

SkyRanger (UK) *

(1)	MANUFACTURER	Individual aircraft are amateur constructed, BMAA is responsible for continued airworthiness.			
(2)	UK IMPORTER	Manufacturer of Kits, Flylight Airports Ltd, Sywell Aerodrome, Northampton, NN6 0BT			
(3)	CERTIFICATION	BCAR SECTION S (First example Issue 2)			
(4)	DEFINITION OF BASIC STANDARD	SkyRanger (UK) Build manual Issue 4.0 or later approved revision. SkyRanger Nynja (UK) Build Manual Issue 1.0 or later approved revision.			
(5)	COMPLIANCE WITH THE MICROLIGHT DEFINITION				
	(a) MTOW [kg]	(Classic)	450	472.5	
		(Swift & Nynja)	450	472.5	500 600
	(b) No. Seats		2		
		<u>MTOW[kg]</u>	<u>450</u>	<u>472.5</u>	<u>500</u> <u>600</u>
	(c) Maximum Wing Loading [§] [kg/m ²]	(Classic)	31.91	33.51	N/A N/A
		(Swift)	35.16	36.91	39.06 46.87
		(Nynja)	35.16	36.91	39.06 46.87
	(d) Vso [kn CAS]	(Classic)	32	32	N/A N/A
		(Swift)	34	34	34 37
		(Nynja)	33	33	34 37
	(e) Permitted range of occupant weights [kg]	Min 55 kg total weight Max 120 kg per seat			
	(f) Typical Empty Weight (ZFW) [kg]	255–295 depending on variant & MTOW			
	(g) Max ZFW at initial permit issue	266 kg (Rotax 912)			
	MTOW (450) - 172 kg crew - 1 hr fuel	265 kg (Rotax 912S)			
	(16 litres / 11.5 kg) (912 engine at 5200 rpm)	268 kg (Rotax 912) Nynja			
		268 kg (Rotax 912S) Nynja			
		^258 kg (Rotax 582)			
		^262 kg (Jabiru 2.2L)			
		^258 kg (Simonini V2+)			
		^Operation up to 472.5kg only.			
	(for operation at 472.5kg add 22.5kg, 500kg add 40.5kg & 600kg add 119kg to the above max ZFW figures)				
	(maximum weights for other engine types yet to be determined)				

* Note: During aircraft construction, this HADS is to be used with the SkyRanger (UK) stage inspection sheets, form BMAA/AW/022 (SkyRanger). If there is a conflict between the two, the latest HADS will always take precedence.

[§] 'Swift' and 'Nynja' variants have short wing - approved optional modification 14 - with 8.5m wingspan.

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(6) POWER PLANTS

Designation	SkyRanger 912(1)	SkyRanger 912(2) ¹	SkyRanger 912(3)	SkyRanger 912S(1)
Engine Type	Rotax 912 UL DCDI			Rotax 912 ULS DCDI
Reduction Gear	Rotax I = 2.27			Rotax I = 2.43
Exhaust System	Rotax (or CKT type, ref optional mod 7)			
Intake System	K&N			
Propeller Type	Arplast Ecoprop 170/R/110/3	Kiev 273/1700 3 blade	GSC Tech II square tip	Kiev 283/1800 3 blade
Propeller Dia x Pitch	170cm, 21°@50cm	170cm, 24°@35cm	68", 24°@47cm	180cm, 35°@33.5cm
Noise Type Cert No.	181M Issue 1	181M Issue 4	181M Issue 1	181M Issue 5
Max Static RPM ²	5000	5000	5000	5000
Max Cont RPM	5200 ³	5200 ³	5200 ³	5100 ³
MAAN approving	1597	1597, 1612	1597, 1606	1825

Designation	SkyRanger J2.2(1) after S/N 22A710	SkyRanger V2+(1)	SkyRanger J2.2(3)	SkyRanger V2+(1)
Engine Type	Jabiru 2.2L			Simonini Victor II+ (inverted) ⁴
Reduction Gear	Direct drive			Simonini C-type 2.76:1
Exhaust System	Jabiru part No. CM02580			Simonini x2 underslung
Intake System	Bing type 64/32 carb + K&N filters.			K&N
Propeller Type	GT-2/157/98 Laminated Wood	GT-2/157/95 Laminated Wood	Chris Lodge 2 blade Wood	Newton laminated wood, 2-blade
Propeller Dia x Pitch	157cm x 98cm	157cm x 95cm	58" x 32"	68" x 52"
Noise Type Cert No.	181M Issue 2	181M Issue 6	181M Issue 8	181M Issue 5
Max Static RPM ²	2750	2800	2750	6200
Max Cont RPM	3200 ³	3200 ³	3200 ³	6200
MAAN approving	1712	1790	2377	

¹ Note: The correct designation for the propeller is as indicated here, not as per previous issues of this HADS.

² From Noise Type Certificate 181M. CAA noise department may accept a higher max static rpm without a re-test, but a significantly higher engine speed is usually indicative of an incorrectly pitched propeller (or a misreading tachometer).

³ Note that this value is less than that specified by the engine manual to permit a greater zero fuel weight.

⁴ At date of issue of this document, the BMAA has no mechanism in place for series release of the Simonini Victor II+ engine, and thus for any future use the technical office must be consulted.

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Designation	SkyRanger 582 (1)	SkyRanger R100(1)	SkyRanger Swift 912S(2)	SkyRanger Swift 912S(1)
Engine Type	Rotax 582/48-2V	BMW R100 (modified)	Designation now withdrawn. It was used for serial number BMAA/HB/644 only, prior to its re-designation as a Swift 912S(1).	Rotax 912 ULS DCDI
Reduction Gear	Rotax C-type 3.47:1	Rotax C-type 2.62:1		Rotax I = 2.43:1
Exhaust System	Rotax sidemount	See drawings, MAAN file 1719		Rotax (or CKT type, ref optional mod 7)
Intake System	K&N	Dry foam		K&N
Propeller Type	Kiev 183 3-blade	Powerfin composite GA		Kiev 283/1800 3 blade
Propeller Dia x Pitch	180cm, 34° @35cm	70", 14.5° at tip		180cm, 35°@33.5cm
Noise Type Cert No.	181M Issue 3	181M Issue 7		181M Issue 5
Max Static RPM2	6100	5200		4850
Max Cont RPM	6400 ³	6000		5100 ³
MAAN approving	1708	1719		1977

Designation	SkyRanger Swift 912S	SkyRanger Swift 912(1)	SkyRanger Swift 912(2)	SkyRanger Nynja 912S(1)
Engine Type	Rotax 912 ULS DCDI	Rotax 912 UL DCDI	Rotax 912 UL DCDI	Rotax 912 ULS DCDI
Reduction Gear	Rotax I = 2.43:1	Rotax I = 2.27:1	Rotax I = 2.27:1	Rotax I = 2.43:1
Exhaust System	Rotax (or CKT type, ref optional mod 7)			
Intake System	K&N			
Propeller Type	E-Prop DUR-3-175-C4-T 3 blade	Kiev 273/1700 3 blade	Arplast Ecoprop 170/R/110/3	Kiev 283/1800 3 blade
Propeller Dia x Pitch	175cm 25.5°	170cm, 24°@35cm	170cm, 21°@50cm	180cm, 35°@33.5cm
Noise Type Cert No.	-	181M Issue 8	181M	181M Issue 7
Max Static RPM2	5500	5000	5000	4850
Max Cont RPM	5500	5200 ³	5200 ³	4600 ³
MAAN approving	AAN BMAA-1121	2252	2593	2238

Note: E-Prop Propeller also applicable to all Skyranger Swift and Nynja 912S variants.

