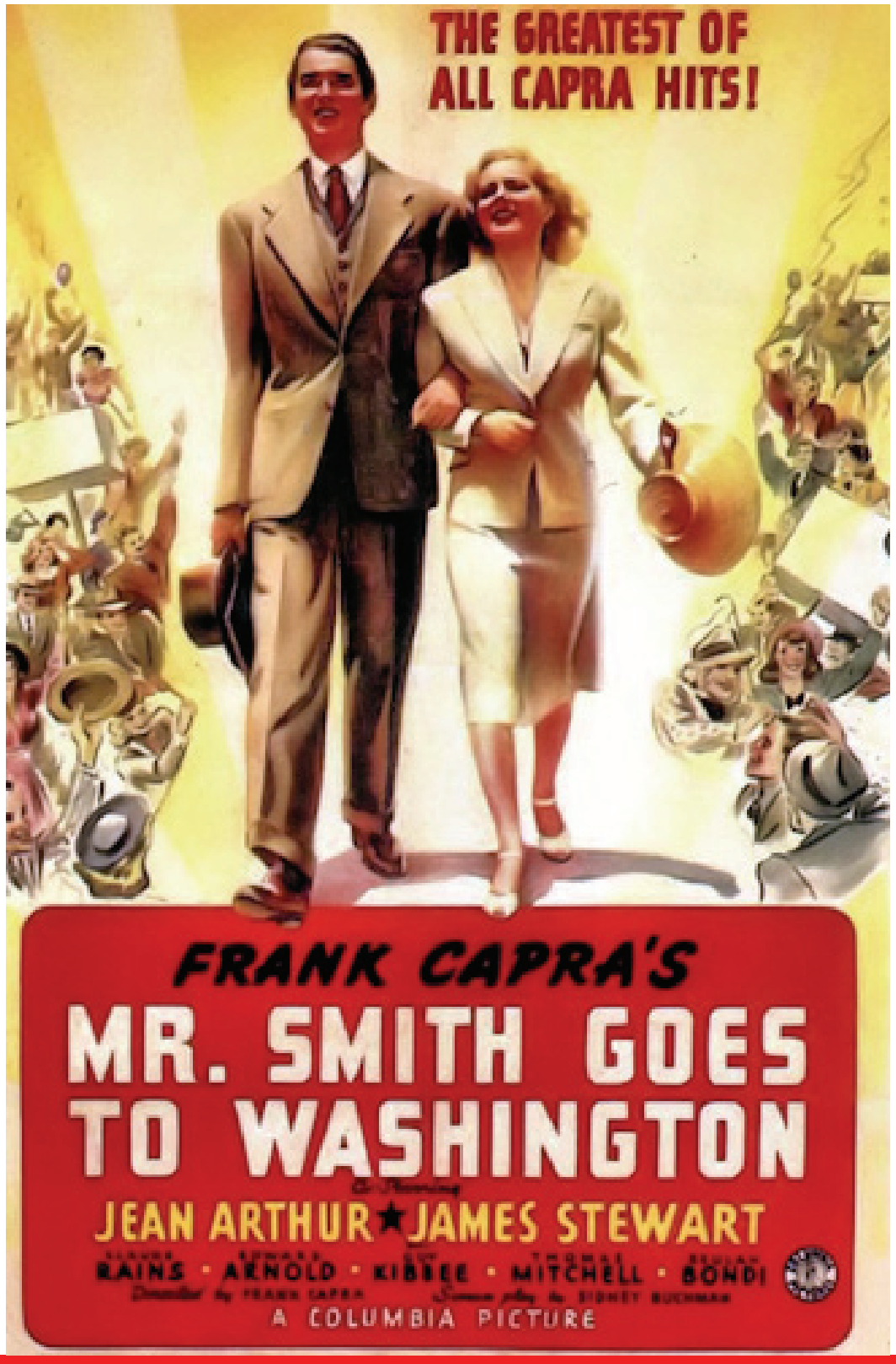
The Times

April 2013

A journal of transport timetable history and analysis



Inside: Riding the Great Circle route to DC

What's in a name ?(3)- Cherrybrook

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The Times

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On the front cover

Jimmy Stewart strides into the Capitol. He got there by train, but now his successors fly on closely-watched planes.

When Mr. Smith went to Washington, he went by train (right). The photo, a still from the film, shows a streamlined PRR K4 Pacific loco hustling Jimmy Stewart towards the Capitol. But, even then, Bob Dylan was singing:

> *Come senators, congressmen, Please heed the call*
> *Don't stand in the doorway, Don't block up the hall*
> *For he that gets hurt, Will be he who has stalled*
> *There's a battle outside, And it is ragin'*
> *It'll soon shake your windows, And rattle your walls*
> *For the times they are a-changin'.*

They certainly were. Jimmy Stewart was probably the last Senator to catch a train to Washington. They all fly now, as do many people "inside the Beltway". In this issue, we look at how a Sydney-Washington trip panned out for AATTC's Deputy Production Manager and ex-politician, Dr Judy Lambert.

Contributors Geoff Lambert, Robert Henderson

The Times welcomes articles and letters. Send paper manuscripts or word-processor files on disk or via e-mail to the editor at the address below. Illustrations should be submitted as clean sharp photocopies on white paper or scanned GIF or TIF format images with at least 300 dpi resolution on disk or via e-mail.

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A trip to Washington

GEOFF LAMBERT

JB's Trip

				Timetable				Timetable				ElapsedTime		
Airline	Flight #	From	Gate	Scheduled	Actual	Difference	To	Gate	Scheduled	Actual	Difference	Scheduled	Actual	Difference
Qantas	QFA007	YSSY	8	15:40	16:00	0:20	KDFW	TermD	12:56	13:45	0:49	14:16	14:45	0:29
American	AAL2270	KDFW	D40	17:10	17:30	0:20	KDCA	28	20:22	20:30	0:08	2:12	2:00	0:12

Kingsford-Smith airport, with Gate 8 at Terminal 1 highlighted by the magenta spot

No, this wasn't *Mr Smith*—AATTC's esteemed Secretary—who went to Washington. Rather it was Dr Judy Lambert, (aka "JB"), *ex-officio* Deputy Production Manager. Very definitely a flying visit, which her husband (that's me folks) watched from the comfort of a work-station.

The data in this article was accessed from a web-site called "Flight Aware"
(http://flightaware.com/)
which describes itself thus:

[Founded in 2005, Flight Aware] *was the first company to offer free flight tracking services for both private and commercial air traffic in the United States and quickly rose to become the most popular flight tracking service in the country.*

Flight Aware currently provides private aviation flight tracking in over 45 countries across North America, Europe, and Oceania, as well as global solutions for aircraft with datalink (satellite/VHF) via every major provider, including ARINC, Honeywell GDC, Satcom Direct, and UVdatalink. Flight Aware also continues to lead the industry in free, worldwide airline flight tracking and airport status for air travelers.

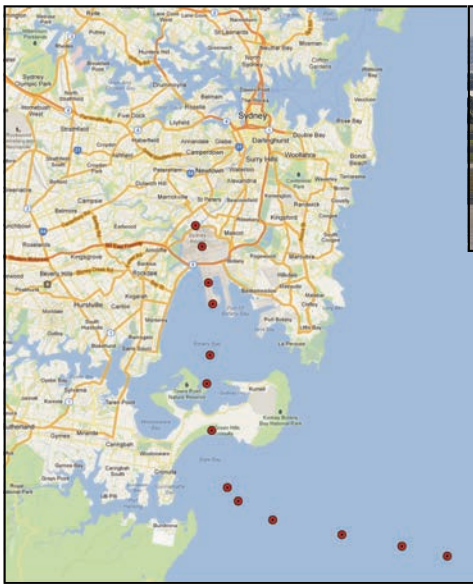
FlightAware's seamless integration of over 50 real-time, worldwide data sources combined with FlightAware's powerful, intuitive, responsive, and reliable web-based interface yield the most capable and useful flight tracking application and service.

The flights which Judy used are known to the public as Qantas' QF7 and American Airlines' AA2270. The "routing" was Sydney (SYD)— Dallas-Fort Worth (DFW) — Washington (Reagan Airport, DCA). The codes used in these descriptions are the IATA (International Air Transport Association) codes. These are what passengers see on their tickets and in the timetable, but they are not the codes used for air navigation. The latter are ICAO (International Civil Aviation Organisation codes). These are the codes that show up on air traffic control radars– and on "Flight Aware". Such codes are generally one character longer than the IATA codes and are at least partly based on early conventions of coding radio call signs. The table at the head of this page uses them. QFA7 is the third longest 747 flight on the planet.

