BEHIND THE LINES

DARREN HARBAR TALKS TO THE SHUTTLEWORTH COLLECTION'S 'DODGE' BAILEY ABOUT THE LYSANDER AND WHY IT WAS IDEAL FOR CLANDESTINE DUTIES

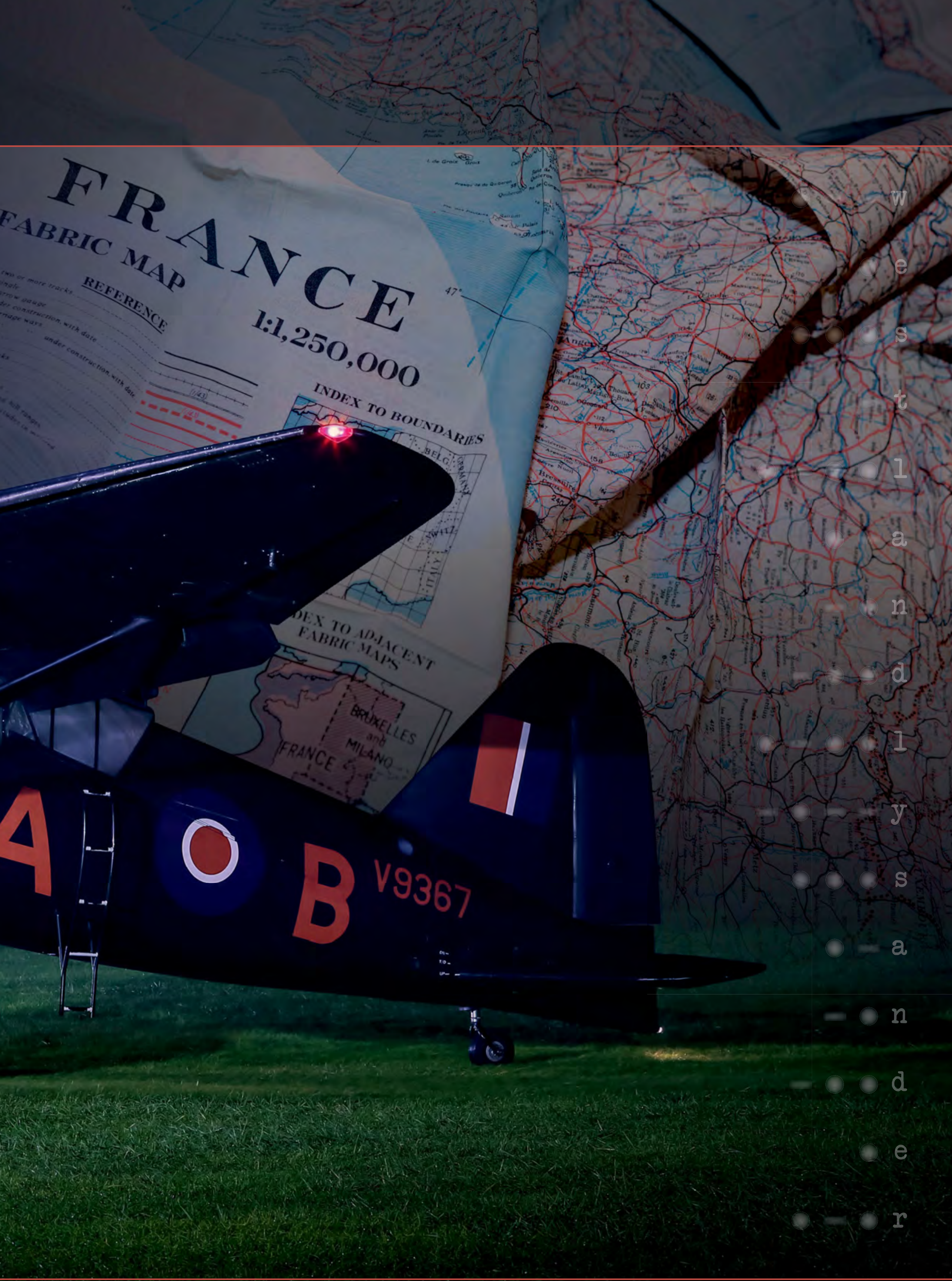
Navigating a Lysander by the full moon into an unknown field marked out with three specially placed lights, required a very special skill. For the pilots of 161 Squadron this was a standard procedure, enabling them to deliver and recover agents and equipment into occupied France.