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Designation	SkyRanger Nynja 912S	SkyRanger Nynja 912(1)	SkyRanger Nynja 912iS (1)
Engine Type	Rotax 912 ULS DCDI	Rotax 912 UL DCDI	Rotax 912iS Sport
Reduction Gear	Rotax I = 2.43:1	Rotax I = 2.27:1	Rotax I = 2.43:1
Exhaust System	Rotax (or CKT type, ref optional mod 7)		
Intake System	K&N		
Propeller Type	E-Prop DUR-3-175-C4-T 3 blade	Kiev 273/1700 3 blade	Kiev 283/1800 3 blade
Propeller Dia x Pitch	175cm 25.5°	170cm, 24°@35cm	180cm, 35°@33.5cm
Noise Type Cert No.	-	181M Issue 8	181M
Max Static RPM2	5500	5000	4850
Max Cont RPM	5500	4850 ³	4850 ³
MAAN approving	AAN BMAA-1121	2535	2671

Note: E-Prop Propeller also applicable to all Skyranger Swift 912S and Nynja 912S variants.

(7) MANDATORY LIMITATIONS

(A) Max Take-Off Weight [kg]		450 / 472.5	500	600
(B) CG Limits [m]	<i>AFT Limit fwd of Datum</i>	0.21m	0.21m	0.197m
	<i>FWD Limit fwd of Datum (Classic)</i>	0.36m	N/A	N/A
	<i>FWD Limit fwd of Datum (Nynja & Swift)</i>	0.38m	0.38m	0.367m
(C) CG datum	(See Annex C).			
(D) Seat Loadings [kg]	Port	Starboard	Total	
	Min 55 kg	-	55 kg	
	Max 120 kg	120 kg	240 kg*	
*Total subject to overall aircraft weight and balance limit – in order to remain within CG limits the combined seat load may be reduced not below 172kg @ 450/472.5kg AUW, 190kg @ 500kg AUW & 200kg @ 600kg AUW.				
		450/472.5	500	600
(E) Never Exceed Speed [kn CAS]	(Classic)	108 ⁵	N/A	N/A
	(Swift)	111	111	117
	(Nynja)	117	117	117
(F) Manoeuvring Speed [kn CAS]	(Classic)	72	N/A	N/A
	(Swift)	74	82	82
	(Nynja)	74	82	82
(G) Flap Limiting Speed [kn CAS]	(Classic)	66	N/A	N/A
	(Swift)	70	70	70
	(Nynja)	70	70	70
(H) Door Open Max Speed [kn CAS] (2 piece doors only)	(ALL TYPES)	72		
(I) Permitted Manoeuvres	Max 60° bank Non Aerobatic Normal acceleration limits, +4 / -2g			
(J) Fuel Contents (Max Useable)	See Annex B			

⁵ Flight test V_{DF}: 120 kn CAS; 124 kn CAS (Swift); 130 kn CAS (Nynja).

(K) Power Plant

Engine	Rotax 912	Jabiru 2.2L	Simonini Victor II+ Aircooled	Rotax 582/48-2V
Max RPM	5800	3,200 (157cm diameter prop) ⁶	6,200	6,800
Max CHT	150 °C ⁷	200°C	130°C	150°C
Max EGT	900 °C	N/A	600 / 620°C	650°C / 1200 °F
Fuel Spec	Unleaded to BS(EN)228, AVGAS 100LL or UL91			
Engine Oil Spec	API SF or SG semi synthetic 4 stroke motorcycle engine oil	See manuals	2-stroke semi- synthetic	As required by engine manual
Gearbox oil spec	Integral with engine	N/A	90W / EP140	As required by gearbox manual
Fuel/Oil Mix	4-stroke, add no oil		50:1 (leaded fuel) 33:1 (unleaded)	50:1
Max.Coolant Temp.	120 °C ⁸	N/A	N/A	80°C
Min Oil Pressure	1.5 bar	220 kPa / 31psi – normal use. 80 kPa / 11psi @ idle	N/A	
Max Oil Pressure	5.0 bar	525kPa / 76psi		
Oil Temperature	50 → 140°C	118°C cont.		
Fuel pressure at cruise power	0.2 → 0.5 bar at 3000 RPM	Max 20kPa/3psi	Max 0.3 bar	0.2 → 0.4 bar

⁶ Maximum RPM is to be set so that maximum tip mach number may not exceed 0.8Mach at ISA sea level conditions.

⁷ If no coolant temperature gauge is fitted, max CHT must be limited to max coolant temperature of 120°C.

⁸ If using water-based coolant, 1.2bar pressure cap is mandatory. If waterless coolant is used, there is no upper limit to the coolant temperature.

Engine	BMW R100	Rotax 912S	<i>Intentionally blank</i>	<i>Intentionally blank</i>
Max RPM	6800	5,800 for 5 mins		
Max CHT	230°C (450°F)	135°C ⁷		
Max EGT	870°C (1600°F)	800°C		
Fuel Spec	Premium Unleaded to BS(EN)228, AVGAS 100LL or UL91			
Engine Oil Specification		API SF or SG semi synthetic 4 stroke motorcycle engine oil		
Gearbox oil spec	See gearbox manual	Common supply with engine		
Fuel/Oil Mix	N/A	N/A		
Max. Coolant Temperature	N/A	120 °C ⁸		
Min Oil Pressure	50 psi	2 bar (above 3,500 rpm)		
Max Oil Pressure	100 psi	5 bar (above 3,500 rpm)		
Oil Temperature	120°C (250°F)	50-130°C		
Fuel pressure at cruise power	TBD	0.15-0.40 bar		

(8) INSTRUMENTS REQUIRED

ASI	Altimeter	RPM	EGT	Compass	Slip ball
Required to $V_{NE} + 5\%$ CAS (calibrated) on scale, and $V_{NE} + 10\%$ CAS before stop ⁹	Required to 10,000 ft	Required to 10% above max revs for engine fitted.	Optional	Required	Required

Coolant temp	CHT	Oil Temp.	Oil. Press.	Fuel pressure
At least one required		Required (4-stroke engines)		Required, first example of new engine types only.

⁹ To give a low risk of failing to meet this when the aircraft is calibrated in flight test, it is *recommended* that instruments with a scale to at-least 140 kn IAS (160 mph IAS) are fitted.

(9) CONTROL DEFLECTIONS

Elevator UP:	25±2°	Tailplane trim tab UP:	Classic/Swift 30±5° Nynja 35±5°
Elevator DOWN:	25±2°	Tailplane trim tab DOWN:	Classic/Swift 40±5° Nynja 35±5°
Ailerons UP:	25±2°	Rudder LEFT:	25±2°
Ailerons Down:	20±2°	Rudder RIGHT:	25±2°
Flaps: Classic/Swift	50mm, 105mm, 180mm, ±10mm, (5mm difference between sides) <i>Flaps settings are at the trailing edge below a straight edge rested across the top of the fuselage.</i>		
Flaps: Nynja	0°, 8°, 19° ± 2°, (1° difference between sides) <i>Neutral setting is 125mm from nearest edge of fuselage fairing to centre of end of flap trailing edge tube. ± 10mm tolerance</i>		

Ailerons neutral is with aileron trailing edges level with flap trailing edges at zero° flap setting¹⁰.

(10) PILOT'S NOTES, MAINTENANCE MANUALS, PLACARDS

(10.1) Manuals approved for use with this aircraft

- (a) Construction to SkyRanger Build Manual Issue 4.0, or SkyRanger Nynja Build Manual Issue 1.0. or later approved version.
- (b) SkyRanger Operators Manual, Issue 3, or SkyRanger Swift Operators Manual, Issue 2, or SkyRanger Nynja Operators Manual Issue 1. or later approved version.
- (c) *Above may be amended by SkyRanger Wing Fold Operators Manual Issue 1.2 or later approved version.*

(a)(b)(c) above the latest, Construction, Wing-fold, Pilot Operators Handbook (POH), Aircraft Maintenance Manual (AMM) & Illustrated Parts Catalogue (IPC) can be obtained from these website links:

Classic & Swift <http://www.skyranger.co.uk/en/skyranger-manuals/>

Nynja <http://www.skyranger.co.uk/en/downloads/>

- (d) Engine Manual to be at Annex B to the Operators Manual.
- (e) Maintain to Operators Manual.

