Proposed Special Condition for Overweight Operation

Applicable to a CS 23 Restricted Category Airplane

Demonstration of Adequate Safety

Introductory note:

The hereby presented Special Condition to the EASA Certification Basis shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11. September 2007, Article 3 (2.) of which states:
"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of issue:

The twin engine composite airplane is certified by EASA in the Restricted Category. The purpose for this Restricted TC is the usage of industrial mission equipment not certified and produced in accordance with EC 1702/2003 (Part 21), such as surveillance cameras and equivalent equipment installations. The Type Certification basis is described in detail in CRI A-02. Except for the equipment qualification the airplane comply with the certification basis JAR23/CS23.

The applicant applied to the EASA on 9. Nov. 2011 for approval of Major Design Change “Operation up to 5,3% above MTOM, MZFM”, EASA project 0010014051. This is a deviation to the initial restricted Type Certification basis defined in CRI A-02. For specific mission purposes and specific equipment installations, an operation with an MTOM “maximum take-off mass” and MZFW ”maximum zero fuel mass” above the already certified masses without fully meeting the defined criteria in certification specification CS23 shall be approved.

Regulation EC 216/2008 Article 5.4. (Airworthiness – Restricted Certificate) defines the conditions for the issuance of a Restricted Certificate of Airworthiness. This offers the possibility of certification of aircraft for which the Essential Requirements of Annex I to EC 216/2008 cannot be complied with.

The applicant applied for extension of the existing Restricted Type Certificate for overweight operation not complying with the type certification basis CS23 (JAR23 defined in detail in CRI A-01)

These kinds of operation are not adequately covered by CS-23 (JAR-23). This CRI is raised on the basis of EC 1702/2003 (Part 21), 21A.16B, to properly address the subject. This CRI also establishes the Restricted Type Certification basis in accordance with 21A.17.

It is not intended to regulate and certify permanent overweight operation, but accept overweight operation for specific purposes of operation as intended in EC 216/2008 Article 5.4

The following Specific Purposes for Overweight Operation shall be covered

- Long Range Operation in remote areas or over water, where no suitable ground facilities available
- Crew Training in Mission Configuration where instructor pilot or mission operator instructor must be on board
- Ferry Flights to, from and between operation bases
- Operation requiring an additional safety pilot on board

The following deviations to CS23 have been identified:

CS	Title	AFM Limitation and Procedures	Compliance - Safety Effect
23.3	Aeroplane categories	Intentional engine shutdown is prohibited; no flight training except operations instruction; Flights into Known or forecasted icing conditions are	Partial Compliance with a limit to all normal flight manoeuvres only.

		prohibited	
23.49	Stalling speed	none	Compliance for Vso @ 2001kg = 62,3 by Elect to Comply with CS 23.49 (Amdt. 1)
23.303	Factor of safety	Maximum OAT Limit of 38°C for the last 4 Hours before Take-Off or maximum structural temperature limitation of 48°C for the composite structure and 66°C for the center wing composite structure. Rate of descent information for landing	Compliance with reduced Temperature Limits by OAT monitoring or measurement of temperature of critical structural components and rate of descent information for landing
23.473	Ground load conditions and assumptions	Operational limit for pilot qualification - 150 Hrs on type; published and placarded max. rate of descent for landing	CS23 load assumptions not fully complied with for the landing gear. Safety is affected by reduced structural reserve during landing. Limitation ensures adequate level of safety through pilot qualification and published rate of descent for landing.
23.562	Emergency landing dynamic conditions	none	Compliance demonstrated, review of initial seat crash test shows over testing. Elect to comply CS 23.562 (Amdt. 1).
23.573	Damage tolerance and fatigue evaluation of structure	Maximum OAT Limit of 38°C for the last 4 Hours before Take-Off or maximum structural temperature limitation of 48°C for the composite structure and 66°C for the center wing composite structure.	Compliance demonstrated by reduced temperature limitation and performed fatigue test for 1999 kg MTOM
23.629	Flutter	none	Compliance demonstration for the new masses carried out. CS23 complied with.
23.641	Proof of strength	Maximum OAT Limit of 38°C for the last 4 hours before Take-Off or maximum structural temperature limitation of 48°C for the composite structure and 66°C for the center wing composite structure.	Compliance demonstrated for lower temperature limit, initial full scale test applicable for increased load
23.723	Shock absorption tests	Operational limit for pilot qualification - 150 Hrs on type; published and placarded max. rate of descent for landing	CS23 load assumptions not fully complied with for the landing gear. Safety is affected by reduced structural reserve during landing. Limitation ensures adequate level of safety through pilot qualification and published rate of descent for landing.
23.725	Limit drop tests		
23.726	Ground load dynamic tests		
23.727	Reserve energy absorption drop tests		
23.1545	Airspeed indicator	Published and placarded performance changes for the overweight condition	Adequately complied with, no changes in airspeed indicator markings, overweight operation limited for specific purposes only. Due to higher mass, slightly increased stalling

