UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Fort Worth, Texas 76193-0100

In the matter of the petition of AGUSTA S.p.A. for an exemption from § 27.1(a) of Title 14, Code of Federal Regulations	Regulatory Docket No. 011SW

GRANT OF EXEMPTION

By letter dated December 22, 1995, Agusta S.p.A., 21017 Cascina Costa di Samarate (VA), Via Giovanni Agusta, 520, petitioned for an exemption from § 27.1(a) of Title 14, Code of Federal Regulations (14 CFR), to the extent necessary to increase the maximum gross weight of the A109 series helicopters from 6,000 pounds to 7,000 pounds while maintaining the original normal category rotorcraft certification.

The petitioner requests relief from the following regulations:

> Section 27.1(a) prescribes, in pertinent part, that the maximum weight of a normal category rotorcraft is 6,000 pounds.

The petitioner supports its request with the following information:

> As background information, the petitioner discusses the regulatory evolution of 14 CFR part 27. The 6,000-pound gross weight limitation was initially established in Civil Air Regulations (CAR) 6 for normal category rotorcraft whose application was made after August 1, 1956. Even though the rotorcraft regulations have changed quite significantly since that time, the applicability of part 27, as shown in § 27.1 has not. The petitioner states that the helicopters manufactured at the end of the fifties were very different

from those of today. Additionally, the petitioner states that the level of safety provided by a modern light twin engine helicopter (light twin) is much higher than that of an old single piston engine helicopter.

Although it can be argued that the weight increase due to the increased regulatory stringency, since CAR 6 was first established in 1956, would be offset by the reduced weight due to new technologies, this is only partially true. One example of this is composites. There is still a lack of confidence in this area resulting in additional factors and requirements that nullify the potential weight savings.

The petitioner states that with the higher expectations of safety, as well as the need for providing comfort and range with a reasonable payload, the light twins have experienced an increase in their gross weight. The increase is now very close to or at the 6,000-pound limit. Agusta has conducted a study on the possible design characteristics of the new light twins which shows that 6,000 pounds is no longer adequate. The petitioner believes that now is the time to revise the weight limit in part 27.

The petitioner also discusses the FAA efforts to date to address the weight limitation of part 27. The FAA issued a request for comments about an increased maximum weight limit for normal category rotorcraft on April 24, 1992. Agusta had already (on April 22, 1992) sent their concurrence to the FAA about the possibility of modifying the applicability of part 27. Additionally, Agusta has been a member of the Aviation Rulemaking Advisory Committee (ARAC) Gross Weight and Passenger Issues for Rotorcraft Working Group (GWWG). This working group is considering a possible rule change to the gross weight limitation of part 27. The GWWG first met on February 1 and 2, 1995, in Las Vegas, Nevada. After four meetings, the GWWG reached a consensus for revising part 27 to increase the maximum gross weight limit from 6,000 to 7,000 pounds and limit the passengers to nine. Through the efforts of this GWWG, the petitioner maintains that all interested parties have had the opportunity to carefully study the issue of increasing the maximum weight limit and have agreed on the criteria. The petitioner believes that a change to § 27.1 is imminent, and a rule change process should be initiated. Based on the time it usually takes to

finalize a rule, however, the petitioner believes that approval of this petition for exemption is fully justified.

The petition provides specific information about the A109 series helicopters. These helicopters have grown from 5,400 pounds for the initial A109 to 5,997 pounds for the latest Model A109's. This growth trend is the result of the addition of an IFR package, various optional installations (often related to Emergency Medical Service (EMS) operations), and improvements made for passenger comfort as well as upgraded transmission and engines.

The latest rotorcraft in the A109 evolution, the A109K2, was specifically designed to provide performance in extreme (high altitude/hot day) operating conditions. As a specific example, this aircraft is used by the Swiss Air Rescue Organization (REGA) for Search and Rescue (SAR) operations in the Alps. This design requirement necessitated increased power resulting in heavier engines (with an associated increase in empty gross weight) and a higher fuel consumption rate than required in the A109K2 predecessors. The certification program of the A109K2 was conducted at an increased gross weight of 6,283 pounds (2,850 kg.), and the helicopter is currently operated by the REGA at this weight. Although the FAA validated the results at 6,283 pounds, the type certificate was issued at 6,000 pounds. The petitioner states that in spite of the higher maximum takeoff gross weight, the helicopter is safer than the A109C because of the new engines and increased main transmission limits. As an example of the improvements, the petitioner presented single engine performance data for the A109C (6,000 pounds) versus the A109K2 (6,283 pounds) model helicopters. At 7,000 feet, the maximum one-engine-inoperative (OEI) rate of climb for the A109C is 90 feet per minute (fpm) versus 620 fpm for the A109K2.