(10.2) The following placards are to be fitted:

- (a) Flight Limitations Placard (to be visible to pilot) See Annex D.
- (b) Engine Limitations Placard (to be located near to engine instruments) See Annex D.
- (c) Fuel Limitations Placard (to be located near to filler cap)

A placard is to be fitted showing fuel capacity (50 or 60 litres), fuel type(s), fuel:oil ratio (if relevant) and if MTOW can be exceeded with full fuel and 180kg cockpit weight, the fuel loads at MTOW for cockpit weights of 180kg / 170kg / 160kg etc. at 10kg intervals down to the maximum fuel load. An example is shown at Annex D.

¹⁰ Early aircraft are rigged such that aileron neutral is with aileron trailing edges 5mm below flap trailing edges at zero° flap setting. This alternative aileron neutral position remains acceptable.

(d) ASI Placard

A correction placard from 30 kn CAS to V_{NE} at no more than 10 kn intervals, and at V_{SO} , V_a and best glide speed, must show the corrections from IAS to CAS. For values, see the approval MAAN for the particular aircraft. An example is shown at Annex D.

(e) Pitch Trimmer Instructions See Annex D.

(f) Switches See Annex D.

Note: It is recommended that airspeed placards are not fitted to new aircraft until after flight testing, due to the requirement for pitot-static system calibrations. Once calibrated, main airspeed limitations are also to be marked on the dial i.a.w. normal aviation practice.

(11) MANDATORY MODIFICATIONS / SERVICE BULLETINS / AIRWORTHINESS DIRECTIVES ETC

See Annex A for required modifications.

MANDATORY PERMIT DIRECTIVES:2004-003 **Additional seat bracing.**

Applies original type of seat only: mandatory fitment of seat bracing modification as per SkyRanger Service Bulletin 001, approved by BMAA MAAN1744, see below.

2006-007 **CKT Exhaust support bracket.**

Applies to Classic and Swift variants with CKT exhaust (Rotax 912 and 912S variants): mandatory fitment of steady bracket modification as per SkyRanger Service Bulletin 2000/1, approved by BMAA MAAN 2000, see below.

2006-008 **Intumescent fire-resistant paint.**

Applies to this aircraft type: mandatory application of intumescent fire-resistant paint to inside of engine cowlings as per SkyRanger Service Bulletin 2000/2, approved by BMAA MAAN 2000, see below.

2006-009 **Kiev Propeller Installation.**

Applies to this aircraft type with Kiev propellers: mandatory check of installation as per SkyRanger Service Bulletin 2000/3, approved by BMAA MAAN 2000, see below.

2014-001-E **Inspection of the control cable shackles and elevator joiner.**

Applies to this aircraft type: inspection of the control cable shackles and elevator joiner for incorrect material type as per BMAA Service Bulletin 2462 Issue 2, see below.

2019-005 **Placarding for aircraft fitted with a Ballistic Parachute Recovery System (BPRS)****Link to generic and miscellaneous CAA Mandatory Permit Directives:**

<https://www.bmaa.org/information-library/aircraft-technical-information/mandatory-permit-directives>

SERVICE BULLETINS:

<u>1744</u>	Issue 1	04/12/2003	SB001: Diagonal seat bracing SB002: modified aileron cable connections.
<u>2000</u>	Issue 1	12/07/2006	SB2000/1: Inspection and modification of CKT exhaust SB2000/2: Application of fire-resistant paint to engine cowlings SB2000/3: Check correct installation of Kiev propeller spacer

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2462	Issue 2	01/12/2013	Inspection of the control cable shackles and elevator joiner
2759	Issue 1	01/07/2019	Upper port engine mounting bolt failure

General link to BMAA Service Bulletins:

<https://www.bmaa.org/information-library/inspectorate/safety-bulletins>

Annual Bettsometer test is to be carried out as follows:

‘Dacron’ fabric: to 1000 grammes / 1.2mm needle with wing sails fitted and tensioned to flight. Test must be to both upper and lower surfaces. Stitching to be tested to 1360 grammes / 1.2mm needle.

‘Porcher Marine’ Xlam fabric: Stitching only 1360 grammes / 1.2mm needle with wing sails fitted and tensioned for flight. Fabric to be assessed based upon visual inspection. Test must be to both upper and lower surfaces (stitching only).

(12) MINIMUM PERFORMANCE AT MAX TAKE-OFF WEIGHT

V_{so} not to be more than:

- 40 mph/35 kt CAS at MTOW (450 & 472.5kg) /idle/landing configuration.
- 52 mph/45 kt CAS at MTOW (500 & 600kg) /idle/landing configuration

See Annex F for other performance data.

Issue History

Issue No.	Reasons for issue
HM4 Issue A (draft)	Preliminary build standard document, to permit construction of prototype.
HM4 Issue B(draft)	Pre-final approval draft.
HM4 Issue 1	First approval version, authorised by MAAN 1597 Issue 1. Signatory G B Gratton, BMAA CTO.
HM4 Issue 2	Addition of two new approved configurations which had been tested under MAAN 1597 and for which propellers now have generic approval under MAAN 1606 and MAAN 1612. Signatory G B Gratton, BMAA CTO.
HM4 Issue 3	Addition of Simonini Victor 2+ and Rotax 582 engine details, modification of W&CG information, clarification of flaps neutral setting position, increase in authorised seat weight, approval of single piece door, approval of alternative Ventral fin. Authorised by MAAN 1672. Signatory G B Gratton, BMAA CTO.
HM4 Issue 4	Change to ASI and RPM gauge requirements, modification to total seat load requirements for CG convenience, minor editorial changes and addition of new configurations under evaluation. Approval of configuration J2.2(1). Authorised by MAAN 1712. Signatory GB Gratton, BMAA CTO.
HM4 Issue 5	Addition of optional modifications of 60 litre fuel tank and wing fold kit approved by MAAN 1745. Addition of SkyRanger SB 001 (seat bracing mod) and SB 002 (aileron control cable mod), approved by MAAN 1744. Corresponding addition of ‘Mandatory modification’ number 25, ‘Optional modifications’ 3, 4 and 5, wing fold placard and ‘points for special attention’ 3. Addition of 582(1) configuration, as approved by MAAN1708. Correction to 912(2) configuration. Signatory G B Gratton, BMAA CTO.

