertical separation distance and/or an optimal horizontal separation distance. In this way, the system 100 is able to maximise the runway throughput of the runway 202 and optimise the runway capacity on the runway 202.

[0047] Fig. 5 shows a flow diagram of an exemplary method 2000 for capturing critical aircraft flight parameters. Method may include surveying a specific area of interest which covers part of the final approach flight path to detect aircraft flying within the area of interest. System 100 may control the visible light camera 120 and the thermal camera 110 to survey the specific area of interest.

[0048] In block 2010, the visible light camera 120 and the thermal camera 110 may perform continuous surveillance and monitoring of the selected area of interest which covers part of the final approach flight path.

[0049] In block 2020, the system 100 may determine if an aircraft has been detected within the final approach flight path by the visible light camera 120 and the thermal camera 110.

[0050] In block 2030, both the visible light camera 120 and the thermal camera 110 may track at least one of the movement, position and trajectory of the aircraft flying within final approach flight path when it is descending and would eventually touchdown on the landing zone of the runway 202.

[0051] In block 2040, the image processing module 134M may process the visible light images and the thermal images captured by both the visible light camera 120 and thermal camera 110 respectively to compute critical aircraft flight parameters, e.g. position, altitude, trajectory, speed, angle of descent, distance to runway threshold etc. at a regular interval, e.g. 1 second interval, 0.5 second interval, 2 second interval.

[0052] In block 2050, the system 100 may store the computed critical aircraft flight parameters into a flight parameters database 242 at a regular interval, e.g. 1 second interval, 0.5 second interval, 2 second interval.

[0053] Fig. 6 shows a flowchart of an exemplary method 2100 for generating minimal horizontal separation distance and/or the minimal horizontal flight separation distance. Method 2100 may include retrieving the first set of flight parameters and the second set of flight parameters, and/or other sets of flight parameters from the flight parameter database 242 and computing the minimal vertical separation distance and the minimal horizontal separation distance based on the first set of flight parameters and the second set of flight parameters, and/or other sets of flight parameters. System 100 may include a minimum separation distance standard database 244 in communication with the processor 132. Method 2100 may include storing the minimal horizontal separation distance and/or the minimal horizontal flight separation distance into the minimum separation distance standard database 244.

[0054] Thermal camera 110 is able to detect foreign objects 20 by detecting the difference in the temperature, i.e. the infrared thermal radiation of the foreground, e.g. the aircraft, with respect to the background, e.g. the surrounding. As the foreground, e.g. aircraft is made of different materials and would have different energy absorptivity, reflectivity and emissivity, from the background, e.g. the surrounding, the foreground would result in different temperature, i.e. different level of infrared thermal radiation, with respect to the background. The difference in temperature between the foreground and the background would be detectable by the thermal camera 110.

[0055] Therefore, it is beneficial to “train” the thermal camera 110, or rather the thermal camera 110 operating module 134T, to differentiate the aircraft 20, by identifying the type of material which the aircraft is made of. As the foreground, i.e. aircraft is made of materials of different emissivity resulting in different level of temperature and different temperature contrast level with respect to the background, i.e. the surrounding, the “well-trained” thermal camera 110 would be able to identify an aircraft 20 more accurately.

[0056] To train the thermal camera 110. Under normal clear weather conditions, the thermal camera 110 may be put through an initial period of “training” whereby the thermal camera 110 may operate in “training” mode to enable it to “learn” from the visible light images 120M of the visible light camera 120. After the initial “training”, the thermal camera 110 may be adequately “learned” to enable the thermal camera 110 to provide reliable and accurate aircraft detection with relatively high level of accuracy. With a high level of accuracy, it would then be possible to enable a system 100 with a “standalone” thermal camera 110 instead of a set of visible light camera 120 and thermal camera 110. In this way, the system 100 will be applicable under adverse weather conditions and/or very low visibility conditions without the visible light camera 120.

[0057] System 100 may determine the relationship between the foreground, e.g. the aircraft 20, and the temperature of the aircraft 20 in the thermal image 110M. Processor 132 may be further configured to train the thermal camera 110 to detect the aircraft 20 based on the visible light images 120M from the visible light camera 120. As it is substantially easier to identify the aircraft 20 in visible light image 120M, the system 100 may form a relationship between the aircraft 20 of the visible light image 120M obtained from the visible light camera 120 and the temperature of the thermal image 110M from the thermal camera 110. In this way, the system 100 may be able to identify the aircraft 20 more easily based on the thermal image thereof.

