

March 2015



SKYWRITINGS

Newsletter of the *Kent Strut*

LAA Engineering at the next meeting!



Nigel Read - Editor

Editorial

After a talk from Weslake's managing director last month, bringing along an example of his company's new A-80 diesel engine, our top rate talks continue this month with a visit from Malcolm McBride, regular contributor to *Light Aircraft* magazine with his safety spot. Coming later are follow up talks on Eastchurch from Air Commodore Bill Croydon and operation Jerico from Fr Peter Geldard.

PAFRA organised a talk on the e-Go canard design recently to which strut members were invited and Gary Smith has provided notes. Don't forget to check the new website for upcoming events—talks, visits and fly-outs.



Weslake Crankshaft from an A-80. See last month's talk report.

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Happy
Easter
folks!



26th March Meeting
LAA Engineering—Malcolm McBride
Cobtree Manor Golf Club, 20:00hrs

www.laakentstrut.org.uk

The Double Sunrise: Qantas's secret Perth-Ceylon wartime service

Flying boats provided a vital service for Australia during the Second World War. In particular, Catalina flying boats played a unique part in daring missions by Australian airmen in Asia and the Pacific and Indian Oceans.

The Catalina missions included long-range mine-laying, torpedoing, rescue, evacuation, and holding open far-distant lines of communication. The Catalina was to Australia what the Spitfire was to Britain. In addition to the activity of the Catalinas, existing passenger flying boats were converted for military work, and two squadrons of Australian flying boats based in Britain successfully sought out and sank German U-Boats.

When Singapore fell to Japan in February 1942 Australia lost its air connection to Britain. A new route was urgently needed. Hudson Fysh, co-founder of Qantas, wanted to establish a civilian service between Australia and Sri Lanka, despite the fact that at this time Japan had complete domination of the Indian Ocean, but civil aviation authorities ruled that this route was too dangerous to attempt.

In 1943, at the urging of the British Government, the Royal Air Force in Britain supplied Qantas with five Catalina aircraft, if Qantas agreed to open a flying route from Perth to Ceylon (Sri Lanka). It was to be the world's longest regular non-stop service - a total distance of 5632km (3520 miles). The weight of fuel limited the Catalina's load to only three passengers and 69kg of diplomatic and armed forces mail. The flying boats travelled at 160 miles an hour.

Qantas Empire Airways began to operate the Catalina flying boats between Perth and Koggala Lake in Ceylon (Sri Lanka). This extraordinary, top secret, civilian service made 271 crossings of the Indian Ocean with no loss of life, continuing right through to the end of the war. In the process they delivered 860 high priority government and military passengers, large quantities of microfilmed mail, and urgent war-related freight - a major contribution to the war effort.

These Catalinas were completely defenceless, carrying no weaponry, and with all armour plating removed so that the planes were sufficiently light to make the long crossing of more than 6480 km. In order to remain undetected by the Japanese, they flew by night using celestial navigation and without radio, except for a very brief midnight weather bulletin in Morse code. The average length of the flights was 28 hours. Because the journey was made by night, the crew and passengers saw the sun rise twice, hence the name 'Double Sunrise' service.

The Double Sunrise service still holds the record for the longest non-stop commercial air route and the record for the longest ever non-stop commercial flight - 32 hours 9 minutes. The last Double Sunrise flight departed from Sri Lanka for Perth on 17 July 1945.



<http://www.australia.gov.au/about-australia/australian-story/flying-boats-in-ww2>

The “e-Go” SDDR Aeroplane. Notes on the recent PAFRA talk from Gary Smith



Many engineering competition entries never progress from the drawing board but the “e-Go light Aircraft” is definitely not the norm. In 2007 the CAA unexpectedly launched a new ultra light aircraft category called the Single Seat De-Regulated or SDDR. If an aircraft could be built with an empty weight of less than 115Kg, wing area 10m² and have a stall speed less than 35 Kt it would be allowed to operate without official certification or intervention.

115Kg would be sufficient for an open framed microlight or “weed hopper” but keen to encourage some development the Light Aircraft Association launched a competition to encourage designers to come up with some “proper aeroplane” designs.