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HM4 Issue 6	Modifications to wing fold approval: authorisation of optional stainless steel wing pins (MAAN 1745). Addition of V2+(1) configuration, as approved by MAAN 1685. Correction of climb performance of Rotax 912 powered variants, at Annex F. Addition of proposed R100(2) configuration. Amendments to Jabiru 2.2 engine operating limits. Amendment to authorised manual states. Addition of optional modifications: alternative exhaust system on Rotax 912 and fitment of cabin heat system, approved by MAAN 1738. Amendments to control deflections. Approval of configuration J2.2(2), authorised by MAAN 1790. Approval of configuration R100(1), authorised by MAAN 1719. Signatory G B Gratton, BMAA CTO
HM4 Issue 7	Correction to configuration J2.2(2). Addition of doors open max speed at section 7. Addition of optional modifications 9-12. POH now at Issue 2. Approval of new configuration 912S(1), authorised by MAAN 1825. Signatory G B Gratton, BMAA CTO
HM4 Issue 8	Maximum continuous engine speed reduced to 5,100 rpm on Rotax 912S and corresponding increase in maximum permitted empty weight. Addition of 'optional modification' number 13 (alternative covering material), authorised by MAAN 1893. Signatory G B Gratton, BMAA CTO
HM4 Issue 9	Modification to 'Betts' sail testing, authorised by MAAN 1955. Service Bulletins 2000/1, 2000/2 and 2000/3 authorised by MAAN 2000. Addition of Swift 912S(1) configuration, mandatory modifications 27-29 and approved optional modifications 14-20, approved by MAAN 1977. Fracture of saddle washers and fuel tank plumbing added for special attention. Max static RPM added to variant definitions. Clarification of Rotax 912/912S CHT and coolant temperature limits. Aileron neutral position changed to be in line with build manual. Signatory J A F Viner, BMAA CTO
HM4 Issue 10	Changes to 912/912S temperature limits. Addition of Optional Modification 22 (Woods wing root fairings). Addition for placarding two-piece door open limit speed. Addition of item 7 in Annex E. Signatory J A F Viner, BMAA CTO
HM4 Issue 11	In Para above (HM4 Issue 10), 'two-seat' corrected to 'two-piece'. Swift 912(1) variant added, approved by MAAN 2257. Optional modifications 23 and 24 (and point for special attention 8) added, approved by MAAN 2273. Signatory B J Syson, BMAA CTO, 4/2/2010.
HM4 Issue 12	Improvements to wording and formatting. Minor corrections. Change to Annex B, optional mod 15, approved by MAAN 2277. Addition of Nynja 912S(1) variant, approved by MAAN 2238. Up-issue of manuals, approved by MAAN 2238. Addition of max cont engine speed to Section 6. Note at top of Annex A, Mandatory Modifications to say they are now incorporated into standard build. Annex B, Approved Optional Modifications table rationalised. Signatory B J Syson, BMAA CTO. 29 th March 2011.
HM4 Issue 13	Clarification of total seat weight limit in Annex C. Addition of J2.2(3) variant approved by MAAN 2377. Correction of 912UL gearbox ratio. Betts test note moved to Annex E. Signatory B J Syson, BMAA CTO. 16 th March 2012.
HM4 Issue 14	Addition of SkyRanger Swift 912S(2) and Optional Mods (7(b), 9(b), 32-37), approved by MAAN 2498. Inclusion of either Rotax or CKT exhausts for all Rotax 912 series variants; confirmed acceptable from noise perspective with N Davis, CAA. SkyRanger Swift 912S(2) redundant and deleted, although not to be reused as one aircraft has

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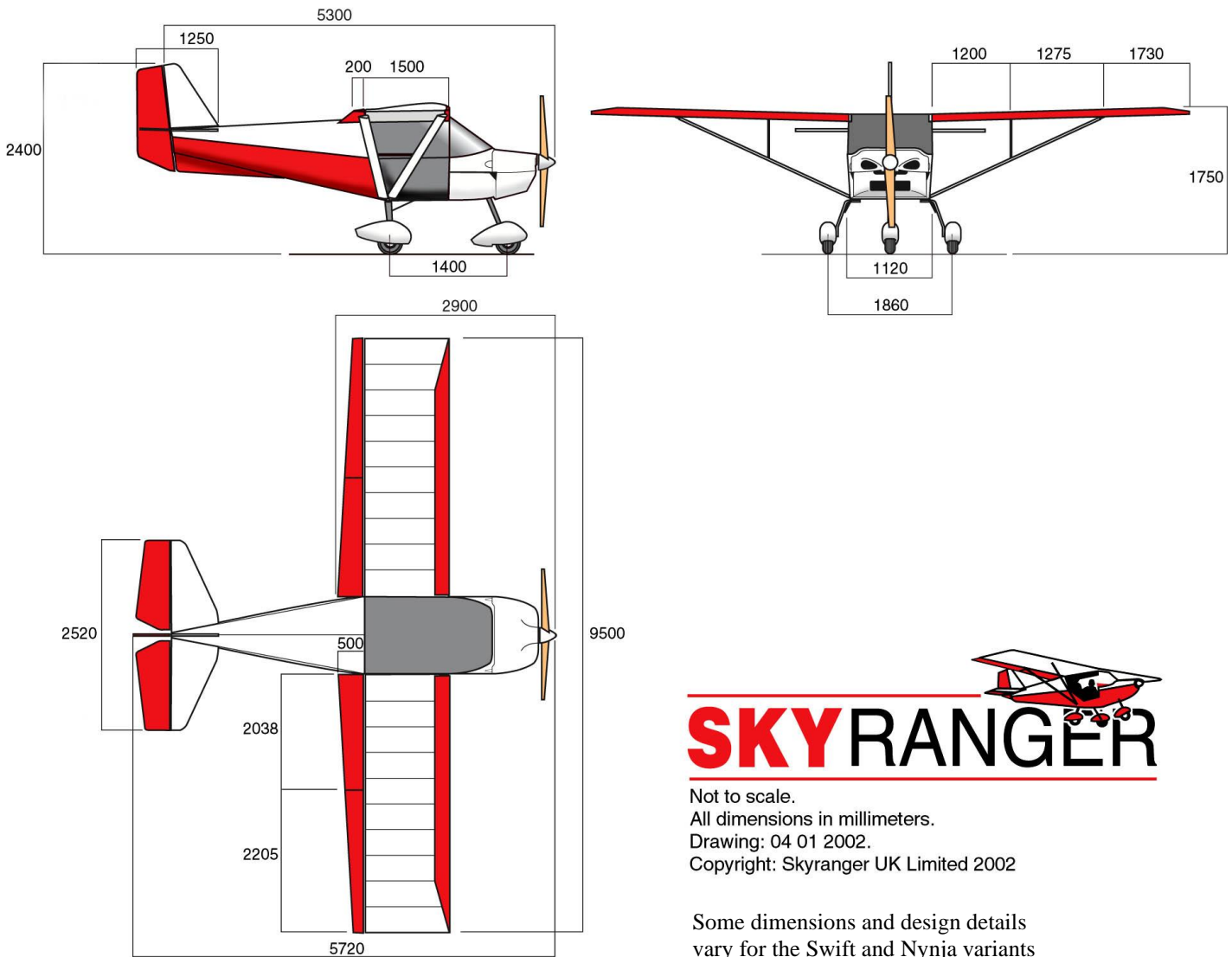
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Issue No.	Reasons for issue
	had Permit and Noise Certificate with this designation. Clarification of Optional Mod 4. Signatory B J Syson, BMAA CTO. 14 October 2014.
HM4 Issue 15	Addition of potential increase in MAUW from 450 kg to 472.5 kg subject to fitment of an approved airframe-mounted parachute recovery installation. MAUW increase approved by MAAN 2238 issue 4. In addition to approval of various individual airframe-mounted parachute recovery installations, MAAN 2408 issue 2 approved a 'series' fitment for the SkyRanger Nynja. Addition of CAA MPD 2014-001-E. Signatory B J Syson, BMAA CTO. 16 December 2014.
HM4 Issue 16	Addition of SkyRanger Nynja 912(1) variant plus max ZFW and performance for SkyRanger Nynja powered by Rotax 912UL approved by MAAN 2535 issue 1. Signatory B J Syson, BMAA CTO. 21 May 2015.
HM4 Issue 17	Nynja forward cg limit extended to 0.38m fwd of datum approved by MAAN 2575. Modification numbers 38 to 47 added standard with Skyranger Nynja LS (MAAN 2405) approved by MAAN 2575. Wing loading footnote amended, paragraph 5(c) Signatory B J Syson, BMAA CTO. 9 November 2015.
HM4 Issue 18	Addition of SkyRanger Swift 912(2) variant approved by MAAN 2593 Signatory B J Syson, BMAA CTO. 23 March 2016.
HM4 Issue 19	BMAA AAN MAAN 2239 weight details added for operation at 472.5kg without a BPRS. Flylight status changed to manufacturer. BMAA SB2759 added. Modifications details added or amended numbers: 22, 36, 42, 48, 49, 50 & 51. Weight and balance limits clarified for different modification states, mainwheel datum different if mod 34 fitted. Betts testing requirement of Xlam fabric removed in common with factory-built aircraft. Points for special attention items 10 and 11 added. Signatory R Pattrick, BMAA CTO 29 September 2021.
HM4 Issue 20	New MTOW options (500kg & 600kg) added with associated data and limitations. AAN-BMAA-1114 Flylight Airsports Modification 030 GRS 6/600. BMAA-AAN-1104 E-Prop DUR-3-175-C4-T for Swift & Nynja 912ULS. Addition of 600kg MTOW option Swift(3) & Nynja 912UL/ULS via BMAA-AAN-1096. Addition of 500kg MTOW option Swift(3) & Nynja 912UL/ULS via BMAA-MAAN-2931. Aircraft documents, CAA MPDs & BMAA SBs updated. UL91 fuel type added. Flylight factory modifications applicable to amateur built: #52 MRF 026 SkyRanger Nynja and Swift AUW 600kg #53 MRF 030 GRS 6/600 Ballistic Recovery Parachute System #54 MRF 033 Engine Inspection Hatches #55 MRF 035 (Durandal) E-Prop #56 MRF 036 Oil Cooling System Change #57 MRF 039 Lift Strut Aerofoil Change Brief summary of 500kg & 600kg upgrade mods Signatory R Pattrick, BMAA CTO 05/03/2024.

