Bush Cat
by SkyReach

Amendment details for OMCH- (all versions) after CH 007-08-2018

Cheetah XLS

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AIRPLANE SERIAL NUMBER	N/A
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Chapter:	**Limitations**
Section:	**Airspeed limitations**
Instruction:	Replace existing speeds with the speeds given in this supplement

Limitations: Airspeed limitations:

The stall speeds given below are referenced to the standard aircraft in the idle power condition for the centre of gravity envelope as shown in the mass and balance section. Indicated airspeeds applicable for factory standard installation of pitot static system and when verified with calibration.

NOTE: SPEEDS APPICABLE ONLY TO AIRCRAFT WITH SKYREACH APPROVED VORTEX GENERATOR INSTALLATION.

Speed		**CAS (MPH)**	**IAS (MPH)**
V_S	Stall speed (clean)	47	42
V_{S1}	Stall speed (flaps in take-off position)	44	37
V_{S0}	Stall speed (flaps in landing position)	43	35
V_F	Maximum flap extended speed	74	80
V_A	Maximum manoeuvring speed	82	90
V_{NO}	Maximum structural cruise speed	82	90
V_{NE}	Never exceed speed	108	125
$V_{doors\text{-}off}$	Door off maximum speed	70	75

Chapter:	**Limitations**
Section:	**Centre of gravity limitations**
Instruction:	Replace existing CG envelope limits with the limits given in this supplement

Limitations: Centre of gravity limitations:

The centre of gravity position limits are given below as distances aft from the wing leading edge. Note that the special operation limits given in column 3 require a reduction of V_F, from 80 MPH IAS to 75 MPH IAS.

	Forward limit	**Aft limit**	
		Standard limit	**Special operation limit***
400kg	385mm (15.2in) (25.5%MAC)	455mm (17.9in) (30.2%MAC)	461mm (18.1in) (30.6%MAC)
560kg	461mm (18.1in) (30.6%MAC)	478mm (18.8in) (31.7%MAC)	486mm (19.1in) (32.2%MAC)

Chapter:	**Limitations**
Section:	**Structural limit load factor limits**
Instruction:	Replace existing load factor limits with the limits given in this supplement

Limitations: Structural limit load factor limits:

Positive:

Flaps up: +4.0G
Flaps down: +2.0G

Negative:

Flaps up: -2.0G
Flaps down: 0.0G

Chapter:	**Normal procedures**
Section:	**Airspeeds for safe operation**
Instruction:	Replace existing speeds with the speeds given in this supplement

Normal procedures: Airspeeds for safe operation:

The speeds given below are referenced to the standard aircraft within the revised centre of gravity envelope as shown in the mass and balance section, at sea level ISA, 560kg. Indicated airspeeds are applicable for factory standard installation of pitot static system. The speeds referenced throughout this section refer to the indicated airspeeds in the table below.