The agents were 'run' by the Special Operations Executive (SOE). These men and women were 'on the ground' communicating strategic information obtained about enemy forces to the intelligence services in London; others taught the French underground fighters. Agents were highly trained in a variety of skills including code reading and encryption, evasion and sabotage techniques.

BREAKING THE MOULD

Although the Royal Air Force was formed as an independent air arm in 1918 a great proportion of its work was in direct support of the

Below right
An atmospheric nocturnal view of the Shuttleworth Collection's Westland Lysander 'V9367'. ALL DARREN HARBAR UNLESS NOTED


FRANCE
FABRIC MAP
REFERENCE
1:1,250,000
INDEX TO BOUNDARIES
DEX TO ADJACENT
FABRIC MAPS
BRUXELLES
and
MILANO
FRANCE
A
B
V9367
Westland Lysander

Above right
The 150-gallon fuel tank as fitted to SD Lysanders.

Right
The Lysander's cockpit.

Right centre
Side access ladder.

army. Throughout the 1920s and 1930s there was a constant need for specialised army co-operation aircraft, and from 1931 the bulk of the role fell to the Hawker Audax biplane, followed in 1937 by the Hector, a much-developed version along the same theme. However, the Hector's career was to be short-lived.

The Air Ministry issued Specification A39/34 for a Hector replacement and Westland put forward a radical solution, the P.8. This entered production as the Lysander, named after a 4th Century BC Spartan military commander.

One of the best known survivors of the type is based at Old Warden, Bedfordshire, with the Shuttleworth Collection. Chief pilot 'Dodge' Bailey knows a thing or two about the type's handling and can compare its operational use with a more modern platform.

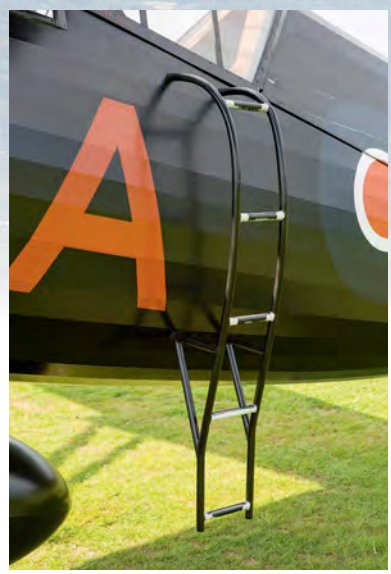
Dodge: "Chief designer [W E] Petter at Westlands took pains to consult with current army co-operation pilots before embarking on the design of the P.8. He must have decided that the days of the biplane were over – his new aircraft would do everything a biplane could in terms of low-speed flight and off–field landings, but it would be cleaner and faster.

"So his design provided a robust fixed landing gear for off-airfield landings, but aerodynamically spatted so as not to compromise unduly his desire for speed. Its crew were seated in large glazed cockpits with the wing planform chosen to maximise the fields of view of both

pilot and observer. The provision for a vertical camera was built in to the rear fuselage, and a retractable [message] pick-up hook fitted.

"To maximise downward field of view the design incorporated a high parasol wing, which was too far from the ground for easy re-arming. This led to the addition of stub wings being fitted to the landing gear legs to carry supply canisters or light bombs.

"Finally, the pilot had forward-firing machine guns mounted in each landing gear spat, firing outside the propeller arc, and defensive armament was fitted in the rear cockpit. Westland had in effect designed the perfect aircraft to support a second round of World War One, but the new war was to be a very different affair."



IDEAL CHOICE

First flown on June 15, 1936 Lysanders entered service from May 1938 and performed well in the Battle of France. Following the Dunkirk evacuation, the traditional army co-operation role in the west had gone and British-based Lysanders were given other, supporting roles.

When a requirement for an aircraft to carry out clandestine landings in occupied Europe came about, the Lysander's special capabilities and its availability made it an ideal choice.

Dodge continues: "The Lysander possessed the ability to operate off semi-prepared fields and had an outstanding downwards view to aid navigation, but it was essentially a short-range aircraft. The fuel capacity of a standard Lysander was 95 gallons which gave a maximum range of little more than 300 miles at cruise power. This was inadequate given that there would be no refuel possible during the turn-around in France.