ILLUSTRATION OF AIRCRAFT

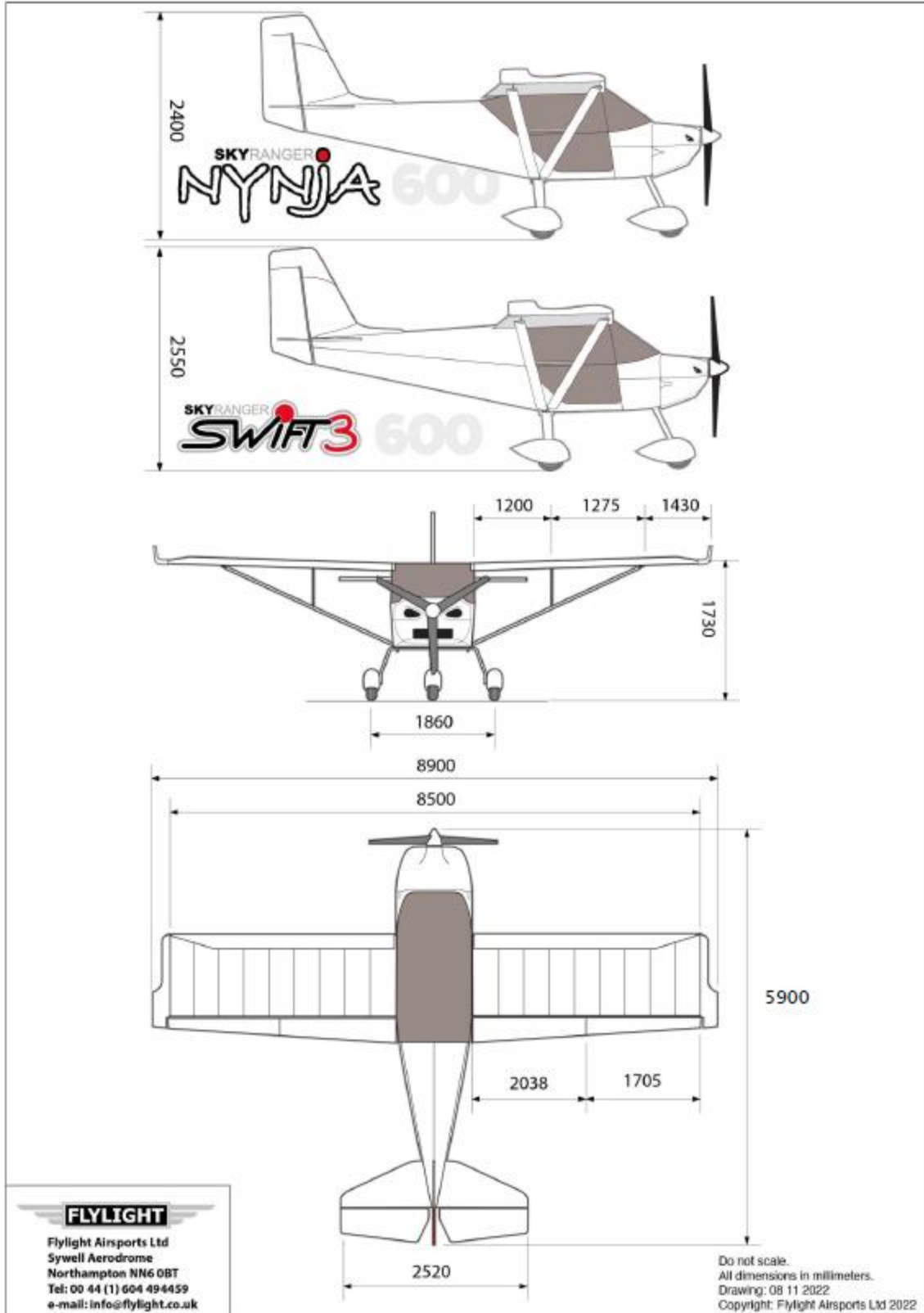
SkyRanger Classic



Not to scale.
All dimensions in millimeters.
Drawing: 04 01 2002.
Copyright: Skyranger UK Limited 2002

Some dimensions and design details vary for the Swift and Nynja variants

SkyRanger Swift & Nynja 600



ANNEX A

MANDATORY MODIFICATIONS

The following mandatory mods apply to early Classic and Swift variants. They are now incorporated into the build standard and build manuals and are included here solely for historic reasons.

No. Brief Description

- 1 All control cables changed from 2.5mm diameter to 3mm diameter 7x19 stainless steel, minimum breaking load 5.0kN. (Not rear fuselage bracing, rudder centring or rudder stop cables.)
- 2 Control stick and supporting structure redesigned, including aileron torque tube and associated horn. Aileron and elevator stops incorporated into design
- 3 Rudder stops arranged using 2.5mm diameter 7x19 stainless steel cable, minimum breaking load 3.4kN, between cable attachments on rudder pedals and central fuselage tubes.
- 4 Dual throttles redesigned – see UK build manual at current issue.
- 5 Rudder, elevator and aileron horns redesigned – see UK build manual at current issue.
- 6 Arrangement of control cable pulleys and flap handle changed – see UK build manual at current issue.
- 7 Flap handle incorporates a bend mid-length to maintain hand clearance from pulleys.
- 8 Flap detent lever altered to accommodate changed flap handle geometry.
- 9 Nose-wheel steering bar strengthened. (Distinguished by use of box-section bar.)
- 10 Arrangement of pulleys in wings changed to improve rigidity – see UK build manual at current issue.
- 11 Elevator trimmer system modified to incorporate closed loop system.
- 12 Nose-leg lower mount braced top and bottom with steel plates, mounting bolt sleeved.
- 13 Nose-leg reinforced with steel inner sleeve, 2mm wall thickness.
- 14 Main UC drag links redesigned, now consists of U-channel brackets with stainless steel tube between.
- 15 Fuselage side rail tubes now use inner sleeve and U-bracket rear fitting.
- 16 Orientation of jury-strut upper mounting brackets changed, long side down most. Does not apply if aerofoil tube jury struts (optional mod. 15) are fitted.
- 17 Upper doorframes made from 5/8" diameter aluminium tube.
- 18 Firewall extended upwards to upper cowling.
- 19 Fire-resistant acoustic foam applied to cockpit side of firewall.
- 20 Fire-resistant paint applied to inside of engine cowlings as set out in service bulletin SB 2000/2. Mandatory for all aircraft.
- 21 Fuel system designed and defined to comply with Section S – refer to UK build manual at current issue.
- 22 Wooden load spreader bars placed at forward upper tank supporting points.
- 23 Tank securing straps arrangement changed. Now one-piece and incorporate stainless steel ring.
- 24 Fitment of ventral fin. (This may be of either Flylight type, or French "Vmax" type supplied)