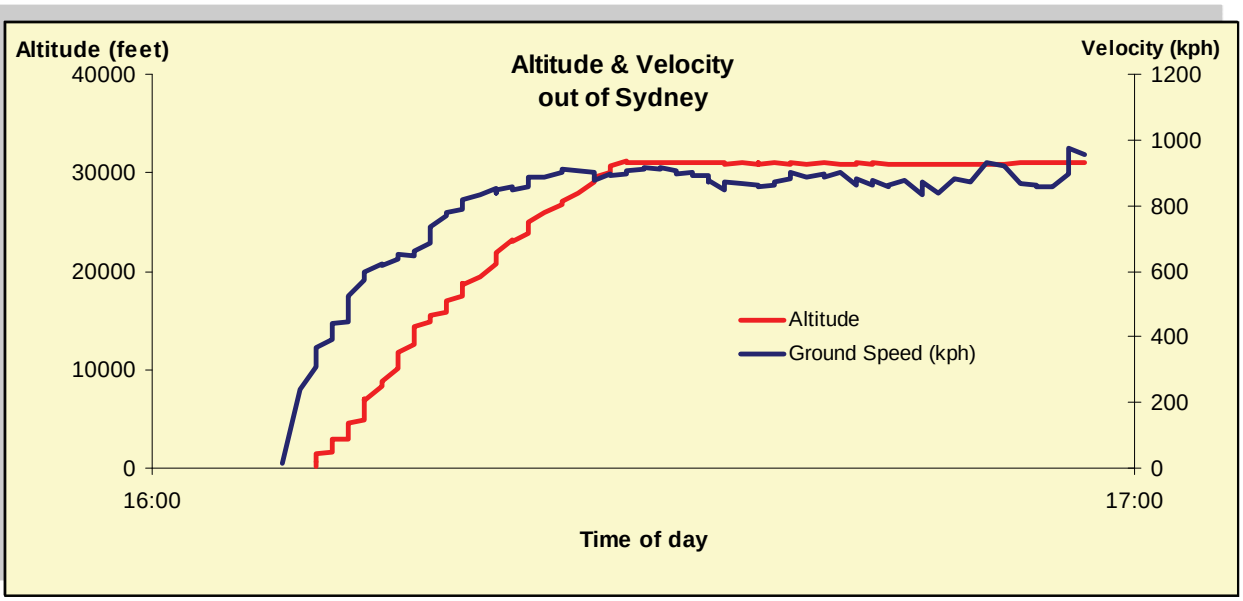
Take-off

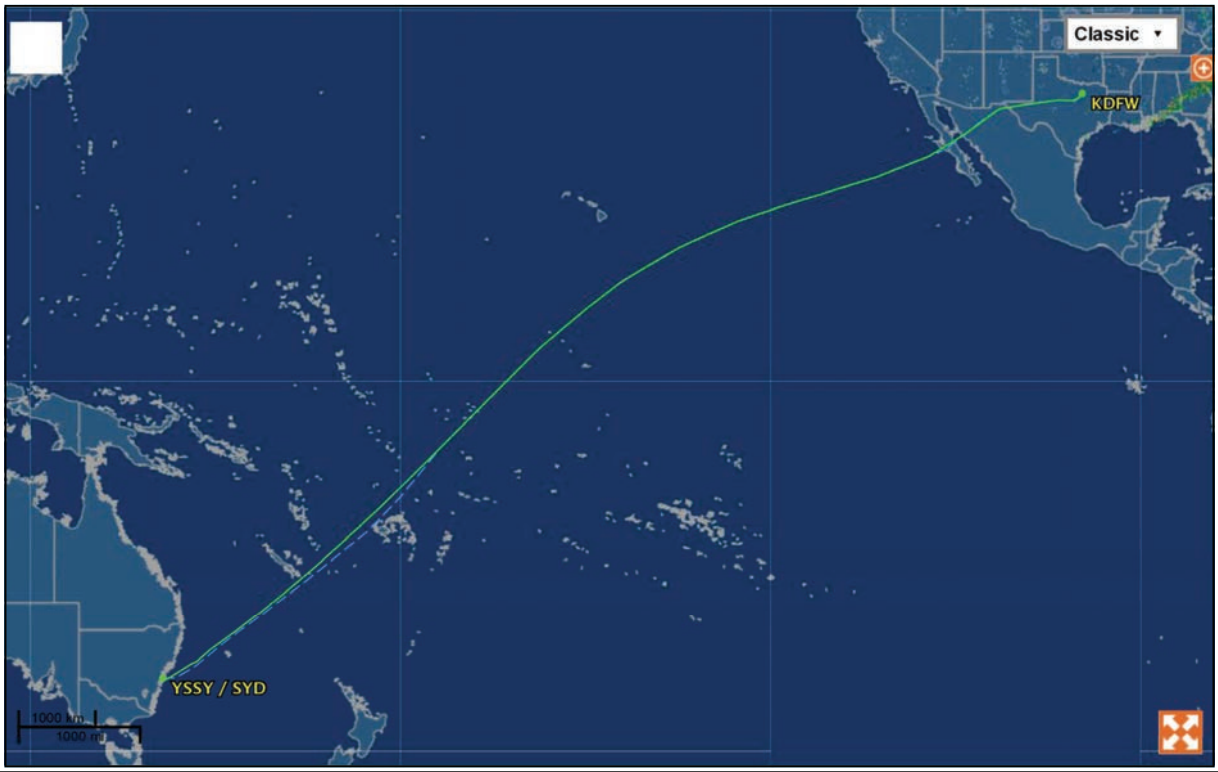
Judy's flight started, naturally enough, at Sydney's Kingsford Smith airport on Friday 22nd February. This was the start of a rather wild and wet weekend on the East Coast and a strong southerly wind was blowing. Take-off was thus down the old North-South runway into this wind. The plane made a slight veer to the west and, after passing Cronulla, made a slow, almost 150 degree turn to make a "bee-line" for Dallas. The take-off plot below was made by copying the flight path table (like that on page 8) into an Excel spreadsheet and converting the latitude and longitude numbers to Google Earth format (.kml). Flight Aware can itself provide kml files for each flight, but their maps are hard to read. The kml files can be used to plot direct onto Google Earth's imagery (as on

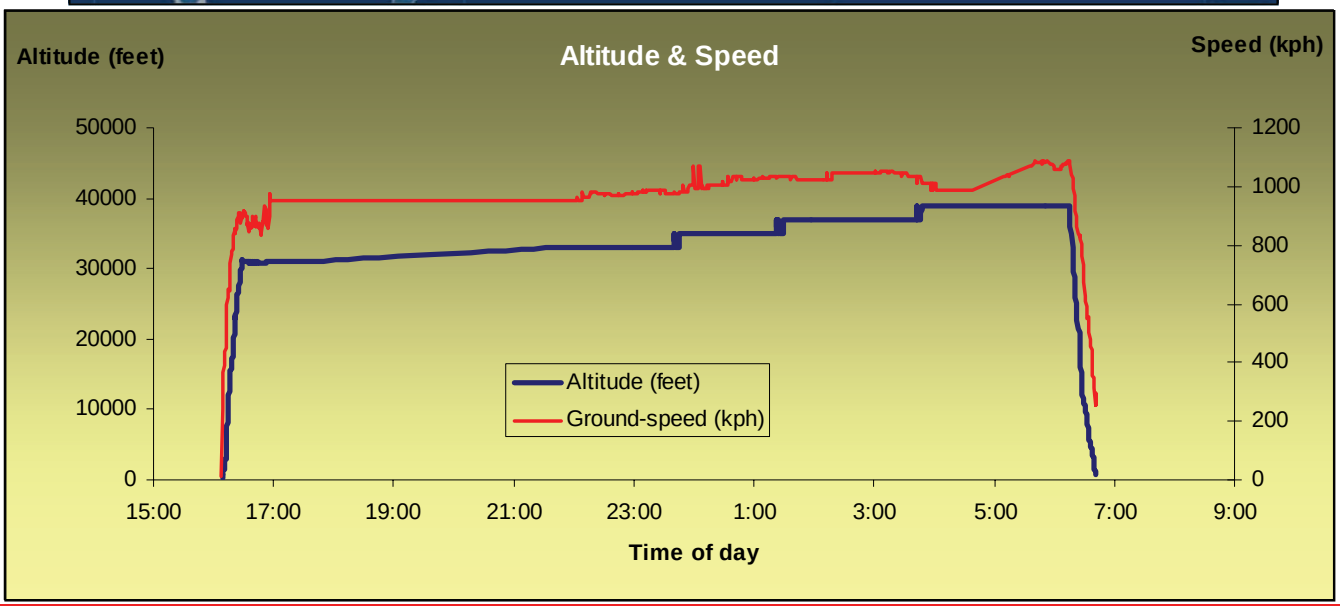
(Continued on page 5)