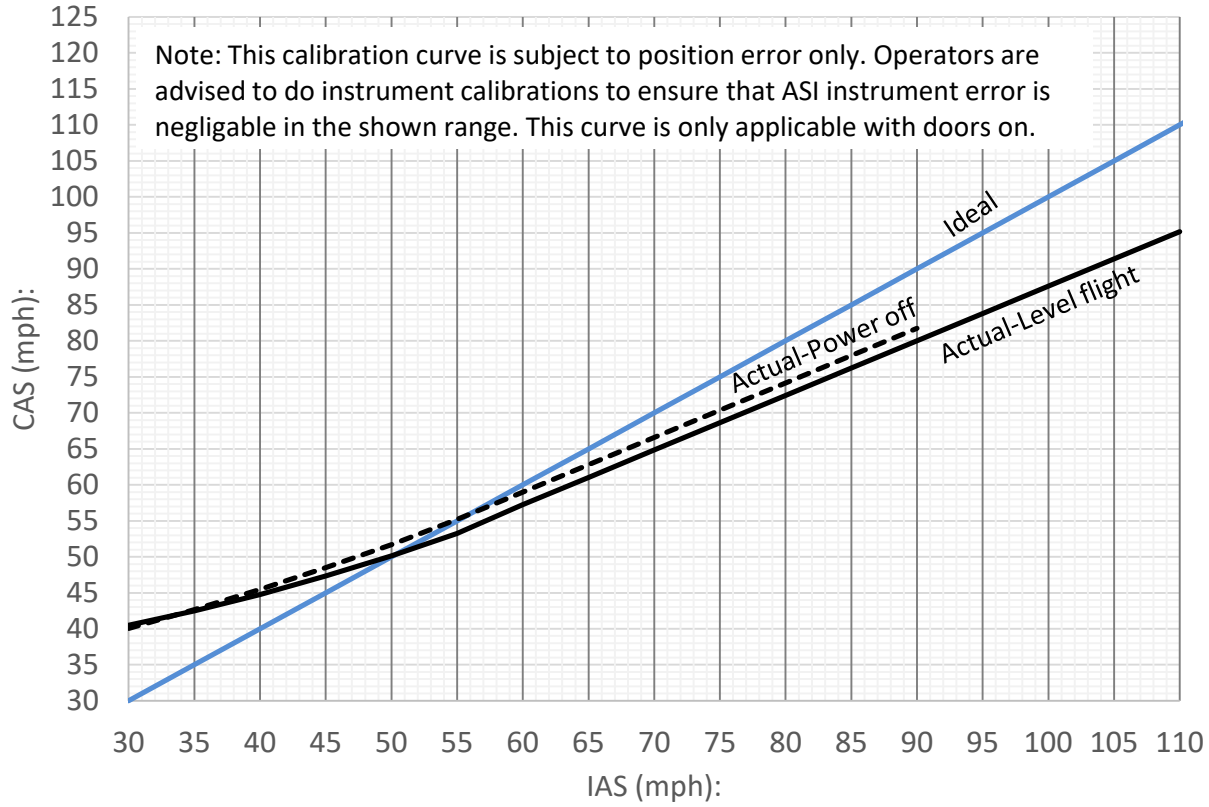
NOTE: SEE CHAPTER 6 FOR SPEEDS PERTAINING TO LIMITING MASSES

	CAS (MPH)	**IAS (MPH)**
V_R:	53	56
$V_{X\ (TAKE\ OFF\ FLAP)}$:	56	60
$V_{Y\ (CLEAN)}$:	68	76
V_A:	82	90
V_{NO}:	82	90
V_F:	74	80
V_{REF} (1.3xVso):	56	56
Max. crosswind component:	32	

Chapter:	**Performance**
Section:	**Airspeed indicator calibration**
Instruction:	The section given in this supplement must be added to the existing manual

Performance: Airspeed indicator calibration:

The relationship between IAS and CAS given below is for the factory standard installation of the pitot-static system. It has been determined on an aircraft with an ASI which has **no instrument error** and is thus representative of **position (pressure) error only**. Instrument error calibration should be carried out on your aircraft to ensure that there are no leaks and that the instrument error is negligible. If it is found that the instrument error is not negligible, refer to the SkyReach Technical Guidance Material.



Chapter:	**Performance**
Section:	**Flight speeds**
Instruction:	Replace existing speeds with the speeds given in this supplement

Performance: Flight speeds:

The speeds given in the table below are for the factory standard aircraft rigged as per the kit manual. Speeds given are applicable for the revised centre of gravity envelope as shown in the mass and balance section. The speeds given are for 560kg. Climb performance speeds, V_X and V_Y, are given for sea-level, ISA conditions.

	Speed	
	CAS [MPH]	**IAS [MPH]**
$\mathbf{V_s}$	47	42
$\mathbf{V_{s1}}$	44	37
$\mathbf{V_{s0}}$	43	35
$\mathbf{V_R}$	53	56
$\mathbf{V_{Ref}}$	56	56
$\mathbf{V_{bg\ (clean)}}$	64	67
$\mathbf{V_{x\ (take\text{-}off\ flap)}}$	56	60
$\mathbf{V_{Y\ (clean)}}$	68	76

Note: V_{S1} denotes take-off flap stall speed.

Note: Indicated airspeeds for V_R and V_X determined using climb power airspeed calibration curve (not shown on graph on previous page).