No. Brief Description

- through Flylight from 2003)
- 25 Fitment of seat bracing, as set out in SkyRanger SB 001. Applies to both standard seats and adjustable reach seats (optional mod. 20).
 - 26 Fitment of tailpipe steady bracket on CKT exhaust (applies to Rotax 912 and 912S variants; mandatory for Rotax 912S variants) as set out in service bulletin SB 2000/1.
 - 27 Swift variants only. Fitment of extended inner sleeves at root of front wing spars.
 - 28 Swift variants only. Fitment of aerofoil tube jury struts (optional mod. 15).
 - 29 Swift variants only. Fitment of extended roof batten that runs down the centre of the windscreen (optional mod. 16).

ANNEX B

APPROVED OPTIONAL MODIFICATIONS

The installation of all optional modifications is to be inspected by a BMAA inspector and an entry made in the appropriate logbook(s). Note that other approved modifications may exist which are not listed here – however these should be described in other BMAA approval documentation.

- The following key applies:
- ✓ Part of the build standard. Not optional.
 - Optional – standard
 - Optional – non-standard
 - X Not applicable

No.	Brief Description	Classic	Swift	Nynja
1	Baggage hammock behind seats and above fuel tanks. This is to be placarded with a limit of 10kg if fitted.	○	○	○
2	2(a) Single piece door, or 2(b) Two piece door. (One of these options should normally be fitted)	○ ○	○ ○	○ ○
3	3(a) 50 litre fuel tank, or 3(b) 60 litre fuel tank (inspectors to confirm cross-tube tu40 and diagonal bracing tubes tu27 are 22mm diameter, not 20mm) (One of these options must be fitted. Inspectors to confirm fuel limitations placard matches fuel tank capacity.)	○ ●	○ ●	○ ●
4	Aileron cable attachment modification (to help avoid mis-rigging). There are two versions of this modification: 'handed' ends to the (continuous) aileron cables, as set out in Sky Ranger SB 002; handed de-rig 'breaks' in the aileron cables, introduced for the Nynja, but can also be fitted to Classic/Swift.	○	○	●
5	Wing fold modification.	○	○	○

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No.	Brief Description	Classic	Swift	Nynja
6	Use of 8mm steel or stainless steel wing pins in place of bolts.	0	0	0
7	Fitment of CKT stainless steel exhaust (Rotax 912 and 912S configurations only) 7(a) Original type CKT exhaust 7(b) Nynja type CKT exhaust (requires repositioned oil cooler on Classic and Swift) Up to August 2014, there was no distinction made between these two exhausts. Prior to August 2014 option 7 fitted to a Classic or Swift was 7(a); option 7 fitted to a Nynja was 7(b).	0 0	0 0	X 0
8	Fitment of Flylight/CKT cabin heat (to be fitted with optional mod. 7 only)	0	0	0
9	Fitment of Flylight wheel spats 9(a) Original style wheel spats 9(b) 'Teardrop' style wheel spats When wheel spats 9(b) were introduced in August 2014, the original style spats were re-designated as 9(a).	0 0	0 0	0 0
10	Fitment of Flylight wing tip fairings	0	0	0
11	Fitment of spinner for Kiev propellers	0	0	0
12	Fitment of spinner for Jabiru engines	0	X	X
13	Alternative covering material: fitment of Porcher Marine 2420 ('Xlam') fabric covering in place of Dacron covering	0	0	0
14	Short wing option. Aerofoil tube jury struts (optional mod. 15) and the extended roof batten (optional mod. 16) must be fitted as well.	X	✓	✓
15	Alternative, Flylight aerofoil tube jury struts. Can be incorporated into a long wing variant in accordance with Flylight document 'Retrofit of Aerofoil Struts to Classic Wing', authorised by MAAN 2277.	0	✓	✓
16	Fitment of Flylight extended roof batten that runs down the centre of the windscreen	0	✓	✓
17	Fitment of Flylight transverse batten immediately behind the fuel tanks.	0	●	X
18	Fitment of Flylight sprung door latches	0	●	✓
19	Fitment of Flylight Mk II, large, composite, instrument panel	0	0	X
20	Fitment of Flylight adjustable reach seats. (For Nynja variants requires fitment of Classic/Swift style seats.)	0	0	0
21	Fitment of Flylight centre console	0	0	0

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No.	Brief Description	Classic	Swift	Nynja
22	Fitment of wing root fairings manufactured and supplied by K Woods. (Fitment is to be made in accordance with the 'Installation instructions for the SkyRanger wing root fairings designed and manufactured by Kevin Woods', Issue 1, supplied with the parts. Flylight do not provide build support for the fitment of these parts.) Nynja variant is fitted with its own wing root fairing as standard. a) Woods b) Nynja (std Nynja; optional Classic Swift)	0	0	X
23	Lowered pilot's seat implemented in accordance with Flylight document 'SkyRanger seat modification to give increased headroom for pilots tall in the back' dated 8 June 2008. Consolidated control cable pulley block (optional mod. 24) must be implemented as well. (For Nynja variants requires fitment of Classic/Swift style seats.)	0	0	0
24	Consolidated control cable pulley block implemented in accordance with Flylight document 'SkyRanger port rudder pulley block consolidation' dated 16 December 2009.	0	0	✓
25	Composite seats (must have op mod 24 fitted as well for this)	0	0	✓
26	Nynja wingtip fairings.	0	0	●
27	Wing strut end fairings	0	0	●
28	Console instrument panel	0	0	✓
29	Fuel tank pickup fitting	0	0	✓
30	Nynja control stick and integral elevator horn / joiner	0	0	✓
31	Nynja two-piece door – upper door fixing / hinge method	0	0	✓
32	Flylight external fuel filler	0	0	✓
33	Large diameter balance pipe between fuel tanks	0	0	0
34	Nynja spec TU9 main cross member and main gear internal drag reaction braces	0	0	✓
35	Nynja type TU34 front door pillar, door system and throttle control system	0	0	✓
36	Deletion of ventral fin, and incorporation of Nynja upper fin extension fairing and rudder. a) Short Extension b) Long Extension	0	0	✓
37	Nynja spec front leg gear	0	0	✓
38	Flap lever and supporting structure reinforced (LS)	0	0	0
39	Front lift strut to spar attachment bracket (LS)	0	0	0

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No.	Brief Description	Classic	Swift	Nynja
40	Main-gear tapered leg, internal drag bracing, Beringer wheels, brakes and master cylinder brake handle. (LS) a) Beringer axle mount bracket b) Best-Off axle mount bracket	O	O	O
41	Stainless steel firewall (LS)	O	O	O
42	Larger Oil Cooler (95mm) (LS)	O	O	O
43	Emergency electric fuel pump (LS)	O	O	O
44	Fuel tank vents linked together (LS)	O	O	O
45	Cabin heater bypass (LS)	O	O	O
46	Large trim tab (LS)	O	O	O
47	Carb breather drains (LS)	O	O	O
48	Push pull hand throttle	x	x	O
49	Swift 3 Kit – Nynja cowlings, engine mount, firewall and modified fabric.	x	O	x
50	Adjustable Seats	O	O	O
51	Twin control column (Swift 3 and Nynja Only)	x	O	O
52	MRF 026 SkyRanger Nynja and Swift(3) AUW 600kg	x	O	O
53	MRF 030 GRS 6/600 Ballistic Recovery Parachute System	x	O	O
54	MRF 033 Engine Inspection Hatches	O	O	O
55	MRF 035 (Durandal) E-Prop (912S Only)	x	O	O
56	MRF 036 Oil Cooling System Change	O	O	O
57	MRF 039 Lift Strut Aerofoil Change	O	O	O

(LS) Denotes standard on Light Sport models, see HM19.