(Above) QFA007 on an earlier flight and;
(Below left) the take-off flight path it took on 22-Feb-2013


Altitude (feet)
Altitude & Velocity
out of Sydney
Velocity (kph)
40000
30000
20000
10000
0
1200
1000
800
600
400
200
0
Altitude
Ground Speed (kph)
16:00
17:00
Time of day


Classic
KDFW
YSSY / SYD


Altitude (feet)
Altitude & Speed
Speed (kph)
50000
40000
30000
20000
10000
0
1200
1000
800
600
400
200
0
Altitude (feet)
Ground-speed (kph)
15:00
17:00
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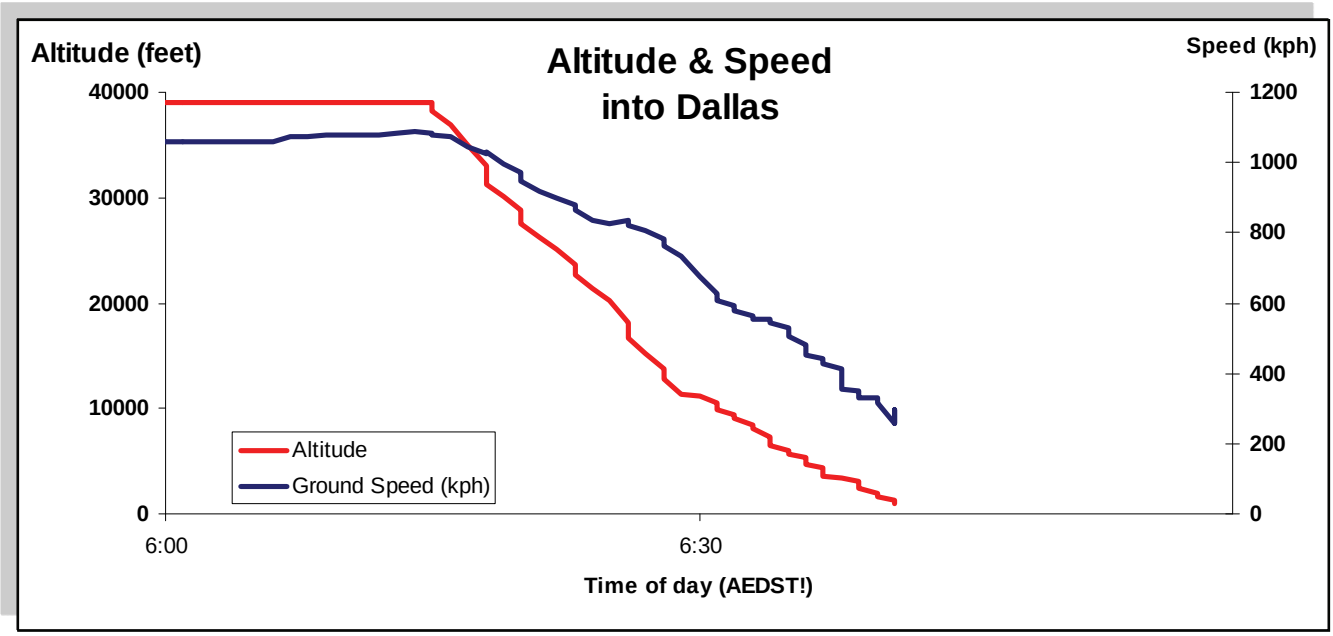
21:00
23:00
1:00
3:00
5:00
7:00
9:00
Time of day



the landing plots for Dallas and Washington) or they can be further imported into Google Maps, as was done for the take-off.

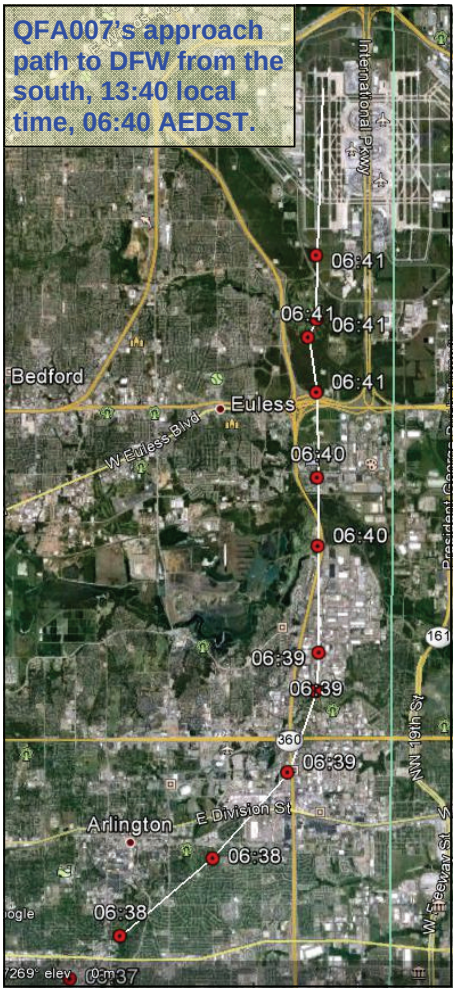
Climb to cruise phase

It was a slightly bumpy ride up to 40,000 feet as the 747 battled wind-shear associated with the storm. There was somewhat of a gusty head wind at higher altitude and the speed & altiude path (top chart on page 4) shows its effects. Flight Aware used a number of sources to piece together this information and this also creates a few wobbles– especially in the reported bearings. The last time I took this flight—in similar weather— the seat-belt sign was not turned off for 4 hours.

Cruise

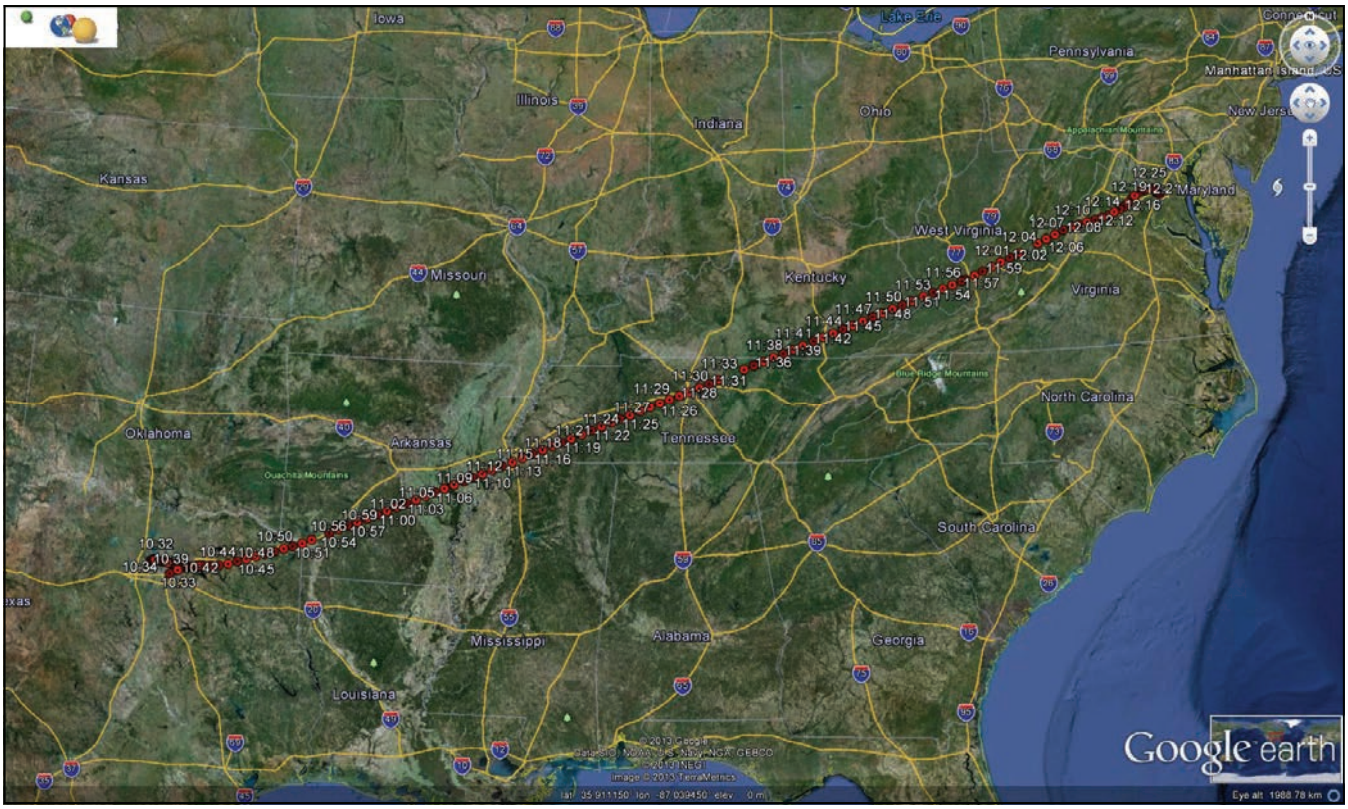
For the journey "up" to the equator a lot of the "waypoints" were interpolated by Flight Aware. This resulted in a few anomalies in the tabular data at the "seams" between one data source and the other. Flight Aware's track map (middle chart on page 4) somehow smooths away these anomalies.