"To adapt it for this new role a special contract was issued to Westland. The resulting modification included a 150-gallon fuel tank carried under the fuselage and an external fixed ladder to facilitate rapid passenger changeovers." [As such it was designated Lysander III (SD) – special duties.]

"While these excrescences increased overall drag, the extra fuel capacity gave a range of around 1,000 miles giving the capability to fly from the south coast of England down as far as Lyon and return. Although this represents the maximum range with a three-hour flight each way, the majority were somewhat shorter with between 1½ and 2½ hour legs being more typical."

DEAD RECKONING

"Giving the aircraft the physical capability to reach a landing site somewhere in occupied France was one thing – finding the place at night was another! In order to avoid destruction by flak or fighters these clandestine operations into occupied Europe had to be conducted during the hours of darkness and, to facilitate visual navigation, during periods of good moonlight.

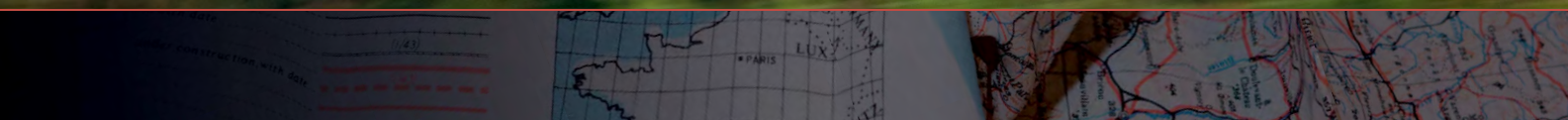
"Its secret agent 'cargo' was carried in the observer's cockpit, so of necessity the navigation task fell to the pilot as the sole crew member.

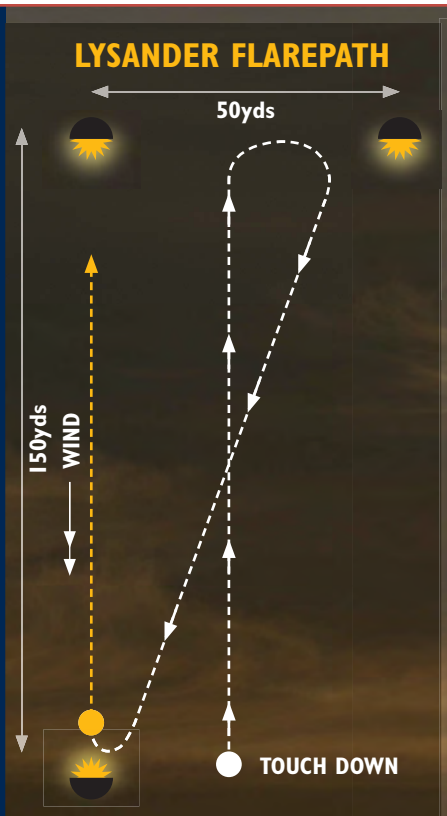
Since there was no

Above
Shuttleworth's Lysander represents a machine used during World War Two by 161 Squadron.

Below
Based at Old Warden, 'V9367' flies as a tribute to all who operated the type.

"Giving the aircraft the physical capability to reach a landing site somewhere in occupied France was one thing – finding the place at night was another!"





Right
Diagram of the L-shaped flarepath and how the Lysander would touch down, return and turn ready for quick departure.

SOE OPERATIONS

autopilot, the pilot hand-flew the aircraft throughout – navigating to find a specific landing site, which might be a disused airfield but more likely was simply a farmer's field deemed suitable for the purpose.

"There were no on-board radio aids to navigation at that time, so a technique known as 'deduced, or dead, reckoning' – DR – was universally adopted. This method worked on the principle of vectors: if any two vectors are known the third can be established – hence deduced reckoning.

"In normal practice, a flight sets off on a heading calculated to reach the turning point or destination, and an appropriate airspeed is maintained until the estimated time of arrival. If the airspeed indicator and compass are accurate, the pilot flies the speed and heading accurately and if the wind is exactly as forecast, the aircraft will reach the point after the appropriate elapsed time.