LIST OF REQUIRED MODS FOR 500kg & 600kg MTOW – APPROVAL FROM BMAA MUST BE OBTAINED

500kg	600kg
#37 Nynja spec front leg gear (Swift only) #38 Flap lever and supporting structure reinforced (LS) #39 Front lift strut to spar attachment bracket (LS) #40 Main-gear tapered leg, internal drag bracing, Beringer wheels, brakes and master cylinder brake handle. (LS) a) Beringer axle mount bracket b) Best-Off axle mount bracket #42 Larger Oil Cooler (95mm) (LS) #46 Large trim tab (LS) - Rear fuselage "X brace" cables and fittings (SWIFT ONLY)	#37. Nynja spec front leg gear (Swift only). #38. a) & b) Flap lever and supporting structure reinforced (LS) #39. Front lift strut to spar attachment bracket (LS) #42. Larger Oil Cooler (95mm) (LS) #46. Large trim tab (LS) #52. 600kg capable one-piece main landing gear (including uprated SKR.9 or TU9 tube). - Thicker front strut plate (increased from 2.5mm thick to 4mm thick). - Thicker anti drag cable (increase from 3mm diameter to 4mm diameter) - Front lift strut inner sleeve (6060T6 20mm diameter x 2mm wall, 2000mm long, lower end 150mm from strut end). - 600kg capable SKR.9 (lift strut carry through and landing gear mounting structure). - Nynja style fuselage "X" bracing cables (SWIFT ONLY).

ANNEX CWEIGHING INFORMATION

CG Datum	Original prototype G-CBIV, Nynja and 500/600kg variants at Mainwheel axle centreline. Swift at Mainwheel axle centreline if Modification 34 Main gear internal drag reaction braces fitted. Classic and Swift at -0.04m forward of Mainwheel axle centreline, external drag reaction brace fitted. Positive is forward of datum
Weighing attitude	Sitting on all three wheels on level ground and with correct tyre pressures, the horizontal tailplane trailing edge tube (forward of the elevator) is to be 10mm below the horizontal tailplane leading edge tube or 8mm for the Nynja only.

SkyRanger (600 kg)

Main wheel moment arm:	0m, defines datum
Nose wheel moment arm:	1.40m forward of datum (FoD)
Fuel moment arm:	-0.35m aft of datum (AoD) (60 litres = 43 kg)
Crew moment arm:	0.15m forward of datum (FoD), fixed seat 0.15 – 0.22m forward of datum (FoD), adj. seat
Baggage moment arm:	-0.35m aft of datum (AoD) (max 10kg)
Crew weights:	0 - 120 kg (each) (min cockpit load 55 kg)
Aft CG Limit:	0.197m forward of datum (FoD)
Forward CG Limit:	0.367m forward of datum (FoD)

SkyRanger (450 / 472.5 / 500 kg)

Main wheel moment arm:	0m (Nynja & Original prototype G-CBIV) 0m (Swift with internal drag reaction braces fitted) -0.04m AoD (Classic & Swift with external drag reaction braces fitted)
Nose wheel moment arm:	1.45m forward of datum (FoD)
Fuel moment arm:	-0.29m aft of datum (AoD) (60 litres = 43 kg)
Crew moment arm:	0.15m forward of datum (FoD), fixed seat 0.15 – 0.22m forward of datum (FoD), adj. seat
Baggage moment arm:	-0.29m aft of datum (AoD) (max 10 kg)
Crew weights:	0 - 120 kg (each) (min cockpit load 55 kg)
Aft CG Limit:	0.21m forward of datum (FoD)



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Forward CG Limit: 0.38m forward of datum (FoD)
 0.36m forward of datum (FoD) – CLASSIC (A/C with small trim tab)

Items that are non-essential for flight and are easily removable may be eligible for non-inclusion in the ZFW calculation and be considered as payload. Those items not included in the ZFW, and their weight, must be clearly placarded. These items may include:

Baggage hammock 1.5 kg
 Doors 5.5 kg

ANNEX D

EXAMPLE PLACARDS

(a) Flight Limitations Placard (to be visible to pilot)

<u>SkyRanger [Engine] [Registration]</u>	
Never Exceed Speed:	_____ IAS *
Manoeuvring Speed:	_____ IAS *
Flap limiting speed	_____ IAS *
Stall Speed (with flaps):	_____ IAS *
Stall speed (clean):	_____ IAS *
Best climb speed:	_____ IAS *
Best glide speed:	_____ IAS*
Bank angle limits:	+/- 60°
Normal Acceleration Limits:	+4 / -2g
Empty Weight:	_____ kg **
Max Take-Off Weight:	450 / 472.5 / 500 / 600 kg **
Minimum Seat Weight:	55 kg
Maximum Seat Weight:	120 kg in each seat.
Aerobatics and deliberate spinning prohibited.	

*Values and units IAS will be given in the approval MAAN for the individual aircraft.

** This must match the most recent W&CG report for the aircraft.

(b) Engine Limitations Placard (to be located near to engine instruments)

A placard showing the limitations for all indicated engine parameters is to be mounted close to the engine instruments. Also, main limitations are to be shown as coloured markers (red for danger, amber for caution) on the instrument displays.

(c) Occupant Warning Placard (to be visible to both occupants)

See Operators Manual.

(d) Fuel Limitations Placard (to be located near to filler cap)

FUEL	
Capacity 50/60 ¹¹ Litres	
2-stroke mix / 4-stroke, add no oil ¹¹	
<u>Cockpit Weight (kg)</u>	<u>Max. Fuel Load (litres)</u>
<u>Including baggage</u>	
180	
170	
....	
.... Or below	60 litres
83 MON or 90/95 RON minimum unleaded to BS(EN)228, AVGAS 100LL or UL91	

(e) ASI Correction Placard (to be close to the ASI)

*This is only an example. In particular, values are not applicable to non-Swift variants. For actual values see the approval MAAN for the particular aircraft.

*450 / 472.5 kg

Kn CAS (calibrated)	34 V_{SO}	36 V_{S1}	40	47 min sink	50	52 glide/ approach	57 climb	70 V_{FE}	72 Doors	74 V_A	80	90	100	111 V_{NE}
Kn / Mph IAS (indicated)														

500 kg

Kn CAS (calibrated)	34 V_{SO}	36 V_{S1}	40	47 min sink	50	52 glide/ approach	57 climb	70 V_{FE}	72 Doors	80	82 V_A	90	96 V_{NO}	100	110	117 V_{NE}
Kn / Mph IAS (indicated)																

600 kg

Kn CAS (calibrated)	37 V_{SO}	41 V_{S1}	47 min sink	50	54 glide/ approach	61 climb	70 V_{FE}	72 Doors	80	82 V_A	90	100 V_{NO}	110	117 V_{NE}
Kn / Mph IAS (indicated)														

The ASI must also be marked with the main IAS limiting speeds in accordance with normal aviation practice.

¹¹ Delete / amend as applicable.