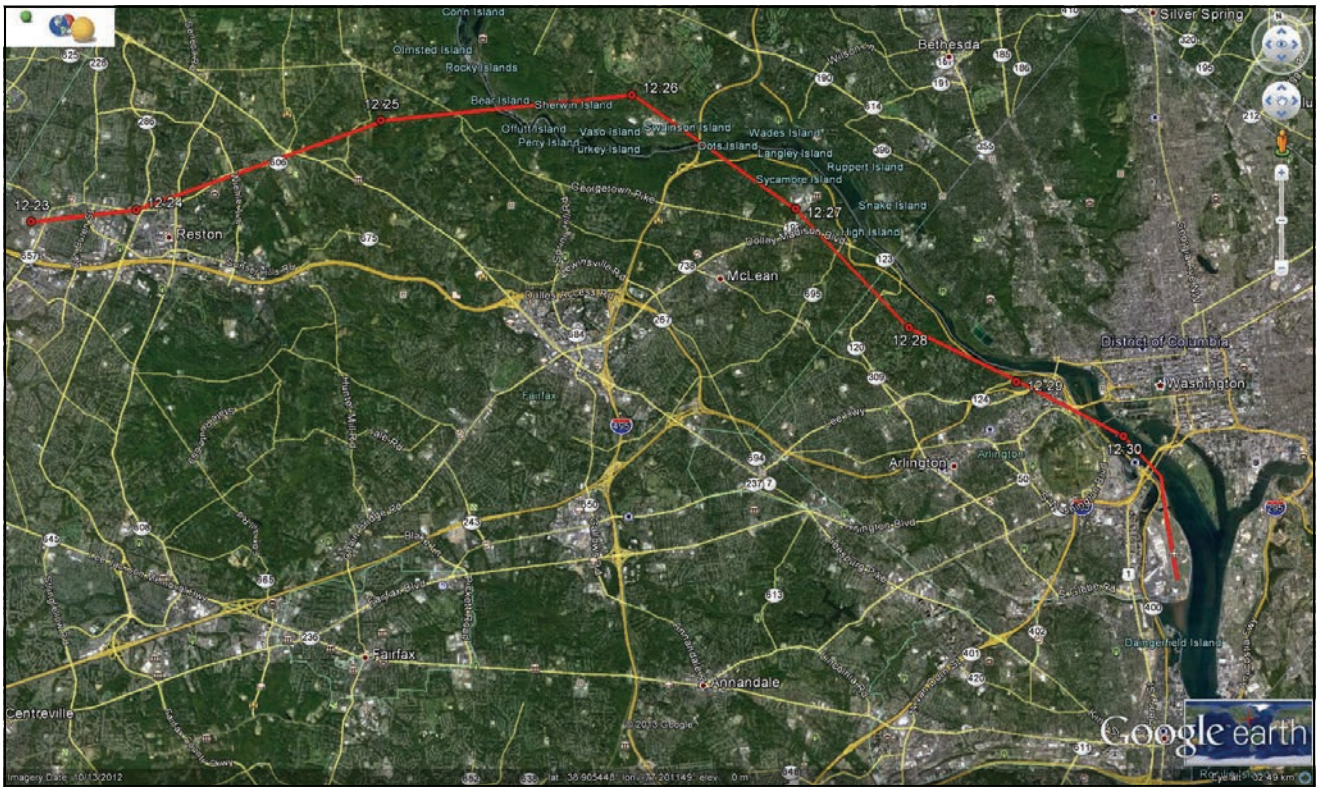
Although I used the term "beeline" for QFA7, this chart is not a straight line. Planes follow a Great Circle line, or geo-



QFA007's approach path to DFW from the south, 13:40 local time, 06:40 AEDST.

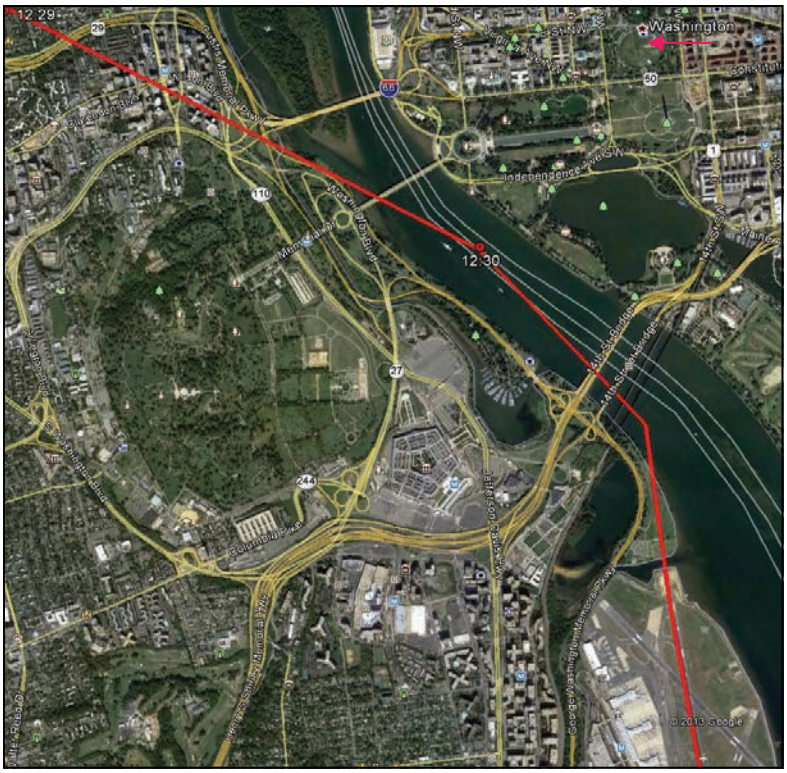
Dallas-Fort Worth (KDFW) airport, with Gate D40 in Terminal D highlighted by the magenta spot.



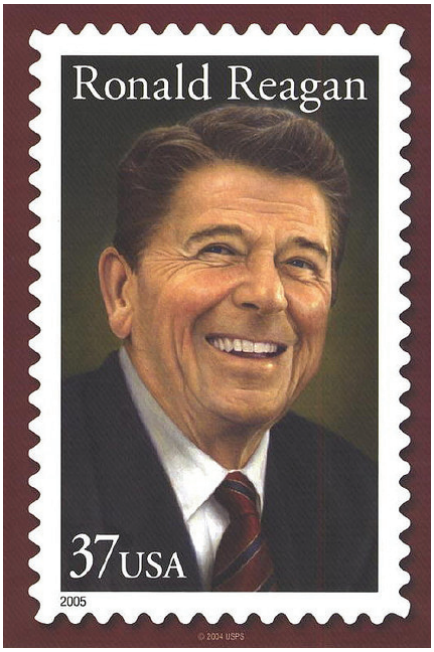


desic, because this is the shortest distance between two points on a curved 2-dimensional surface (or any surface). Such curved lines are familiar to anyone who has watched NASA TV's coverage of the Shuttle and International Space Station. Airline maps always show curved lines– but this is just an artistic convenience.