Chapter:	**Mass and balance**
Section:	**Centre of gravity limits**
Instruction:	Replace existing CG envelope limits with the limits given in this supplement

Mass and balance: Centre of gravity limits:
The centre of gravity position limits are given below as distances aft from the wing leading edge:

	Forward limit	**Aft limit**	
		Standard limit	**Special operation limit***
400kg	385mm (15.2in) (25.5%MAC)	455mm (17.9in) (30.2%MAC)	461mm (18.1in) (30.6%MAC)
560kg	461mm (18.1in) (30.6%MAC)	478mm (18.8in) (31.7%MAC)	486mm (19.1in) (32.2%MAC)

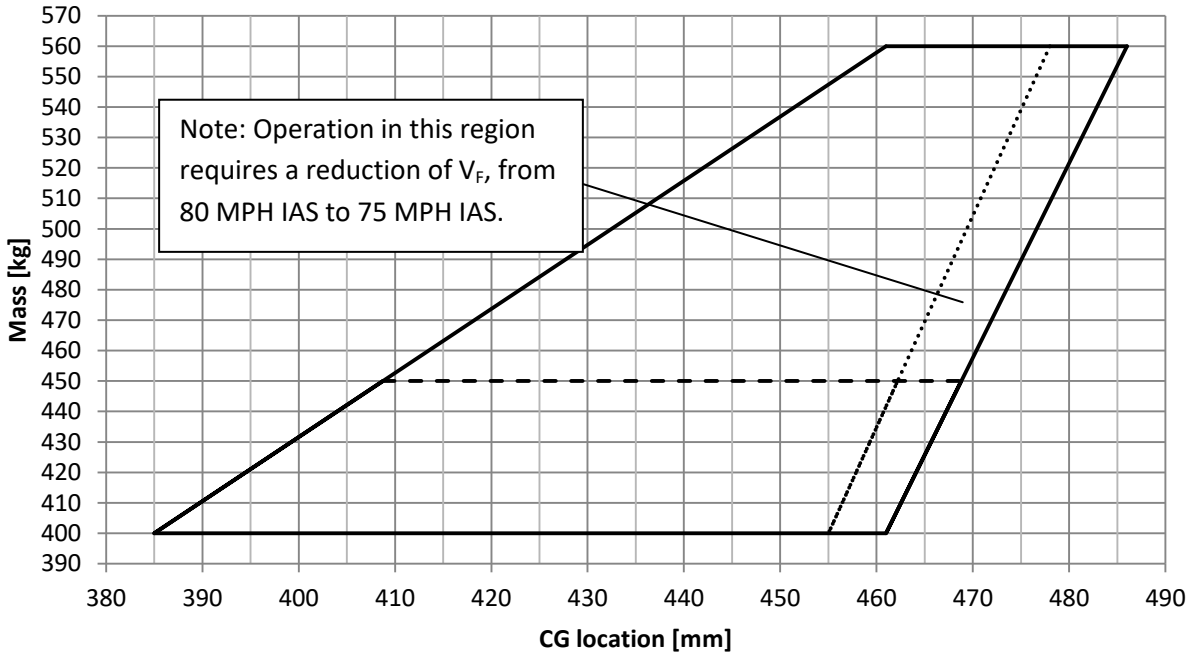
* Note that the special operation limits given in column 3 require a reduction of V_F, from 80 MPH IAS to 75 MPH IAS.

Chapter:	**Mass and balance**
Section:	**Mass and balance form**
Instruction:	Replace existing section with the content given in this supplement

Mass and balance: Mass and balance form:

It is a legal requirement that a mass and balance calculation be performed before each flight for the particular load case of the aircraft. The following form should be used, in conjunction with the empty aircraft data reflected in the most recent aircraft mass and balance report. Once completed, fill in the table below and ensure that the 'total' values fall within the allowable range shown in the figure. It is recommended that the operator keep photocopies of this page for regular operational use.

Item		**Mass**	**x**	**Arm**	**=**	**Moment**
Empty aircraft			x		=	
Pilot and passenger			x		=	
Fuel:	Litres x 0.734 = kg		x		=	
Upper baggage			x		=	
Lower baggage			x		=	
		Add column				Add column
TOTAL						



Chapter:	**Systems description**
Section:	**Airframe description**
Instruction:	The content given in this supplement must be added to the existing manual

Systems description: Airframe description:

Vortex generators installed on the upper wing surface increase the maximum attainable angle of attack in flight and have been shown to reduce stall/minimum flight calibrated airspeeds by about 9mph at 560kg. Note that the type of vortex generator, location, method of mounting as well as the angle and spacing of installation can significantly affect the performance of the vortex generators. Any deviation from the SkyReach approved installations can adversely affect the stall speeds and handling qualities of the aircraft.

