

# GRANDFATHER OF FLIGHT SIMULATION - THE LINK TRAINER

by Astri Fernando


The art of flying has evolved from wood and fabric contraptions held together by cables to carbon composite and titanium alloy marvels controlled by complex avionics. A century of aviation has seen the invention of many types of machines and craft, most of which have become obsolete. The survivors of such obsolete machines are carefully preserved by historians at many museums world wide. The Sri Lanka Air Force Museum at the Ratmalana Air Force Base is a treasure trove of knowledge. It offers a unique insight to aviation in Sri Lanka which no other organization offers. Amongst her many historic exhibits stands the first flight simulation system brought to Sri Lanka decades ago.

When the First World War broke out a need for ground based pilot training was felt by the military establishments of the warring parties. The subsequent years saw several attempts to build devices which could simulate instrument flying techniques. These efforts culminated in the invention of the "Link Trainer" in 1926 by Mr. Edwin Albert Link. The Link Trainer was widely used by many of the allied air forces during World War II. It helped to train thousands of pilots and navigators needed to wage the 'air war' which brought the axis powers to its knees.

The trainer was built of a system of pumps, valves and bellows which responded to the pilot's controls. Mr. Link had used his extensive knowledge in organ manufacturing to connect a motor to the trainer and mount it on a pedestal giving the pilot a range of motion. A student pilot could 'pilot' the trainer to pitch, dive, roll and climb. In training he relied on the instruments in the cockpit to 'fly' the device. The instrument readings in the cockpit are reflected to an instructor outside who guides the student to navigate a given flight path. Another important feature was the fact that the actual flight path the student navigates was 'drawn' on a map by a mechanical apparatus.

In early 1963 the Royal Ceylon Air Force had procured a variant of the Link Trainer (D4) from Air Trainers Ltd of United Kingdom. Air Trainers Ltd manufactured several versions of the link trainer under license from Link Aviation Devices Inc. The Trainer had rendered valuable service to the fledging air force in training many of her early pilots. It had been phased out of service in late 1980. After being withdrawn from service the trainer gradually fell in to disrepair. In 1982 attempts were made to repair the trainer. A team made up of Air Force engineers and specialists from the University of Moratuwa attempted to service and extend the operation life of the trainer. Their analysis deemed the device beyond economical repair. With the passing of time the operators who manned the trainer and knew its functions left the Air Force and with them the operational knowledge of it was lost. For the next 27 years the Link Trainer was lost in the maze of storage at the Aircraft Preservation and Storage Unit (APSU) within the Ratmalana Air Base.



The background image shows a large, blue and yellow Link Trainer simulator in a museum hangar. Several Air Force personnel in white uniforms are visible, some standing near the simulator and others in the background. The simulator has a cockpit-like structure with a yellow seat and various control panels.

During an annual inspection of the APSU the preset Commander of the Air Force had observed the Link Trainer and recalled memories of its function during the 1970's. Having inquired in to the serviceability of it, he had explained his childhood experience with the device and knew firsthand the valuable service it has rendered. Air Chief Marshal Goonathilake had taken a keen interest in the Trainer and directed the Commanding officer Wing Commander Malinda Perera of the Air Force Museum to attempt to restore it to operational condition.

In august 2009 the Air Force Museum commissioned a team lead by Flight Lieutenant TNP De Silva and comprising of Flight Sergeant Senarathne and Corporal Hemantha to study the mothballed Trainer and restore it. The first obstacle was to find relevant information of the D4 model. Faced with a lack of manuals and technical details the team resorted to searching on the World Wide Web for instructions and diagrams on the Link Trainer. Help came in the form of scanned pages of a Link Trainer manual from an aviation expert Mr.Ray Kidd at the Norfolk and Suffolk Aviation Museum England. The team had already repaired the three phased motor and set about substituting local 'Rexene' fabric to remake the torn bellows. The team communicated with Mr.Kidd throughout the restoration project and were encouraged by his guidance and assistance.

After a short study of the manual received from UK, the electrical system was restored and instruments recalibrated. Within weeks the Trainer was pitching and yawing on its pedestal. The second stage saw the original sensing mechanism based on "Teletorque". system duplicated on the simulator. This device was a unique mechanism which made the Link Trainer more interesting. By the end of October work on the exterior had begun and a new coat of paint brought back the Trainer its pride. After the final touches were made the Link Trainer was ready for her grand re-entrance to the Air Force museum. Few weeks later the President H.E. Rajapaksha opened the refurbished Air Force Museum and the Link Trainer caught his attention in the No.2 hanger. The restoration team leader and Commanding Officer of the museum were on hand to brief the President and invitees the history, role and function of the Trainer.

Today the Link Trainer D4, one of the few operational ones left in the world is exhibited at the No.2 hanger of the Air Force Museum. It stands as a testament to the skill and dedication of the men and women who serve in the Sri Lanka Air Force today.

The museum, the only one of its kind in the Island is open to the public from 9.00am to 4.00pm from Tuesday to Saturday. More information on the Air Force Museum is available at [http://:museum.airforce.lk](http://museum.airforce.lk) or on [www.airforce.lk](http://www.airforce.lk).