The A109 at an increased gross weight would not carry any more passengers or be physically larger than the earlier A109's. Thus, there would not be an increase in the potential risk to those on board the helicopter or to people or property on the ground. Additionally, the A109 series helicopters show a level of safety beyond the minimum standards for part 27, including the original design conception to meet part 29 Category A Engine Isolation standards. This design encompasses the duplication of major

systems like fuel, hydraulics, and the electrical system, allowing the helicopter to tolerate some major failures.

With respect to noise implications, the petitioner states that tests have shown the A109K2 (including the configuration flown by the Swiss at 6,283 pounds) to be relatively quiet. This is especially true when considering that the Swiss noise limits are 3db less than the International Civil Aviation Organization (ICAO) limits. The petitioner states that the weight increase, therefore, would not impose additional acoustic interference to the public.

From an economic perspective and in view of the FAA's responsibility to work both on aviation safety and to enhance the air commerce, the petitioner believes that this petition is fully understandable. The A109 could carry out corporate and EMS operations at a reasonable price with more than an adequate level of safety. The cost of certifying the A109 to part 29 would be about $40 to $50 million, which, according to the petitioner, would be totally unaffordable and unjustified.

Finally, the petitioner states that favorable consideration of this exemption by the FAA will provide substantial benefits to the public, especially for the high altitude and temperature EMS and SAR operations. As an example, the petitioner discusses an EMS operator in the U.S. that is operating an A109K2 at the existing weight limitation of 5,997 pounds. This limitation has restricted the operator's capability to utilize the full range of the helicopter by limiting the fuel quantity. If the operator could utilize the full capacity of the fuel tank, a more cost effective service could be provided to the public while maintaining the safety of a twin-engine design. Additionally, the petitioner does not believe that this exemption would provide unfair advantages to Agusta since other twins could benefit from a positive response to this petition by the FAA.

A summary of this petition was published in the Federal Register (61 FR 6885) on February 22, 1996, and no comments were received.

The FAA's analysis/summary is as follows:

The FAA has reviewed the facts and data presented by Agusta S.p.A. in support of this petition and has determined that a grant of the requested exemption is appropriate and justified.

Since 1956 the FAA, as correctly stated by the petitioner, has based the distinction between normal and transport category rotorcraft certification requirements on the maximum certified gross weight of the aircraft. At the time of rulemaking, there were two major weight groupings of civil helicopters: one group was in the 2,000 to 3,000 pound range; the other group was in the 7,000 to 8,000 pound range. The upper weight limit for normal category rotorcraft was set at 6,000 pounds based on the spectrum of existing and anticipated designs. Safety-based design requirements and associated certification costs are dramatically higher for a transport category helicopter. The regulatory intent in 1956 was to establish a reasonable gross weight limit for normal category, which would permit growth of existing models while providing a stable set of weight-based design criteria for new models. The 6,000-pound weight threshold (and associated safety-based design standards) has served the industry well for over 35 years. However, several operational and design trends have developed over time that have prompted a reevaluation of the current 6,000-pound weight limit. One of the unanticipated design changes has been the development of the normal category "twin-engine" rotorcraft. By the very nature of adding a second engine, the empty weights of these helicopters have grown.

Meanwhile, the FAA certification regulations have evolved, gradually adding more stringent safety requirements that ultimately cause permanent increases in empty weight. The high cost of certification in transport category and the trend toward modification of existing models have resulted in several normal category helicopters nearing the current 6,000-pound gross weight ceiling.

Until 1991, increasing the 6,000-pound weight limit for normal category had never been formally discussed with the FAA. However, in November 1991, a manufacturer petitioned the FAA for a regulatory exemption to allow a helicopter to exceed the 6,000-pound maximum weight limit specified for

normal category rotorcraft. A summary of the petition was subsequently published in the Federal Register (57 FR 4508) on February 5, 1992, for public comment. Formal responses from the industry were few and divided. While some respondents were in favor of the petition, others expressed the view that a weight change should not be permitted without considering increased regulatory stringency or a limit on the number of passengers.

While the FAA denied this petition for a variety of technical reasons, the FAA's Rotorcraft Directorate decided to investigate the general issue of a future rule change in more detail by asking interested parties to comment on the advisability of increasing the current 6,000-pound maximum weight limit. As stated by the petitioner, this request was issued in April 1992. The public was also asked to comment on safety-based design criteria that should be associated with such a change. Approximately 30 letters were received in response to the request. Although there were no specific objections to a future regulatory increase in the maximum allowable weight, the industry and other aviation authorities articulated a wide range of views regarding the scope of such a revision.

Although not discussed by the petitioner, the FAA received a second petition for exemption to § 27.1 from Airlink, Inc. dated July 7, 1993. That petition was for a single A109K2 (S/N 10017) that was operated by Airlink for Air Idaho Rescue (A.I.R.). A.I.R. is a dedicated 24 hour-a-day EMS operator. That petition was denied for several reasons including that the public interest would probably be served "only in the area served by the Petitioner" and that "Petitioner and Advocate would probably be the principal beneficiaries of a grant of exemption."