"But in the real world inaccuracies creep in, with the most significant, usually the wind, being other than as forecast. However, all is not lost. Provided the errors are not too great, the point may be seen and the error assessed and a correction made for the next sector to improve the accuracy. So, providing good fixes are obtained at suitable intervals, there is a very good chance of arriving at the destination in due course.

"While this method is normally practised by a trained navigator working on a plotting table, it works too for the single pilot, provided as much precomputation as possible is done before the flight and provided suitable pinpoints are selected and subsequently seen."

VITAL FIRST FIX

"In the case of the special duties Lysander operations, the pilots would be given the location and usually a reconnaissance photograph of the landing site. They would then select a suitable number of unmistakable pinpoints on the way.

"On moonlit nights, water features show up quite clearly, as do areas of woodland. Towns may be harder to see if blacked out, while roads and railways should not be relied upon as they may not be discernible. Typically, a unique feature on the north coast of France would be chosen as the first fix. The pilot could be assisted in finding this point by requesting a bearing from a friendly DF [Direction Finding] station directly behind the aircraft.

"In any event it was vital that this first fix was seen and accurately overflown if the rest of the flight plan was to work efficiently. The pilot would fly directly over the initial fix on the heading for the second fix and when precisely overhead he would note the time and, in all probability, start the stopwatch.

"He would have marked on the map the track line, chosen to avoid defended areas, and along that marked track he would have made additional marks at intervals of, say, five minutes. By this means he could estimate an approximate position along the track by reference to the stopwatch and the time elapsed since his last fix position.

"The second fix would be chosen so as to be easy to spot from the air, hard to miss – these requirements being best served by features on a major river. For aircraft proceeding down to the unoccupied zone the Loire River offered the best choice of fixes.

"As the hands of the stopwatch indicated that the second fix was approaching the pilot would search ahead to spot it and verify that he had the correct point by trying to identify three unique characteristics associated with the fix; perhaps a river confluence, and a nearby island with a bridge over.

"Once certain of his position, the pilot would use the same procedure as at the first fix – fly right overhead on the next heading and start the watch. If, however, the pilot noticed that the aircraft was off the planned track, he might choose to maintain the heading until abeam the fix and then estimate how big the error was. Armed with this, he could make an adjustment for the next leg which hopefully might cancel out the original error."

SHUTTLEWORTH'S LYSANDER

Built in Canada in 1942 as a Mk.IIIa, the Old Warden Lysander served the Royal Canadian Air Force as a target tug before being sold into private hands in August 1946. The Lysander was imported into the UK in a far from airworthy state in October 1971 when it joined the Strathallan Collection at Auchterarder, Scotland. Registered as G-AZWT, it first flew following restoration on December 14, 1979.

In 1998, Shuttleworth purchased the aircraft and it was ferried to Duxford on October 12, 1997 for another period of restoration. It was delivered to Old Warden in 2001 and has remained based there ever since.

Currently marked as 'V9367', it represents the Lysander flown by Peter Vaughan-Fowler of 161 Squadron in 1942, based at Tempsford, just a short distance down the road from the home of the Shuttleworth Collection. It sports a replica long-range fuel tank and side access ladder as fitted to an SD aircraft. www.shuttleworth.org

Centre left
Aerial reconnaissance map of a landing strip, taken by a PR Spitfire of the Benson-based 541 Squadron in October 1943. Hand-written notes highlight a dry river bed and other potential obstructions.
SHUTTLEWORTH COLLECTION

Left
Located under the fuselage of the Lysander, the red identification light was used to transmit a Morse code letter to the agents on the ground.

RECEPTION COMMITTEE

"Typically, the leg following would lead to the feature from which the pilot would set out to find the field. The feature had to be easy to find and identify, and not too far from the final destination.

"Once there, the pilot would have prepared a large-scale map for the final leg to the landing site. As before he would accurately overfly the fix and start the watch. Proceeding on his precomputed heading and with an eye on the stopwatch he would know that the reception committee on the ground would hear an engine but could not know whether the aircraft was friend or foe.

"As the ETA [estimated time of arrival] for the field approached, the pilot would use the downward identification lamp to send a pre-arranged letter in Morse code – say, R – dot dash dot – which he would repeat.

"The ground party would know what letter to expect and if it was correct, they would signal by hand torch a second letter back up to the aircraft. If the response was as anticipated, the pilot would set up his landing circuit.