Google Earth and Google Maps use a *Spherical Mercator* Projection of the 3 dimensional Earth onto a 2-dimensional piece of paper. Mercator, a 16th Century map-maker, devised this projection to simplify navigation for mariners. The projection has the property that a straight line connecting two points on the map is a line of constant bearing– a *loxodrome* or *rhumb line*. A ship that sails along a loxodrome will reach its desired destination ultimately, but it will not be the shortest distance. The Trans Australia Railway on its long "straight" section was built along a loxodrome and so is not "straight" at all in the sense of being the shortest distance between two points. If QF7 followed a loxodrome to Dallas, it would travel at a constant bearing of 57 degrees 51.5 minutes and travel a distance of 13,924 km. By travelling on a Great Circle Route, with a bearing varying between 60.9 (@Sydney) and 61.2 (@Dallas) degrees Qantas would



How QF7 approached Washington's Reagan Airport. Planes are not allowed to fly over the White House (arrow), so must make a last-minute turn to line up the runway. Just short of touch-down the flight passed close to the Pentagon. Bottom left– Ronnie– the airport's namesake.



save about 120 km or 8 minutes flying time. That doesn't sound like much to a passenger on a 15 hour flight, but it can be crucial for fuel consumption and finding a landing slot. On a recent Los Angeles—Sydney flight, our plane had to divert to Auckland because it deviated from a Great Circle route to counter a strong headwind and did not have a sufficient fuel margin to reach Sydney. For QFA007, bearings across the bulk of the Pacific ranged from 68° out of Sydney, through 45° at the equator to 75° approaching land. The changes were not done in a continuous manner but, rather, in a series of incremental steps. Prior to the equator, these are not visible because most of this data was interpolated by Flight Aware. After the equator these occurred every half an hour. Thus, the plane flew a large number of successive loxodromes to approximate the desired Great Circle.

Along this route the path of a Great Circle doesn't upset too many preconceptions. Even I was surprised, however, that my New Delhi—Sydney flight flew over the Great Australian Bight.

At 19:43 Sydney time, the lucky sods whose birthday it was, had their birthdays extended by another 17 hours, as the plane crossed the International Date line. Coming back the other way, as I discovered, you can be robbed of your birthday altogether. Amusing—but the day switch is liable to introduce the sort of errors that the Y2K bug was meant to introduce. The Excel timetables created from Flight Aware's web site data is liable to fall prey to this.

Quite often trans-Pacific flights run into turbulence at the equator. This "bump" is not caused by *the menagerie lion running around the Earth*, but by wind shear where contra-rotating pressure systems mesh like gears. If this occurred on Judy's flight, it did not show up on Flight Aware's log. I have seen people thrown up to the roof in severe cases.

At about 8 hours into the flight (midnight Sydney time, as shown on this chart), the plane, now much lighter because of the fuel it had already used, began a series of 3 staged increases in altitude, although it ran into a few bumps and eventually a stronger headwind as it approached Baja California in Mexico (bottom chart on page 4).

Into Dallas

The flight entered Texas at about 12:14 CST (05:14 AEDST) and immediately took a course due east towards the south of DFW. DFW is an extremely busy airport and is, into the bargain, American Airlines hub airport. At the time that Judy's plane approached, the air around Dallas was alive with a swarm of planes. Descent began at 13:15 CST, the plane turned northwards and, eventually due north, to land on DFW runway 36C at 13:45, some 49 minutes down on schedule, having lost an extra 29 minutes in transit battling the headwinds. The flight docked at Terminal D, the International Terminal, although Flight Aware could not determine which gate. The approach path and the terminals are shown in the illustrations at the bottom of page 5. The numbers on the flight path are AESDT– Flight Aware tables always use the local time at the origin. Terminal D is the newest terminal at DFW and very flash, light and airy.

On to DC

The connecting flight to Washington's Regan Airport (the main Washington airport is also named after a pollie– John Foster Dulles) left from Terminal D, Gate 40 after a wait of 3h 25m. Had Judy been so inclined, she could have visited all the other terminals on the local Aerotrain Monorail. This is an interesting line which has to ascend and descend over several obstacles in its path. Somehow I doubt whether this was sufficient attraction to induce this. She may have had a Tex-Mex lunch however– such diners abound in all 4 terminals.

AA2270 left DFW 20 minutes down at

AA2270

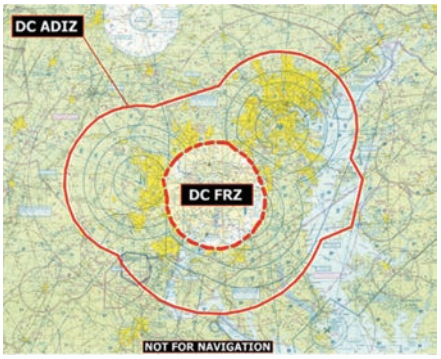
Time	Position		Orientation		Groundspee		Altitude		Reporting Facility
EST	Latitude	Longitude	Course	Direction	KTS	km/h	feet	Rate	Location/Type
10:30	32.9297	-97.0289	83°	East	169	312	2,100		TAA TRACON SMA TRACON (SMA)
10:30	32.9453	-97.0286	1°	North	178	330	2,600	↑1,800	TAA TRACON SMA TRACON (SMA)
10:30	32.9681	-97.0286	360°	North	207	383	3,300	↑2,040	TAA TRACON SMA TRACON (SMA)
10:31	32.9886	-97.0281	1°	North	231	428	4,000	↑2,040	TAA TRACON SMA TRACON (SMA)
10:31	33.015	-97.0192	16°	North	265	491	4,800	↑2,340	TAA TRACON SMA TRACON (SMA)
10:31	33.0306	-96.9883	59°	Northeast	295	546	5,700	↑2,400	TAA TRACON SMA TRACON (SMA)
10:32	32.839	-96.6221	59°	Northeast					FlightAware Approximate
10:32	33.03	-96.9661	92°	East	299	554	6,300		TAA TRACON SMA TRACON (SMA)
10:32	33.0269	-96.9364	97°	East	294	544	6,900	↑2,100	TAA TRACON SMA TRACON (SMA)
10:32	33.0231	-96.8978	97°	East	303	562	7,700	↑2,400	TAA TRACON SMA TRACON (SMA)
10:33	32.9127	-96.4653	67°	East					FlightAware Approximate
10:33	33.0203	-96.8661	96°	East	311	576	8,500		TAA TRACON SMA TRACON (SMA)
10:33	33.0175	-96.8344	96°	East	314	581	9,400	↑2,760	TAA TRACON SMA TRACON (SMA)
10:33	33.0144	-96.7944	95°	East	317	587	10,400	↑1,920	TAA TRACON SMA TRACON (SMA)
10:34	32.9667	-96.2986	90°	East					FlightAware Approximate
10:34	33.0111	-96.7608	97°	East	327	605	10,700		TAA TRACON SMA TRACON (SMA)
10:34	33.0083	-96.7253	95°	East	345	639	11,000	↑1,320	TAA TRACON SMA TRACON (SMA)
10:34	33.0042	-96.6772	96°	East	374	692	11,600	↑1,920	TAA TRACON SMA TRACON (SMA)
10:35	32.983	-96.1197	83°	East					FlightAware Approximate
10:35	33	-96.6378	97°	East	389	721	12,300		TAA TRACON SMA TRACON (SMA)
10:35	32.9975	-96.5981	94°	East	393	727	13,300	↑3,000	TAA TRACON SMA TRACON (SMA)
10:35	32.9928	-96.5475	96°	East	397	735	14,300	↑2,400	TAA TRACON SMA TRACON (SMA)
10:36	32.9894	-96.5061	95°	East	405	750	14,900	↑2,100	TAA TRACON SMA TRACON (SMA)
10:36	32.9853	-96.4642	97°	East	415	769	15,700	↑2,820	TAA TRACON SMA TRACON (SMA)
10:36	32.9814	-96.4106	95°	East	422	782	16,800	↑2,520	TAA TRACON SMA TRACON (SMA)
10:37	32.9775	-96.3669	96°	East	427	790	17,400	↑1,920	TAA TRACON SMA TRACON (SMA)
10:37	32.9781	-96.3219	89°	East	438	811	18,100	↑2,400	TAA TRACON SMA TRACON (SMA)
10:37	32.9847	-96.2644	82°	East	455	843	19,000	↑2,100	TAA TRACON SMA TRACON (SMA)
10:38	32.9906	-96.2178	82°	East	463	858	19,500	↑1,500	TAA TRACON SMA TRACON (SMA)
10:38	32.9981	-96.17	79°	East	472	874	20,000	↑1,800	TAA TRACON SMA TRACON (SMA)
10:38	33.0069	-96.1092	80°	East	484	896	20,700	↑1,800	TAA TRACON SMA TRACON (SMA)
10:39	33.0142	-96.0594	80°	East	494	914	21,200	↑1,740	TAA TRACON SMA TRACON (SMA)
10:39	33.0292	-95.9575	80°	East	510	945	22,400	↑1,680	TAA TRACON SMA TRACON (SMA)
10:40	33.0442	-95.7953	84°	East	512	948	23,900	↑1,680	Fort Worth Center
10:41	33.0653	-95.6411	81°	East	520	962	25,800	↑1,500	Fort Worth Center
10:42	33.1	-95.4642	77°	East	525	972	27,000	↑1,140	Fort Worth Center
10:43	33.1558	-95.2869	69°	East	532	985	28,100	↑ 960	Fort Worth Center
10:44	33.2089	-95.1069	71°	East	561	1040	29,000	↑1,140	Fort Worth Center
10:45	33.2639	-94.9267	70°	East	573	1061	30,400	↑1,500	Fort Worth Center
10:46	33.3144	-94.7486	71°	East	568	1053	32,000	↑1,320	Fort Worth Center
10:47	33.3689	-94.5681	70°	East	568	1053	33,100	↑1,260	Fort Worth Center
10:48	33.4253	-94.3869	69°	East	568	1053	34,600	↑1,440	Fort Worth Center
10:49	33.4772	-94.2108	70°	East	562	1041	36,000	↑ 960	Fort Worth Center
10:50	33.535	-94.0294	69°	East	568	1053	36,600	↑ 480	Fort Worth Center
10:51	33.6053	-93.8522	64°	Northeast	579	1072	37,000	↑ 120	Fort Worth Center
10:53	33.73	-93.5167	66°	East	589	1091	37,000		Memphis Center
10:54	33.8011	-93.3394	64°	Northeast	584	1081	37,000		Memphis Center
10:55	33.8678	-93.1617	66°	East	579	1072	37,000		Memphis Center
10:56	33.9364	-92.9861	65°	Northeast	579	1072	37,000		Memphis Center
10:57	34.0028	-92.805	66°	East	579	1072	37,000		Memphis Center
10:58	34.0711	-92.6064	67°	East	579	1072	37,000		Memphis Center

