Accordingly, there is a need for an air supply system for supplying air to an outside of a hull of a vessel, which mitigates, alleviates or addresses the shortcomings existing and provides a simpler and more efficient air supply system.

~~Disclosed is~~ According to a first aspect of the present invention, there is provided an air supply system for supplying air to an outside of a hull of a vessel. The vessel comprises an engine, such as an internal combustion engine, such as a diesel engine, such as a two-stroke diesel engine. The engine may be a main engine of the vessel. The air supply system comprises one or more turbocharger(s) for supplying a compressed main air flow to the engine of the vessel via a respective first flow path. The air supply system comprises an exhaust gas recirculation (EGR) system for recirculating exhaust gas into the compressed main air flow supplied to the engine via a second flow path. The air supply system comprises a third flow path for supplying a sub-flow of compressed air to one or more Air Discharge Units (ADUs), wherein the one or more ADUs are configured to be arranged in the hull of the vessel below a waterline. The EGR system comprises a blower arranged in the second flow path for supplying exhaust gas to the engine. The first flow path and the second flow path have a first connecting path upstream of the blower and a second connecting path downstream of the blower, for providing a fluid connection between the first flow path and the second flow path. The third flow path is in fluid connection with the first flow path and the second flow path downstream of the blower, such that the sub-flow of compressed air can be extracted from the first flow path and/or the second flow path.

It is an advantage of the air supply system according to the present disclosure that the blower of the EGR system may be used for boosting the pressure of the sub-flow of compressed air provided to the ADUs for reducing the resistance of the vessel in the water. By boosting the pressure of the compressed flow of air using the blower of the EGR system, a release of air through the ADUs may be started even though the pressure of the compressed air from the turbochargers do not exceed the discharge pressure at the ADUs. Thus, an efficiency of the air supply system may be improved.

~~Disclosed is~~ According to a second aspect of the present invention, there is provided a vessel comprising an engine and the air supply system ~~of this disclosure~~ as defined in the first aspect.

It is an advantage of the vessel according to the present disclosure that the blower of the EGR system may be used for boosting the pressure of the sub-flow of compressed air provided to the ADUs for reducing the resistance of the vessel in the water. By boosting the pressure of the compressed flow of air using the blower of the EGR system, a release

CLAIMS

1. An air supply system ~~(100)~~ for supplying air to an outside of a hull ~~(201)~~ of a vessel ~~(200)~~, the vessel ~~(200)~~ comprising an engine, the air supply system ~~(100)~~ comprising:
   - one or more turbocharger(s) ~~(10)~~ for supplying a compressed main air flow to the engine of the vessel via a respective first flow path ~~(11A)~~,
   - an exhaust gas recirculation, EGR, system ~~(30)~~ for recirculating exhaust gas into the compressed main air flow supplied to the engine via a second flow path ~~(11B)~~ and
   - a third flow path ~~(11C)~~ for supplying a sub-flow of compressed air to one or more air discharge units, ADUs~~, (20)~~, wherein the one or more ADUs ~~(20)~~ are configured to be arranged in the hull ~~(201)~~ of the vessel ~~(200)~~ below a waterline,
   - wherein the EGR system ~~(30)~~ comprises a blower ~~(31)~~ arranged in the second flow path ~~(11B)~~ for supplying exhaust gas to the engine,
   - wherein the first flow path ~~(11A)~~ and the second flow path ~~(11B)~~ have a first connecting path ~~(11AB)~~ upstream of the blower ~~(31)~~ and a second connecting path ~~(11BA)~~ downstream of the blower ~~(31)~~, for providing a fluid connection between the first flow path and the second flow path, and
   - wherein the third flow path ~~(11C)~~ is in fluid connection with the first flow path ~~(11A)~~ and the second flow path ~~(11B)~~ downstream of the blower ~~(31)~~, such that the sub-flow of compressed air can be extracted from the first flow path ~~(11A)~~ and/or the second flow path ~~(11B)~~.