- (f) Secondary Control Markings
Choke, cabin heat, trim, flaps, fuel shut-off: see Operators Manual. Other secondary controls are to be placarded as per the associated Operators Manual supplement or normal aviation practice (if no associated Operators Manual supplement).
- (g) ASI Markings
See Operators Manual.
- (h) Switches
All switches are to be marked with function and sense (up=on, down=off).
- (i) Fuses and Circuit Breakers
All fuses and circuit breakers are to be marked with function and rating.
- (j) Fireproof Metal Plate
Showing the aircraft nationality and registration marks (e.g. G-ABCD) to be mounted in a prominent position on the fuselage.
- (k) Pitch Trimmer Instructions

PITCH TRIM nose down ← → nose up

- (l) Switches
All switches are to be marked with function and sense (up=on, down=off).
- (m) Flaps
The flap operating lever is to be marked, in view of a pilot strapped into the left-hand seat, with each flap setting (CR, TO, LD).
- (n) Baggage Hammock (if fitted)
MAXIMUM 10kg
- (o) Wing fold mechanism (if fitted)
A placard stating "Not to be trailered without additional wing support" is to be displayed in a conspicuous place on each upper cabin tube, to be visible when the wing is pulled out.
- (p) Two-piece doors (if fitted)
A placard (or an entry on placard d) above) showing a maximum door-open speed of 72 kn CAS (IAS to be shown if on a separate placard).

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ANNEX E

POINTS FOR SPECIAL ATTENTION

In service, the following points have been found to be commonly recurring faults, and Inspectors must give special attention to the following both during initial approval, and during later inspections.

<u>No.</u>	<u>Brief Description</u>
1.	Placards and limitations must be as stated in the approval MAAN , and <u>not</u> use CAS values as given in the HADS.
2.	Failures to take into account the requirements of BMAA TIL 007 and 027 during the design and installation of the engine and instrument fittings.
3.	If the 60 litre fuel tank is fitted, inspectors must confirm that the cross-member and diagonal bracing tubes are 22mm diameter, not 20mm.
4.	Kiev propeller bolts must be fitted through clearance holes in the spacer, <u>not</u> through larger diameter lightening holes. Incorrect assembly causes undue bending stress and can result in propeller bolt failure.
5.	Fracture of plastic saddle washers. Problem can be caused by over-tightening, exposure to Loctite or failure to remove moulding flashes before use. Plastic saddle washers should <u>not</u> be present on both sides of rudder control hinges.
6.	Incorrect fitment of the fuel tank balance pipe (incorporating the fuel drain) and dip tube. Balance pipe / drain fittings should be fitted as low as is practical on the flat bevelled area on the inside rear corner of each fuel tank. The dip tube must draw fuel from above the balance pipe / drain fitting such that when the dip tube can draw no more fuel it must still be possible to drain at least 0.12 litres of fuel from the tanks. In addition the dip tube must not be so short that its end is positioned above the moulding line at the top of the bevelled area at the rear of the tank. See the build manual at current issue for more details.
7.	Aileron horn stops. Short plastic sleeves are fitted over the central cabin tubes tu19 at the bottom of the control stick to act as aileron control stops. These have been known to slip down the tubes. Ensure that the plastic sleeves are secure and that the aileron horn contacts the sleeves at the limit of aileron movement. If the plastic sleeves have slipped, reposition and secure, and check the aileron control cables for abrasion along their entire length.
8.	Lowered pilot's seat (optional mod. 23). Ensure that axle tube tu9 is not abraded by inner seat support bracket (fatigue crack initiator).
9.	Annual Bettsometer test is to be carried out as follows: 'Dacron' fabric: to 1000 grammes / 1.2mm needle with wing sails fitted and tensioned to flight. Test must be to both upper and lower surfaces. Stitching to be tested to 1360 grammes / 1.2mm needle. 'Porcher Marine' Xlam fabric: Stitching only 1360 grammes / 1.2mm needle with wing sails fitted and tensioned for flight. Fabric to be assessed based upon visual inspection. Test must be to both upper and lower surfaces (stitching only).
10.	Check the undercarriage leg for surface corrosion on any exposed surface to the aircraft and in particular at the mounting bolts and mounting blocks at the U bolts.
11.	Check all control cable pulleys for corrosion and wear, and ensure that they have been rotated in accordance with the Operators Manual. The aileron cable pulleys in the wing are particularly susceptible to wear and corrosion if not maintained properly.

<u>No.</u>	<u>Brief Description</u>
12.	<p>Kiev propeller bolts must be fitted through clearance holes in the spacer, not through larger diameter lightening holes. Incorrect assembly causes undue bending stress and can result in propeller bolt failure.</p> <p>Recommend: Check Kiev propeller blades before each flight for chord wise cracks, initiating from the leading edge. Remove spinner and check Kiev propeller hubs every 100hrs/Biannually for stress cracking.</p>
13.	<p>Aileron horn stops. Short plastic sleeves are fitted over the central cabin tubes tu19 at the bottom of the control stick to act as aileron control stops. These have been known to slip down the tubes. Ensure that the plastic sleeves are secure and that the aileron horn contacts the sleeves at the limit of aileron movement. If the plastic sleeves have slipped, reposition and secure, and check the aileron control cables for abrasion along their entire length.</p>
14.	<p>Undercarriage Rubbers (600kg variants only) Check undercarriage rubbers regularly for condition and ensure that the clamping assembly is secure.</p>

ANNEX F

SCHEDULED PERFORMANCE FOR APPROVED VARIANTS

All performance values are at ISA S/L conditions, MTOW, fwd CG unless stated otherwise. Take-off and landing distances are given for short dry grass fields, clearing 15m obstacle height. Take-off distances include 1.3 safety factor.

Long Wing Variants					
Variant	TODR (TO Flaps)	LDR (LD Flaps)	Climb rate	Vy	Notes
*582 (all variants)	294m	250m	750 fpm ¹²	53 KCAS	-
*912 (all variants)	254m	250m	1100 fpm	53 KCAS	-
*912S (all variants)	234m	250m	1200 fpm	53 KCAS	-
*J2.2(1)	351m	334m	700 fpm ¹³	55 KCAS	Approach speed 47 KCAS
*J2.2(2)	301m	250m	750 fpm	55 KCAS	Approach speed 47 KCAS
R100(1)	400m	300m	550 fpm	54 KCAS	-
Simonini V2+	265m	250m	1200 fpm	53 KCAS	-

Short Wing Variants					
Variant	TODR (TO Flaps)	LDR (LD Flaps)	Climb rate	Vy	Notes
*Swift 912 450kg	321m	282m	940 fpm	57 KCAS	Approach speed 52 KCAS
500kg	385m	310m	850 fpm	57 KCAS	Approach speed 52 KCAS
600kg	485m	335m	690 fpm	61 KCAS	Approach speed 54 KCAS
*Swift 912S 450kg	280m	282m	1100 fpm	57 KCAS	Approach speed 52 KCAS
500kg	336m	310m	1100 fpm	57 KCAS	Approach speed 52 KCAS
600kg	326m	335m	840 fpm	61 KCAS	Approach speed 54 KCAS
*Nynja 912 450kg	321m	282m	940 fpm	57 KCAS	Approach speed 52 KCAS
500kg	385m	310m	850 fpm	57 KCAS	Approach speed 52 KCAS
600kg	485m	335m	690 fpm	61 KCAS	Approach speed 54 KCAS
*Nynja 912S 450kg	280m	282m	1200 fpm	57 KCAS	Approach speed 52 KCAS
500kg	336m	310m	1100 fpm	57 KCAS	Approach speed 52 KCAS
600kg	326m	335m	840 fpm	61 KCAS	Approach speed 54 KCAS

* Where performance at 472.5kg is not known, the performance figures for operation at 450kg should be used for planning purposes using the following factors to convert from 450kg to 472.5kg (from CAA Safety Sense leaflet 7 – Aeroplane Performance):

- TODR – multiply by 1.1.
- LDR – multiply by 1.05.

¹² Measured at 1100 ft density altitude

¹³ Measured at 900ft density altitude