			speed and lower green and white arc speed is 2 and 3 kts off. Marginal effect to flight safety due to elevator limited stall speed with gentle stalling characteristics

Special Condition A06 - Overweight Operation

Deviations from TC basis are legally possible but the Restricted Type Certificate RTC is not a way to avoid compliance with the TC basis for any operation without showing appropriate safety. EASA has reviewed the remaining deviations and agreed to accept these deviations from CS23 in overweight conditions for these specific purposes only, when adequate safety has been demonstrated.

Special Condition:

Adequate Safety with regard to the purpose must be demonstrated in detail. The EASA considers the following minimum safety Items required to be demonstrated and complied with.

Purpose – Mission profile
The Purpose for the overweight operation must be clearly defined; this shall include a mission profile for that kind of purpose. This mission profile shall be used for further analysis and calculations with special attention on weight and load conditions in different flight phases of an established profile and the establishment of restrictions and limitations.
The overweight itself is not considered an adequate purpose. The purpose must be established based on the Missions as defined per CRI A-02.

Adequate Safety demonstration
Any non-compliance with CS23 shall be analyzed and adequate safety with regard to that specific purpose must be demonstrated, this shall lead to additional restrictions and limitations.

Maximum Mass
The maximum mass extension of 5.3 % of the individual limiting masses, which is not more than 101 kg of the current MTOM of 1900 kg, is accepted for deviation from the CS if adequate safety can be demonstrated by additional analytical investigations or tests.

Restrictions and Limitations
With regard to the purpose, these limitations and restrictions may include limitation to specific SNo. or specific mission equipment configurations as defined in the TCDS.

Environmental Limitations
Environmental Limitations such as additional OAT (Outside air temperature) limits, temperature limits of affected structural elements, cross wind limitations (versus demonstrated cross wind component) or special weather minima (turbulence) shall be established.

Flight Behavior
The flight behavior shall be demonstrated within CS23 subpart B. The performance changes shall be evaluated in accordance with CS 23 subpart B.

Structure
The structure with the new defined limitations shall comply with the whole content of CS23 Subpart C. For any noncompliance with a requirement in Subpart C adequate safety with regard to the purpose must be established and evaluated. The new mission profile and weight condition forms the basis for the fatigue and damage tolerance analysis. This may lead to additional structural analytical substantiations, possibly supported by tests, and inspection requirements when operated in overweight condition.

Marking of Limitations
Operating Limitations and Information shall be presented in accordance with CS23 Subpart G.
The new limitations and information must be clearly visible and marked to the pilot when operating in an overweight condition. The new flight envelope may lead to different reference speeds and airspeed

limitations; this may lead to new instrument markings (airspeed indicator) or placards.

Required Markings from Operating Limitations by Mission Equipment installations shall be considered and included.

Service Experience
The type's present service experience from the operation and continuing airworthiness analysis shall be used to identify "weak" structural areas which shall be inspected more frequently when operated with overweight. This may also lead to structural changes in those areas unless it can be demonstrated that no unsafe condition exists. A minimum modification status for this kind of operation shall be defined.

Noise
The noise level must be determined with the new masses in accordance with the noise TC basis.