The winner was the “e-Go”, a very futuristic canard design (smaller wing at the front, main wing to the rear) with a rear engine driving a pusher prop. The design team ensured the aircraft conformed to modern design specification (although legally this was not necessary) and following the construction of a working 1/3 scale model their prototype first flew on 25th October 2013.

With the design completed the marketing team were invited to the Holiday Inn (Rochester) on 21st Jan by PARFA to tell us all about the e-Go project and where it is going next.

David Boughey, the sales manager gave us a summary of the aircraft’s progression from concept to prototype and highlighted some of the problems they overcame on route. They chose to work in composite / carbon fibre but had to develop special techniques to make the already light weight structures even lighter. Samples of the layups were passed around and the quality and strength/weight ratio was quite remarkable.

They chose the 30Hp Rotron rotary (wankel) engine since it was commercially available and already had a good track record in military UAV’s. Its water cooling system ensures the single rotor has good reliability and with few moving parts it

only requires inspection every 200 hours. It has a total loss lubrication system similar to a 2 stroke and the belt reduction system (2.75:1) gives a prop speed of 2400rpm.

Due to its slightly unusual canard layout e-Go have built a ground simulator so new pilots can familiarise themselves with the controls and check etc. This could be rather useful since the aircraft is single seater.

Unlike many canards the e-Go has large wheels (for its size) and can operate from relatively short grass strips. Facts and figures obtained from the prototype were: - operate from 300m grass strips - 350nm range - fuel consumption of 7 litres of unleaded fuel per hour for speed of 90 to 100kt - glide ration 16:1 - benign stall characteristics.

The claimed operating cost of £15 per hour seems optimistic (perhaps that's fuel only!) but never the less it does have the potential for very low operating costs. It can also live in a trailer at home.

The recent increase in the SDDR weight limit (to 300Kg max take off weight) has helped the project by allowing a much improved interior and instrument fit to be included.

It was encouraging to see a new aircraft come off of a British drawing board, the first for many years. I hope we are coming out of the recession and with its good looks, low operating costs and novel design really help it get established and succeed.

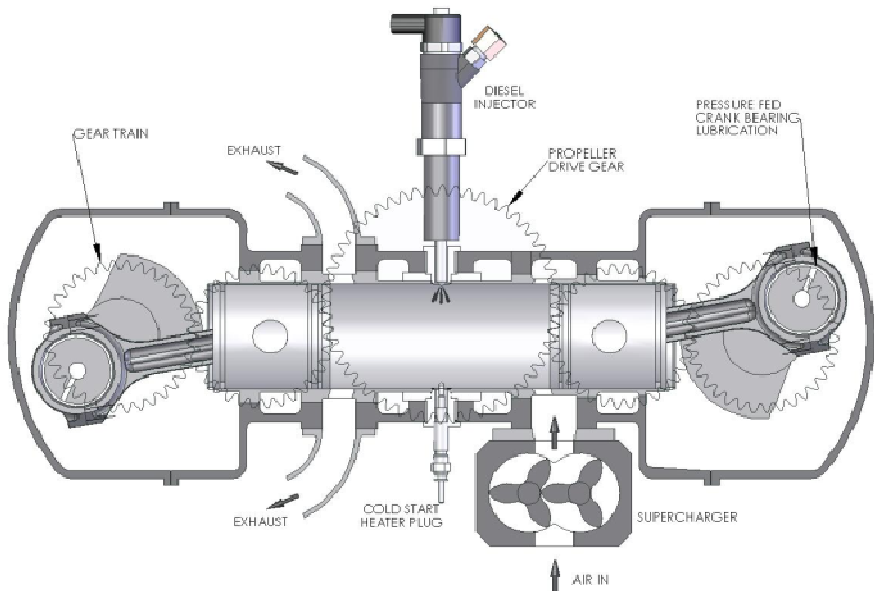
For more information please search www.e-Go.me

Note. Despite the "e" in e-Go being green it is not electrically driven, as many people think, but runs on unleaded petrol. Amazing what you find out when you go to excellent seminars!