"On the ground, three torches would be turned on which constituted the landing lights. These were arranged at the corners of an inverted 'L' with the shorter bar of the inverted letter always pointing into wind. [See the diagram.] This gave the pilot the wind direction for landing and ensured that the take-off was into wind.

"The pilot flew his approach to touch down abeam the light at the end of the long arm and aimed to steer between the two lights forming the short arm of the 'L'. Once slowed down, he would taxi back to the first light, turn back in line with the flare path and prepare for an immediate take-off.

"When his self-loading payload was on board, he would be given a

Above
Pilots of 161 Squadron at Tangmere in 1943. Left to right: 'Jimmy' McCairns, Hugh Verity (author of the exceptional We Landed by Moonlight*) Percy Pickard, Peter Vaughan-Fowler (the Shuttleworth aircraft is painted as his aircraft) and 'Bunny' Rymills.*
SHUTTLEWORTH COLLECTION

"Pilots selected for SD Lysanders were required to practise night navigation until they were proficient and confident in their own ability"

Above right
Westland Lysander 'V9367' at night.

signal from the chief of the reception party and would take off without further delay. A typical turnaround time was three minutes. Once airborne he faced the same navigation task to get home but he could at least call on the radio for some assistance when he was over the English Channel."

TURNING BACK

"Pilots selected for SD Lysanders were required to practise night navigation until they were proficient and confident in their own ability. A certain target was given to them to find at night somewhere in the occupied zone and only those pilots who not only found it but could describe accurately what the objective was would become 'operational'.

"Of course, things only rarely went precisely to plan, sometimes the ground was obscured by fog or the aircraft was in cloud and unable to obtain a visual fix. In such circumstance, the pilots usually carried on with the DR principle and turned onto the next planned heading at the ETA, hoping that a break in the cloud or fog would allow them to find themselves.

"Sometimes this method worked, but with some, the cloud never cleared. After stooging about over where they thought the landing site was – looking for breaks – they eventually would have to set course for home while they had sufficient fuel to do so."

LONG WALK HOME

"That is how they navigated but what of the night landing itself? The designers of the Lysander envisaged it landing on rough surfaces, and of course, nocturnal landings can be somewhat harder arrivals due to the lack of cues to judge height and rate of descent. Therefore, the robust nature of the landing gear was ideal for this role.

"The field of view from the pilot's cockpit – much better than for other single engine aircraft of the era – meant that the pilot could not only keep the landing torches in view throughout the circuit, but also throughout the approach.

"The Lysander was also equipped with a powerful landing light in each spat and these were used briefly on the final approach and touchdown. The consequences of the pilot damaging the aircraft during the landing were serious, as it was a long walk home.

"New pilots had to practise night landings at Tempsford [Bedfordshire] and other nearby landing grounds such as Somersham until they were proficient. This was not easy because the unique high-lift devices fitted to enable low-speed flight gave the aircraft unfamiliar handling characteristics that pilots of the time would find strange and challenging.

"Although the Lysander can fly slowly, about as slowly as a biplane of similar weight, if it's flown a bit *too* slowly, control of the flightpath is lost. A number of pilots lost their lives by pushing these limits a little too far."

LIVING TRIBUTE

To conclude, 'Dodge' offered a modern comparison: "I used to fly [Lockheed] Hercules in the RAF and had some experience of landing on disused airfields and unprepared surfaces for relief flights into the desert. Many of the techniques used in Lysander operations were employed in the Hercules, but I had a navigator and Doppler radar to help me.

"Having flown the Lysander, I have so much respect for the skills these pilots had. It is possible for a modern pilot to get some idea of what it must have been like for the SD squadrons by making short landings, perhaps turning off the GPS and navigating by DR.

"We now have excellent weather information meaning we don't often have to deal with the likes of unexpected icing or fog, and we can get more accurate wind forecasts. We certainly don't have to consider the possibility of being shot down by friendly fire crossing the Channel, or less friendly fire from anti-aircraft defences or night fighters.

"We don't have to land in a field we have never seen before, with just three torches guiding us in. Nor do we have to live with the possibility of being captured on landing and treated perhaps as a spy or saboteur rather than a regular prisoner of war.

"The preservation of an airworthy Lysander in the colours of the special duties squadrons is a living tribute to those courageous men and the even braver men and women that they carried into extreme danger."