Chapter:	**Required placards & markings**
Section:	**Airspeed indicator range markings**
Instruction:	The content in the existing manual must be corrected to reflect the content shown in this amendment

Required placards & markings: Airspeed indicator range markings:
The airspeed indicator shall be marked as follows for a 560kg maximum weight aircraft:

A white arced line from the V_{SO} to V_F speeds (35 - 80 MPH). The lower limit of the white arc indicates the stalling speed of the aircraft with flaps fully extended (V_{SO}). The speed at the upper limit of the white arc indicates speed you can safely fly with flaps fully extended (V_F). Thus the white arc region is the flap operation speed range.

A green arced line shall run from the V_S to V_{NO} (42 - 90 MPH). The lower limit of the green arc indicates the stalling speed of the aircraft with no flaps (V_S). The upper limit of the green arc indicates the maximum speed for operation in rough air (V_{NO}).

A yellow arced line shall run from the V_{NO} speed to the V_{NE} speed (90 - 125MPH).

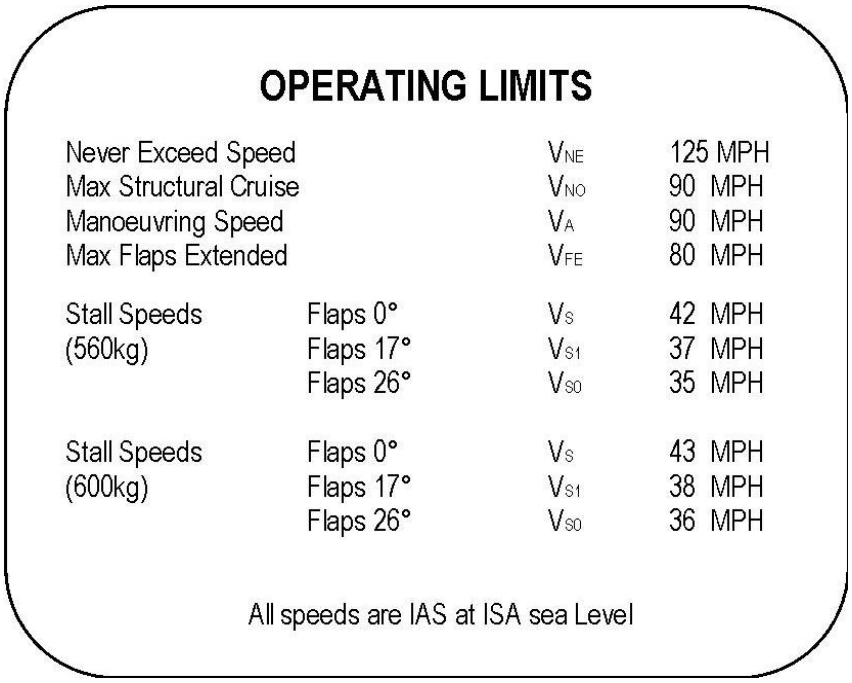
A red line shall be placed at the upper limits of the yellow line to represent the V_{NE} speed (125MPH).

EFIS Systems shall have the following speed ranges programmed to indicate the same speed ranges as indicated on a standard airspeed indicator.

- V_{SO} to V_F speeds: 35 - 80 MPH.
- V_S to V_{NO} speeds: 42 - 90 MPH.
- V_{NO} to V_{NE} speeds: 90 - 125 MPH.
- V_{NE} 125 MPH.

Chapter:	**Required placards & markings**
Section:	**Operating limitations placard**
Instruction:	The content in the existing manual must be corrected to reflect the content shown in this amendment

Required placards & markings: Operating limitations placard:
The operating limitation template should be placed in an easily visible location for the pilot.



OPERATING LIMITS

Never Exceed Speed		V_{NE}	125 MPH
Max Structural Cruise		V_{NO}	90 MPH
Manoeuvring Speed		V_A	90 MPH
Max Flaps Extended		V_{FE}	80 MPH
Stall Speeds (560kg)	Flaps 0°	V_S	42 MPH
	Flaps 17°	V_{S1}	37 MPH
	Flaps 26°	V_{S0}	35 MPH
Stall Speeds (600kg)	Flaps 0°	V_S	43 MPH
	Flaps 17°	V_{S1}	38 MPH
	Flaps 26°	V_{S0}	36 MPH