1730, by which time it was well and truly dark. It was also cold (for Dallas) at about 10ºC. Dallas is not much used to snow and I have been stuck there when the airport was closed by an ice-storm– something the city and the airport were completely unprepared for.

Flight 2270 was much more of a "bee-line" in the "apiaristic" sense– the Google Earth chart I made out of the table above shows this clearly– although the eye of faith can still discern the Great Circle nature of it (top chart, page 6).

Inside the Beltway

The approach to Reagan on the Friday evening was from the north. This imposes a few tricky navigational puzzles. First, a plane approaching Reagan this way comes perilously close to infringing on the air



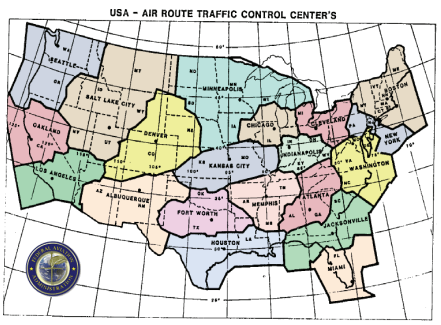
space of Dulles airport to the north-west of the city. Second there are two types of restrictions on air-apace around Washington DC– especially relating to the White House and the Pentagon. These are legacies of "9/11". They are the ADIZ (Air Defence Identification) and the FRZ (Flight Restricted) Zones. A pilot who violates the boundaries may be intercepted by military aircraft and escorted to the nearest airport, followed by suspension or revocation of the pilot's certificates. Dulles is also tricky– I have been on a flight landing there where the co-pilot (learning the ropes) messed it up and we had to go round again– infringing the FRZ.

On this landing, passengers would have a good view of the Pentagon out the right hand windows– but the scars from 9/11, which provoked these rules, are no longer visible.

So, nearly 21 hours after take-off in Sydney, 2013's *"Mr Smith"* arrived in Washington at 21:30 EST. This was a bit late for a lone woman to be catching the Metro into Georgetown, so she used a taxi instead. It is not far, after all.

Reagan is closer to DC than Kingsford-Smith is to Sydney. The Metro runs to it– and at no added fare! Dulles, on the other hand, is much further away and the Metro construction is still crawling towards it. Dulles is an interesting airport because the departure and arrival gates are way over the other side of the field from the terminal buildings. Passengers and crew travel from one to the other on buses on stilts.

The original Mr Smith had quite a few adventures in Washington, but 2013's equivalent traveller experienced little of such things. As I write this we do not know what happened on the return journey. The last time I tried this trip, anticipated bad weather in Dallas caused me to be bumped off onto a Nashville flight, in a tiny plane sitting up front with the pilots. From Nashville (nice airport to pass the time) I flew to LA and ended up in Sydney ahead of the Dallas flight. This sounds like a good deal– but it wasn't because my Dallas-Sydney flight was the maiden run of this service and the champagne flowed like water. That's the trouble when *"Mr Smith goes to Washington*". He can't make the timetable fit his preconceptions.



Some notes on data sources

The flight information used in this article came almost entirely from Flight Aware. The ancillary information– such as that about airports—was garnered from a range of sources. As well as the data shown in the table on page 8, Flight Aware collects even the names of the crew and other commercial information

Where does Flight Aware get its information? The downloadable table for QFA007 shows the following sources for the data:

Albuquerque Center
Aus ATC (Calculated)
Aus ATC (RADAR)
Estimated
FAA TRACON SMA
FlightAware
FlightAware Approximate
FlightAware Transoceanic
Fort Worth Center
Oakland Oceanic (ODAPS)

The two **"Centers"** are Area Control Centers. In air traffic control, an Area Control Center (ACC), also known as a Center (or in some cases, *en-route*, as opposed to TRACON control), is a facility responsible for controlling aircraft en route in a particular volume of airspace. In the US, such a Center is referred to as an Air Route Traffic Control Center (ARTCC, map lower left). A Center typically accepts traffic from, and ultimately passes traffic to, the control of a Terminal Control Center or another Center. Most Centers are operated by the national governments of the countries in which they are located.

Aus ATC is Australian Air Traffic Control

TRACON Many airports have a radar control facility that is associated with the airport. In most countries, this is referred to as Terminal Control; in the U.S., it is referred to as a TRACON (Terminal Radar Approach Control.) While every airport varies, terminal controllers usually handle traffic in a 30-to-50-nautical-mile (56 to 93 km) radius from the airport. Where there are many busy airports close together, one consolidated Terminal Control Center may service all the airports. SMA stands for Surface Movement Advisor and is an adjunct to TRACOM designed to predict the ground traffic and gate occupancies at airports resulting from current operations.

ODAPS (Oceanic Display and Planning System). A computer-based programmable oceanic air traffic control system that (a) accepts and processes data from various sources, such as the aeronautical telecommunications network (ATN) and the automatic dependent surveillance (ADS) system and (b) performs various traffic control functions. The Oakland ODAPS is part of the Oakland ARTCC.

Oakland Oceanic Flight Information Region: The bulk of Oakland oceanic traffic flows over a complex and varied Pacific route system. A number of routes connect the continental U.S. and Hawaii with the Pacific Rim, including Japan, the Philippines, Australia and New Zealand. Another set of routes traverses the western-most portion of Oakland airspace connecting Japan and Korea on the north with Australia and New Zealand to the south. The Pacific Organized Track System (PACOTS) provides fuel-efficient routes for long distance transpacific flights. These routes are adjusted every 12 hours in response to upper level wind conditions. The most northerly routes are grouped in the North Pacific Composite Route System (NOPAC), whereas the traffic between the continental U.S. and Hawaii flies on the six Central East Pacific Composite Route System.