2. The air supply system ~~(100)~~ of claim 1, the air supply system ~~(100)~~ comprising a first flow control device ~~(12A)~~ for controlling a flow through the first connecting path ~~(11AB)~~ between the first flow path ~~(11A)~~ and the second flow path ~~(11B)~~, a second flow control device ~~(12B)~~ for controlling a flow through the second connecting path ~~(11BA)~~ between the first flow path ~~(11A)~~ and the second flow path ~~(11B)~~, a third flow control device ~~(12C)~~ for controlling a flow through the third flow path ~~(11C)~~, and/or a fourth flow control device ~~(12D)~~ for controlling a flow of exhaust gas into the second flow path ~~(11B)~~.

3. The air supply system ~~(100)~~ according to claim 2, wherein, in a first operating mode, the first flow control device ~~(12A)~~ and the third flow control device ~~(12C)~~ are configured to be opened and the second flow control device ~~(12B)~~ and fourth flow control device ~~(12D)~~ are configured to be closed, so that a flow of exhaust gas through the second flow path ~~(11B)~~ is prevented and a sub-flow of air is extracted from the first flow path ~~(11A)~~ and routed via the first connecting path ~~(11AB)~~ via the blower ~~(31)~~ of the EGR system ~~(31)~~ to the ADUs ~~(20)~~.

4. The air supply system ~~(100)~~ according to any one of the previous claims, wherein the air supply system ~~(100)~~ comprises two or more turbocharger(s) ~~(10, 10A)~~, wherein the air supply system ~~(100)~~ further comprises one or more cut out valves ~~(17)~~ for controlling an exhaust gas flow to at least a first turbocharger ~~(10A)~~ of the two or more turbochargers ~~(10, 10A)~~.

5. The air supply system ~~(100)~~ according to claim 4, wherein, in a second operating mode, the one or more cut out valves ~~(17)~~ are closed, so that the exhaust gas flow to at least the first turbocharger ~~(10A)~~ of the two or more turbochargers ~~(10)~~ is prevented.

6. The air supply system ~~(100)~~ according to claim 4 or 5, wherein, in a third operating mode, the one or more cut out valves ~~(17)~~ are open, so that the exhaust gas flow to at least the first turbocharger ~~(10A)~~ of the two or more turbochargers ~~(10)~~ is allowed.

7. The air supply system ~~(100)~~ according to any one of the previous claims, wherein, in a fourth operating mode, the first flow control device ~~(12A)~~ and the third flow control device ~~(12C)~~ are configured to be closed and the second flow control device ~~(12B)~~ and fourth flow control device ~~(12D)~~ are configured to be open, so that a flow of exhaust gas through the second flow path ~~(11B)~~ is allowed and fed into the first flow path ~~(11A)~~ via the blower ~~(31)~~ of the EGR system ~~(31)~~ and the second connecting path ~~(11BA)~~.

8. The air supply system ~~(100)~~ according to any one of the previous claims, wherein, in a fifth operating mode, the second flow control device ~~(12B)~~ and the third flow control device ~~(12C)~~ and the fourth flow control device ~~(12D)~~ are configured to be open and the first flow control device ~~(12A)~~ is configured to be closed, so that a flow of exhaust gas through the second flow path ~~(11B)~~ is allowed and fed into the first flow path ~~(11A)~~ and the third flow path ~~(11C)~~ via the blower ~~(31)~~ of the EGR system ~~(31)~~ and the second connecting path ~~(11BA)~~.

9. The air supply system ~~(100)~~ according to any one of the previous claims, wherein the EGR system ~~(30)~~ comprises a scrubber ~~(32)~~ arranged in the second flow path ~~(11B)~~ for cleaning the exhaust gas, wherein the scrubber is arranged upstream of the blower ~~(31)~~ and the first connecting path ~~(11AB)~~.

10. A vessel ~~(200)~~ comprising an engine and the air supply system ~~(100)~~ according to any one of the claims 1-9.