All speeds are IAS at ISA sea Level

Chapter:	**Training supplements**
Section:	**Multiple**
Instruction:	The content given in this supplement must be added to the existing manual

Training supplements:

Take-off:
The installation of vortex generators has afforded a reduction in the takeoff and landing speeds required. However, takeoff below the published V_R speed is not recommended as the aircraft will be in a very low speed, high attitude and low energy state if an engine failure occurs just after takeoff. Thus, it will likely bleed off speed very quickly if an engine failure does occur. Even if such a failure occurs just after takeoff while flying the published speeds, the pilot may have to pitch the nose down promptly to maintain a safe airspeed. If obstacle clearance is not a factor once airborne, allow the aircraft to accelerate in the initial climb to at least 10mph above V_R. This will give a greater speed margin to allow for an engine failure to be recognised and reacted to.

Stalls / spins:
Vortex generators installed on the upper wing surface allow a higher angle of attack and lower flight speeds to be obtained prior to wing stall. The BushCat is not fitted as standard with any stall warning system, and so the only indicators of an impending stall are low airspeed, high pitch attitude and a light aerodynamic buffet. Operators who are accustomed to the BushCat without vortex generators will notice a significant change in the stalling characteristics of the aircraft. With vortex generators fitted, there is little aerodynamic buffet preceding the stall in most configurations. The stall is defined by a sharp breakaway of airflow from the wing and a nose down pitching tendency. Recovery is made by moving the stick forward to un-stall the wings, before applying full power and slowly pulling out of the dive. With vortex generators fitted, the aircraft is less prone to wing drops during stalls, but this could still happen if the stall is entered with control deflection or sideslip. If a wing-drop is encountered, centralising the ailerons, applying opposite rudder and lowering the nose should prevent the aircraft from entering a spin. During stalls with the power set significantly above idle, the nose of the aircraft may not drop and the aircraft may sit in the stall until aft pressure on the control stick is released or positive recovery inputs are applied. During this, significant aerodynamic buffeting could occur and lateral oscillations may develop if the aircraft is not recovered from the stall expeditiously.

If a spin develops, the usual spin recovery techniques as discussed in the procedures section have been shown to quickly recover the aircraft. The aircraft tends to spin in a nose down attitude and thus builds up speed very quickly. A pull-out manoeuvre should be executed quickly after spin recovery to prevent exceeding V_{NE}.

Approach and landing:
The normal approach speeds for the aircraft, depending on the type of landing and weight, are between 56 and 60 MPH. However, the aircraft has been shown to bleed off speed very quickly during the flare and high sink rates can occur. In an effort to reduce the risk of hard and bounced landings it is recommended that an approach speed of 1.3 x Vso is used, particularly when new to the aircraft. The aircraft should then be gently flared at 3-6 ft above the landing surface and this altitude held until the speed bleeds off and the aircraft sinks to the ground. The lower approach and landing speeds afforded

by the vortex generators can lead to a lack of elevator authority to adequately flare the aircraft prior to touchdown if speeds lower than the published V_{Ref} are used, particularly if steeper approaches are flown in an effort to clear obstacles. It is imperative that this situation is caught *before* the flare is initiated, by diligently flying the recommended approach speeds and going around if the approach becomes destabilised. If it is found that full aft stick is inadequate to achieve the required pitch rate/attitude in the flare, a controlled increase in power can assist the situation.

Operations in the aft CG shaded area:
If it is desirable to operate within the special region of the weight and balance envelope then a reduction must be made to the published value of V_F, from 80 MPH IAS to 75 MPH IAS. Care should be taken when intending to operate in this area so that the absolute aft limit is not exceeded. If the absolute aft limit is accidentally exceeded, either by error in the empty CG determination or pre-flight CG calculations, then conditions of reduced or neutral stability may be encountered. If this occurs, the aircraft may begin to oscillate around the desired trim speed with hands off the stick, particularly with flaps down. The pilot must hold the stick steady and not attempt to fight the oscillations. The act of placing a hand back on the stick and gripping it is a stabilising action. Additionally, the flaps should be retracted and the power reduced, if altitude and speed allow for it. Both of these are stabilising actions. The aircraft should then be landed, ideally without the use of flaps and using minimal power. If the field intended necessitates the use of flaps, then the pilot could consider holding to burn off fuel (as this will act to shift the CG forward) before attempting a landing with flap deflected