Most of the data is obtained by radar means by these institutions. In areas not covered by radar (in this case, the south-west Pacific), data is only patchily available and Fight Aware calculates it by interpolation from known data along the route. Altitude cannot usually be determined by radar. In most instances radar can determine certain other data, such as Flight ID, because planes carry transponders which send out such ID's when they are queried by radar. Planes, of course, know where they are. They also talk to one another via their own radar.

The USA is introducing a new system, the Automatic Dependent Surveillance-Broadcast (ADS-B). Airservices Australia, has already implemented ADS-B . ADSB reverses the radar concept. Instead of radar "finding" a target by interrogating the transponder, the ADS-equipped aircraft sends a position report as determined by its navigation equipment, normally in the "contract" mode where the aircraft reports a position, automatically or initiated by the pilot, based on a predetermined time interval. It is also possible for controllers to request more frequent reports. However, since the cost for each report is charged by the ADS service providers to the company operating the aircraft, more frequent reports are not commonly requested ADS is significant because it can be used where it is not possible to locate the infrastructure for a radar system (e.g. over water). Computerized radar displays are now being designed to accept ADS inputs.

What's in a name? Named Sydney private bus routes (3) Cherrybrook Express, Jenner Road Jet, Cedarwood Loop.

ROBERT HENDERSON

Most bus routes are known solely by their number and end destinations. However, a small number of Sydney private bus routes have also had names attached to them, even if only for short periods of time. This is the third in a series, briefly surveying those that spring to mind.

These were three names applied to bus routes run by Harris Park Transport between Pennant Hills station and various parts of the north western suburb of Cherrybrook and neighbouring Dural in the late 1980s.

The name Cherrybrook was coined in the 1830s by settlers, who built a small timber cottage called "Cherrybrook Cottage" after the cherry trees which they planted near the creek running through their land. Many years later the property was bought by Eric Vaux, who established a dairy and kept the name Cherrybrook. Coincidentally Eric Vaux was also a bus proprietor – not in Cherrybrook, but along nearby Castle Hill Road between Pennant Hills and Castle Hill (Route 184) for about four years in the early 1950s.

In 1959, some of the land at Cherrybrook was subdivided to become the first project home village in Sydney. However, it was not until the 1980s that any further significant development occurred in the vicinity.

Even before World War II, there was a bus route, numbered 91, along the principal thoroughfare in the area, New Line Road. It had been established in about 1935, but remained a spasmodic, rural service until the 1950s. Destination signs read "New Line Road" until well into the 1960s, as buses from Pennant Hills terminated at different locations along that road. The scattered nature of the housing away from New Line Road did not make running a bus into what was first called the Greenway estate (now Cherrybrook) a viable proposition until about 1965. The name of that estate is remembered by one of current Cherrybrook's streets, Francis Greenway Drive.

Progress towards running a regular service through the heart of Cherrybrook was slow and did not occur until Harris Park Transport took over the route on 1 July 1982. In an on-again-off-again process, they trialled different routes through the new suburb between 1982 and 1984. The varying sets of streets followed by these trial routes possibly only served to confuse the predominantly car-oriented residents of the growing suburb.

So it was that, as from 18 May 1987, Harris Park Transport finally introduced a more consistent, all-day service between Pennant Hills and Cherrybrook. This they named the "Cherrybrook Express", as a means of promoting their new venture. In peak hours there was also the "Cedarwood Loop", but during the weekday off-peak the Cherrybrook express diverted via Cedarwood Drive. Curiously, although they operated a Saturday morning service, they chose not to print it in this timetable. As often happened when private bus services were self-funded, no buses ran on Sundays or Public Holidays for some time after then.

On 12 July 1989, Harris Park Transport added a mainly peak-hour route between Cherrybrook and Parramatta, also coming under the umbrella of Route 91. It too was regarded as part of the "Cherrybrook Express".

In the meantime housing development had extended west to Jenner Road, Dural, just over the creek from Cherrybrook. To serve that new subdivision, Harris Park Transport started running the "Jenner Road Jet" there in peak hours as from 21 September 1988.

Timetables issued by Harris Park Transport for Route 91 continued to use the three names in the late 1980s and early 1990s. The last one I have which shows the names is dated 28 June 1993. The next known timetable has a date of 30 September 1996, where the route numbers 626 (Pennant Hills-Cherrybrook, with some trips extended to Castle Hill) and 627 (Parramatta-Cherrybrook) in the Sydney Region Route Number System had been substituted for 91. The Cedarwood Loop ceased to run at that time, but the company added a Sunday service to Cherrybrook to satisfy minimum service levels.

The Cherrybrook bus routes changed hands three times in short succession in 2004/5: from Harris Park Transport to Hillsbus on 22 December 2004 (when Harris Park Transport handed in its route bus contracts); to State Transit (Sydney Buses) on 28 January 2005 (when Hillsbus was unable to provide enough buses for school day services on the ex-Harris Park Transport routes); then back to Hillsbus (after its management had been transferred to Comfort DelGroCabcharge) on a permanent basis from 25 September 2005.

Today Cherrybrook passengers have the choice of regular seven-day- a -week service on Route 621 (City-Cherrybrook-Castle Hill), with supplementary peak hour Route 620 (City-

ROUTE 91

MAY 18, 1987

DURAL AND THE GREENWAY ESTATE TO PENNANT HILLS STATION

The - "Cherrybrook Express" →

MONDAYS TO FRIDAYS

TO PENNANT HILLS STATION

Depart Dural	Arr/Dep Purchase & New Line Roads	Arr/Dep Appletree Shops	Arr/Dep Francis Greenway Drive & Boundary Rd	Arrive Penn Hills Station
a.m.	a.m.	a.m.	a.m.	a.m.
	6.05	6.12	6.23	6.31
6.20	6.27	6.35	6.46	6.55
	6.40	6.48	6.58	7.06
	6.48	6.56	7.06	7.14
	7.05	7.13	7.23	7.32
	7.16	7.24	7.34	7.43
	7.25	7.34	7.44	7.54
	7.45	7.53	8.03	8.11
S7.50 Express via New Line Road and Thompsons Corner				
	8.15*	8.23	8.35	8.55
	K8.53	9.01	9.11	9.23
	9.10	9.18	9.28	9.43
	10.10	10.18	10.28	10.43
	11.10	11.18	11.28	11.43
	12.10	12.18	12.28	12.43
	2.10	2.18	2.28	2.43

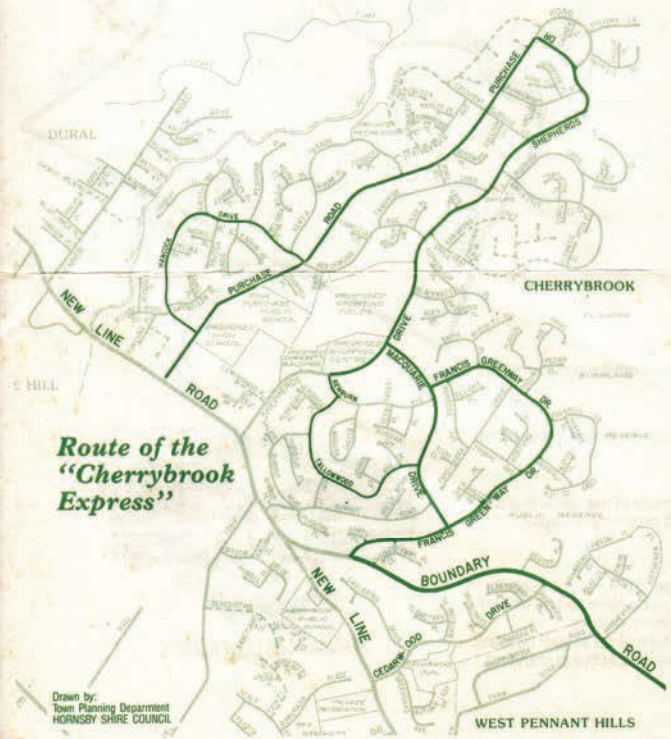
Depart Francis Greenway Drive & Boundary Rd	Arr/Dep Appletree Shops	Arr/Dep Purchase & New Line Roads	Arrive Penn Hills Station
4.08	4.18	4.25	4.35
4.28	4.38	4.45	4.55
4.46	4.56	5.03	5.11
5.04	5.14	5.21	5.30
5.20	5.30	5.37	5.47
5.39	5.49	5.56	6.06
6.02	6.12	6.19	6.27
6.16	6.26	6.33	6.43
6.36	6.46	6.53	7.03