Several of the benefits identified in the Airlink petition, however, will be realized by the public in general if the increased gross weight is applied to the entire fleet of A109 helicopters. An increase in the gross weight of the A109 will allow the helicopter to take off with a full fuel loading. This will increase the range of the helicopter, allowing passengers to be transported over longer distances. This increased distance will be of particular benefit in rural areas where medical care is not immediately available, or in situations where a patient must quickly be transported

to a specific center for specialized care. An added benefit will be the ability to transport more than one patient at a time. This can be especially beneficial in the case of an accident involving more than one person or in situations where a family member needs to accompany a patient.

The FAA held a public meeting in February 1994 to determine a course of action that was in the best interest of the public and the aviation community. The public interest in this area was confirmed at that time and the ARAC GWWG, discussed by the petitioner, was established with representatives from the FAA, JAA and TCA, as well as U.S. and European helicopter manufacturers. This GWWG was established in February 1995 and tasked to recommend new or revised requirements for increasing the gross weight and passenger limitations for normal category rotorcraft. To date, the GWWG has met five times. The Working Group representatives have tentatively agreed to increase the gross weight limitation of 14 CFR part 27 to 7,000 pounds, with the possibility of some increased stringency for helicopters certified with eight or nine passengers.

The petitioner is correct in the implication that new technologies cannot immediately provide a weight savings advantage. The FAA does not automatically accept the potential benefits of a new technology until there is enough history to warrant any changes. As the petitioner stated, composite materials are an example of this idea. The FAA has imposed additional more stringent factors, if composites are used, to account for material variability's, etc., that could offset the potential weight savings.

The FAA agrees that the performance improvements that have been made to the A109 helicopters, especially with respect to the A109K2, have increased the empty gross weight, resulting in a decreased payload. This payload penalty is even more severe at the high altitudes and hot-day conditions where many of these helicopters operate. An increase in the gross weight will be especially beneficial for EMS and SAR, since many helicopters can not fly in the mountainous areas served by some of these operators. By increasing the gross weight of the helicopter, A109 operators will be able to fly in these areas with full fuel and increased payload, allowing for faster rescue of injured people in these areas.

Although the petitioner states that the A109 helicopters are relatively quiet and that a weight increase would not impose additional acoustic interference to the public, this is only the petitioner's opinion and does not relieve the burden of conducting appropriate FAA noise tests. Agusta has recently conducted a part 36, Appendix H noise test on the yet to be FAA certified A109E at 6,283 pounds. If the FAA approves these tests and results, the helicopter will have met the noise requirements for gross weights up to 6,283 pounds for the A109E only. Additional noise tests may need to be conducted before the maximum gross weight of the A109E can exceed 6,283 pounds or before other models of the A109 can exceed their current maximum gross weight.

A large percentage of the U.S. A109 helicopters operate in an EMS or SAR mission. A 1,000-pound increase in the gross weight of these helicopters will allow more patients to be transported over longer distances in more adverse operating conditions (high altitude and hot temperatures) without a decrease in the current level of safety.

In consideration of the foregoing, I find that a grant of exemption would be in the public interest and would not have an adverse effect on safety. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, formerly §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, as amended, delegated to me by the Administrator (14 CFR § 11.53), Agusta S.p.A. is hereby granted an exemption from 14 CFR §§ 27.1(a) to the extent necessary to allow Agusta S.p.A. to increase the maximum gross weight of the A109 series helicopters from 6,000 pounds to 7,000 pounds while maintaining the original normal category rotorcraft certification. This exemption is subject to the following conditions and limitations:

1. The design of the helicopter cannot be changed in order to increase passenger carrying capability as part of the gross weight increase.

2. Prior to exercising the privileges of this exemption, each A109 helicopter (for which exemption is sought) and all modifications that have been made to it must meet the requirements established in the current certification basis at the increased gross weight. This includes any special

requirements for certification, i.e., equivalent levels of safety and special conditions that may have been issued to complete certification.

3. The results of the 14 CFR part 36, Appendix H noise tests for the A109E at 6,283 pounds must be approved prior to certification at this gross weight.

4. Additional Appendix H noise tests may need to be conducted prior to any increase in the maximum gross weight for the A109 helicopters or prior to further increase (beyond 6,283 pounds) in the gross weight of the A109E helicopter once it is certified.

5. A method must be in place to ensure that any life limited components affected by the increase in gross weight are identified. The A109K2 Maintenance Manual currently requires that "When components with a retirement life and with the same part number and therefore interchangeable are used promiscuously on A109 models, they must be restricted to the lowest retirement value." This requirement will apply to all A109's at the increased maximum gross weight.

Issued in Fort Worth, Texas, on October 9, 1996.

Eric Bries
Acting Manager, Rotorcraft Directorate
Aircraft Certification Service, ASW-100