February Meeting

John Lambertson, MD of Weslake Engines gave us a talk on the new aero diesel engine they have produced, (A-80), bringing along an example mounted on a stand. John described the thinking behind the design and the history of Weslake from it's beginnings in 1918 by Harry Weslake, through to developing speedway and formula 1 engines and developing production cars. Various slides and short videos were shown. The front view below shows the general arrangement with two cranks at each side and how changing the idler gears allows the prop speed to be varied from the crank speed allowing different applications from marine to generator to aero engine use.



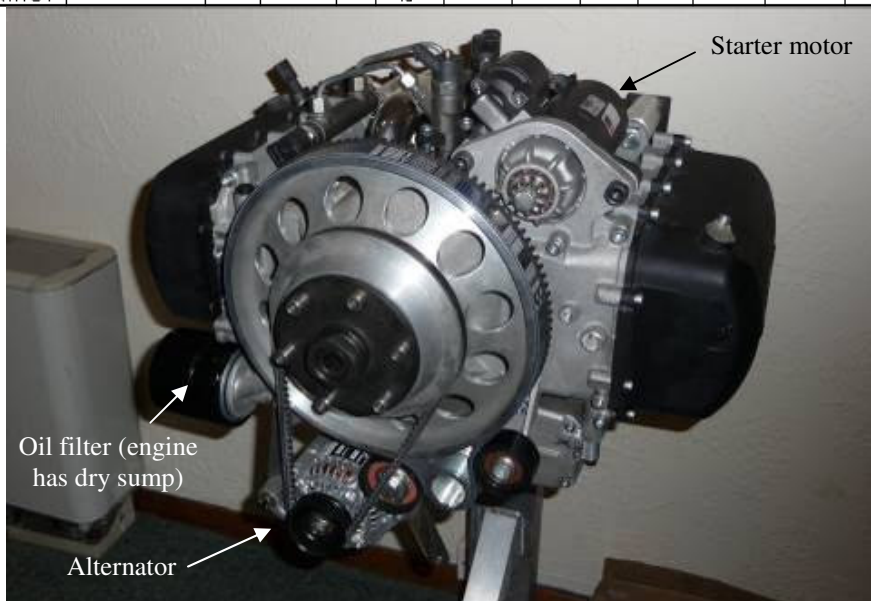
A supercharger (supplied from Australia) is essential to start and keep the engine running. Driven by a wide poly vee belt via a couple of idlers that absorb cyclic vibrations. Later developments may see a turbo charger added so that the supercharger is only required for starting. The engine uses Bosch common rail fuel injection.

John spoke about adding more cylinders which increases the power to weight ratio greatly (Weslake W325). A chart comparing various engines is reproduced on the next page, of particular interest is the break mean effective pressure (BMEP) that shows a very low figure compared to other engines indicating low internal forces. At the moment the lb/hp is higher than calculated for the Rotax but there is scope for some weight saving over the early prototypes.

The engine uses a dry sump. Working on a 2 stroke principle, design of the silencer is important. Price and availability were not quoted nor sound level but John said he liked the sound of it!