[0058] To optimize the performance of the thermal camera 110, it is necessary to optimize the detection configuration parameters of the thermal camera 110. The detection configuration parameters of the thermal camera 110 may be a set of operating parameters pertaining to the thermal camera 110 to enable the thermal camera 110 to detect the foreground, e.g. the aircraft 20, with optimum and high level of accuracy. Operating parameters of the thermal camera 110 may include sensitivity, gain, brightness, contrast, shutter timing settings, etc. In this way, as the system 100 trains the thermal camera operating module 134T, the detection performance of the thermal camera 110 would be improved over time to a level at which it may be able to operate as “standalone” and sole aircraft detector for the system 100, i.e. without the visible light camera 120. The optimized performance thermal camera 110 would be beneficial under adverse weather conditions and/or under very low visibility conditions.

[0059] A skilled person would appreciate that the features described in one example may not be restricted to that example and may be combined with any one of the other examples.

[0060] The present invention relates to a system for optimising the runway capacity of an airport runway and a method thereof generally as herein described, with reference to and/or illustrated in the accompanying drawings.

Claim

1. A method for optimising runway capacity on an airport runway, the method comprising:
monitoring an area of interest along a final approach flight path of one or more aircraft via a visible light camera and a thermal camera,
detecting a first aircraft when it enters the area of interest,
generating a first set of flight parameters of the first aircraft,
detecting a second aircraft when it enters the area of interest,
generating a second set of flight parameters of the second aircraft, and
analysing the first set of flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft and the second aircraft to optimise the runway capacity of the airport runway.
2. The method according to claim 1, wherein monitoring the area of interest comprises capturing a plurality of visible light images and a plurality of thermal images of the area of interest over a period of time using the visible light camera and the thermal camera respectively.
3. The method according to claim 2, wherein detecting the first aircraft comprises identifying the first aircraft in the plurality of visible light images and the plurality of thermal images.
4. The method according to claim 2 or 3, wherein the first set of flight parameters is generated by processing the plurality of visible light images and the plurality of thermal images.
5. The method according to any one of claims 2 to 4, wherein detecting the second aircraft comprises identifying the second aircraft in the plurality of visible light images and the plurality of thermal images.
6. The method according to any one of claims 2 to 5, wherein the second set of flight parameters is generated by processing the plurality of visible light images and the plurality of thermal images.

7. The method according to any one of claims 2 to 6, wherein the plurality of visible light images and the plurality of thermal images are processed at an interval of time.
8. The method according to any one of claims 1 to 7, further comprising tracking the movement of the first aircraft and the second aircraft along the final approach of the flight path.
9. The method according to any one of claims 1 to 8, further comprising storing the first set of flight parameters and the second set of flight parameters at a time interval.
10. A system for optimising runway capacity on an airport runway, the system comprising:
a thermal camera adapted to monitor an area of interest along a final approach flight path of an aircraft and capture a thermal image of the area of interest,
a visible light camera adapted to monitor the area of interest and capture a visible light image of the area of interest,
a processor in communication with the thermal camera and the visible light camera,
a memory in communication with the processor for storing instructions executable by the processor, wherein the processor is configured to,
monitor the area of interest along the final approach flight path of one or more aircraft via the visible light camera and the thermal camera,
detect a first aircraft when it enters the area of interest,
generate a first set of flight parameters of the first aircraft,
detect a second aircraft when it enters the area of interest,
generate a second set of flight parameters of the second aircraft,
analyse the first set of flight parameters and the second set of flight parameters to generate at least one of a minimum vertical separation distance and a minimum horizontal separation distance between the first aircraft and the second aircraft to optimise the runway capacity of the airport runway.
11. The system according to claim 10, wherein to monitor the area of interest, the processor is configured to capture a plurality of visible light images and a plurality of thermal images of the area of interest over a period of time using the visible light camera and the thermal camera respectively.

12. The system according to claim 11, wherein to detect the first aircraft, the processor is configured to identify the first aircraft in the plurality of visible light images and the plurality of thermal images.
13. The system according to claim 11 or 12, wherein the first set of flight parameters is generated by processing the plurality of visible light images and the plurality of thermal images.
14. The system according to any one of claims 11 to 13, wherein to detect the second aircraft, the processor is configured to identify the second aircraft in the plurality of visible light images and the plurality of thermal images.
15. The system according to any one of claims 11 to 14, wherein the second set of flight parameters is generated by processing the plurality of visible light images and the plurality of thermal images.
16. The system according to any one of claims 11 to 15, wherein the plurality of visible light images and the plurality of thermal images are processed at an interval of time.
17. The system according to any one of claims 10 to 16, wherein the processor is further configured to control the visible light camera and the thermal camera to track the movement of the first aircraft and the second aircraft along the final approach of the flight path.
18. The system according to any one of claims 10 to 17, further comprising a flight parameter database in communication with the processor, wherein the processor is configured to store the first set of flight parameters and the second set of flight parameters at a time interval in the flight parameter database.