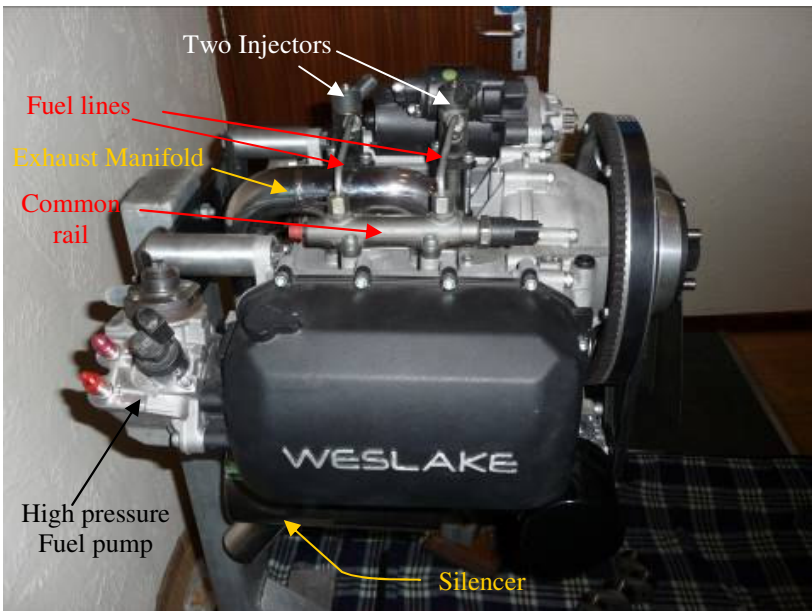
WESLAKE POWERPLANTS PLUS OTHER ENGINES FOR COMPARISON JUNE 2014

ENGINE	Induction Turbocharged / Supercharged	BORE (mm)	STROKE (mm)	CYL	CC	BHP	RPM	RPM (prop)	BMEP	PISTON SPEED (ft/min)	WEIGHT (lbs)	LB/HP
Weslake A-80	Supercharged	74.2	77	2	1,332	80	4000	2500	98	2020	158	1.98
Rotax 912	Normally Aspirated	79.5	61	4	1,211	80	5800	2400	148	2322	138	1.73
Continental IO200	Normally Aspirated	103	98	4	3,280	100	2750	2750	144	1768	220	2.2
DA 100	Supercharged	80	90	2	1,810	100	3300	2450	109	1950	210	2.1
Weslake W-325	Turbo & Sup.	87	92	4	4,375	325	3500	2200	138	2112	429	1.32
Lycoming IO540	Normally Aspirated	130	111	6	8,875	300	2700	2700	163	1968	473	1.58
Jumo 205 E	Supercharged	105	160	6	16,625	700	2500	?	110	2625	1257	1.8
Jumo	Turbo & Sup.	105	160	6	16,625	1000	3000	?	130	3150	1430	1.43
Detroit Diesel	Turbo & Sup.	123	127	6	9,054	370	1800	NA	148	2015	2020	5.45
Napier Deltic	Turbo- compound	130	184	18	88,230	3700	2100	NA	130	2535	15750	4.25
6TD-2	Turbo- compound	120	120	6	16,286	1200	2600	NA	184	2047	2596	2.16
Fairbanks Morse	Turbocharged	206	254	6	102 ltr	2205	900	NA	156	1500		
Sulzer RTA 84	Turbo & Sup.	800	2400	4	1,200 ltr	16120	87	NA	250	1370		



Front view showing large drive pulley for supercharger and starter motor. Starter ring gear is behind the large pulley. Separate belt for the alternator

John with the engine. Belt drive to the supercharger at the front LH lower side



Fuel pump behind the RH crank, common rail and injectors. Top exhaust manifold

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28th March (post March meeting). Fly out to Clacton.
 2nd May (Bank Holiday weekend). Spalding Flower Festival.

30th May (post May Meeting). Isle of Wight – invite Devon Strut.

27th June (post June BBQ). Lee on Solent – hovercraft museum

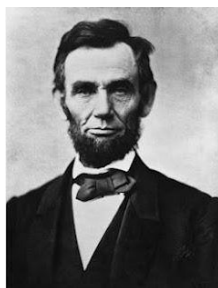
29th Aug (post Aug meeting). Shuttleworth.

27th Sept. Abbeville end of season Lunch.

Other suggestions welcomed—contact any committee member

www.solleysicecream.co.uk

*Now with shop open for Ice cream and free landings. Contact Steve first!
 Steve's number is in left panel*



"Don't believe everything you read on the Internet just because there's a picture with a quote next to it."

—Abraham Lincoln

Dates for your Diary 2015**25th March Southend airspace**

PAFRA - Holiday Inn
 Rochester, 19:30

26th March LAA's Malcolm McBride**30th April Eastchurch:- Bill Croydon****28th May Operation Jericho:-**

Peter Geldard

25th June BBQ Ripple**July meeting is replaced by 1st Aug:-****1st August Sunday Fly-in EGTO****27th August BBQ at Rochester**

< Various Fly-outs are also planned

Depending on weather—look out

for last minute notification!