FROM PENNANT HILLS STATION

Depart Penn Hills Station	Arr/Dep Purchase & New Line Roads	Arr/Dep Appletree Shops	Arr/Dep Francis Greenway Drive & Boundary Rd
a.m.	a.m.	a.m.	a.m.
6.32	6.40	6.48	6.58
7.07	7.16	7.24	7.34
7.16	7.25	7.34	7.46
7.36	7.45	7.53	8.03
8.56	9.10	9.18	9.28
10.00	10.10	10.18	10.28
11.00	11.10	11.18	11.28
12.00	12.10	12.18	12.28
2.00	2.10	2.18	2.28

Depart Penn Hills Station	Arr/Dep Francis Greenway Drive & Boundary Rd	Arr/Dep Appletree Shops	Arr/Dep Purchase & New Line Roads	Arrive Dural
4.00	4.08	4.18	4.25	
4.20	4.28	4.38	4.45	
4.38	4.46	4.56	5.03	
4.56	5.04	5.14	5.21	
5.12	5.20	5.30	5.37	
5.31	5.39	5.49	5.56	
5.54	6.02	6.12	6.19	
6.08	6.16	6.26	6.33	
6.28	6.36	6.46	6.53	
6.50	6.58	7.08	7.15	
7.10	7.18	7.28	7.35	7.42

WE OPERATE A LIMITED SATURDAY SERVICE TO PENNANT HILLS AND PARRAMATTA — PHONE 633 2181 FOR DETAILS
NO SERVICE SUNDAYS OR PUBLIC HOLIDAYS



Route of the "Cherrybrook Express"

KEY
* Denotes operates via Thompsons Corner.
"K" Denotes operates via Kitchener Road Retirement Village.
"S" Denotes operates School terms only.

DESCRIPTION OF ROUTES

MORNING BUSES operate express from Greenway Estate to Pennant Hills Station commencing at corner of Purchase and New Line Roads and travelling via Purchase, Hancock, Purchase, Shepherds, Kenburn, Tallowwood, left Macquarie, right Francis Greenway, left Boundary, direct to the station.
AFTERNOON BUSES operate express from Pennant Hills Station direct to Greenway Estate via the reverse order of morning streets, terminating at Purchase and New Line Roads.

HARRIS PARK
VOLVO
VOLVO
SINCE 1931
TRANSPORT CO.
SERVING THE COMMUNITY

OFF PEAK BUSES (9am-3pm) commence at Purchase and New Line Roads and operate to Pennant Hills Station via Greenway Estate, Boundary, Cedarwood, New Line and Victoria Roads. Off Peak return buses from Pennant Hills station follow same route as forward journey.
Passengers wishing to board the bus in New Line Road between New Line and Boundary and New Line and Purchase should call us on 633-2181 for details.

Passengers
This service is introduced on a trial basis for a six month period from May to December, 1987.
We are a privately owned company and we need your support to enable us to continue to operate after this date. If you are happy with our service please use it and tell your friends. If you are not happy then please tell us! (Write to the Manager, P.O. Box 410, Parramatta.)
Thank you for your concern.

The "Cedarwood Loop"

CEDARWOOD DRIVE NEW LINE AND VICTORIA ROADS TO PENNANT HILLS STATION
MONDAYS TO FRIDAYS

CEDARWOOD DRIVE TO PENNANT HILLS STATION

Arr/Dep Cedarwood and Boundary	Arr/Dep Cedarwood and New Line	Arr/Dep Victoria Rd and New Line	Arrive Pennant Hills Station
a.m.	a.m.	a.m.	a.m.
6.13	6.15	6.18	6.26
6.36	6.38	6.41	6.49
6.58	7.00	7.03	7.12
7.21	7.23	7.26	7.35
7.48	7.50	7.53	8.02
	S8.40	via Victoria and Loftus	8.58
9.56	9.58	10.01	10.08
10.47	10.49	10.52	10.59
11.54	11.56	11.59	12.06
1.24	1.26	1.29	1.36
2.29	2.31	2.34	2.41
4.07	4.09	4.12	4.20
4.30	4.32	4.35	4.43
4.53	4.55	4.58	5.06
5.17	5.19	5.22	5.29
5.42	5.44	5.47	5.54
6.06	6.08	6.11	6.18
6.30	6.32	6.35	6.42

PENNANT HILLS STATION TO CEDARWOOD DRIVE

Depart Pennant Hills Station	Arr/Dep Cedarwood and Boundary	Arr/Dep Cedarwood and New Line	Arr Victoria New Line
a.m.	a.m.	a.m.	a.m.
6.27	6.36	6.38	6.41
6.49	6.58	7.00	7.03
7.13	7.21	7.23	7.26
7.39	7.48	7.50	7.53
9.00	9.56	9.58	10.01
10.16	10.47	10.49	10.52
11.23	11.54	11.56	11.59
12.53	1.24	1.26	1.29
1.58	2.29	2.31	2.34
4.00	4.07	4.09	4.12
4.23	4.30	4.32	4.35
4.46	4.53	4.55	4.58
5.10	5.17	5.19	5.22
5.35	5.42	5.44	5.47
5.59	6.06	6.08	6.11
6.23	6.30	6.32	6.35
6.50	6.57	6.59	7.02

SATURDAY SERVICE FROM GREENWAY ESTATE, NEW LINE AND VICTORIA ROADS TO PENNANT HILLS AND PARRAMATTA

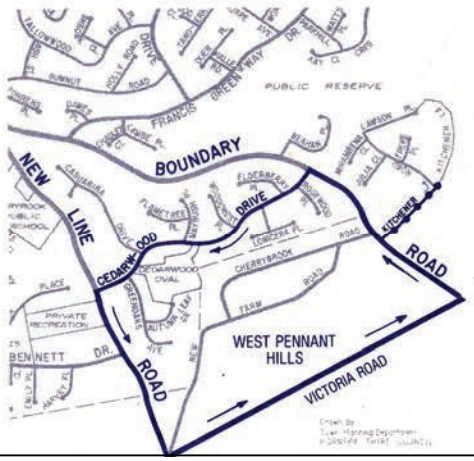
Depart Pennant Hills	Arr/Dep New Line and Victoria Road	Arr/Dep New Line and Shepherds Drive	Arrive Francis Greenway and Boundary Road	Arrive Pennant Hills	Arr/Dep Carlingford Square	Arrive Parramatta Station
a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.
7.44	7.48	7.51	7.56	8.02	8.15	8.35
9.15	9.20	9.23	9.28	9.35	9.55	10.15
10.25	10.30	10.33	10.38	10.44	11.02	11.22
10.50	10.55	10.58	11.03	11.09	11.26	11.47
12.00	12.05	12.08	12.13	12.19	12.35	12.55
12.25	12.30	12.33	12.38	12.44	1.03	1.23
2.00	2.05	2.08	2.13	2.19	2.33	2.53

NO SERVICE SUNDAYS OR PUBLIC HOLIDAYS

SATURDAY BUSES operate from outside the milk bar in Yarrara Road (Pennant Hills) via Yarrara Road, left Ramsay Road, left Bellamy Road, left Boundary Road, right Victoria Road, right New Line Road, right Shepherds Drive, right Macquarie Drive, left Francis Greenway Drive (North). Follow Francis Greenway Drive around the loop, then left Boundary Road, left Bellamy Road, right Ramsay Road, right Yarrara Road. Bus then travels onto Carlingford Square and Parramatta Station.

PENNANT HILLS STATION TO KITCHENER ROAD RETIREMENT VILLAGE

Depart Kitchener Village for Pennant Hills Station	Depart Pennant Hills Station for Kitchener Village (via Loftus)
9.15am	11.03am
11.08am	1.41pm
1.46pm	2.47pm



ROUTE 91
10TH JULY, 1989

The "Jenner Road Jet"

DAVID, JENNER AND FRANKLIN ROADS TO PENNANT HILLS STATION

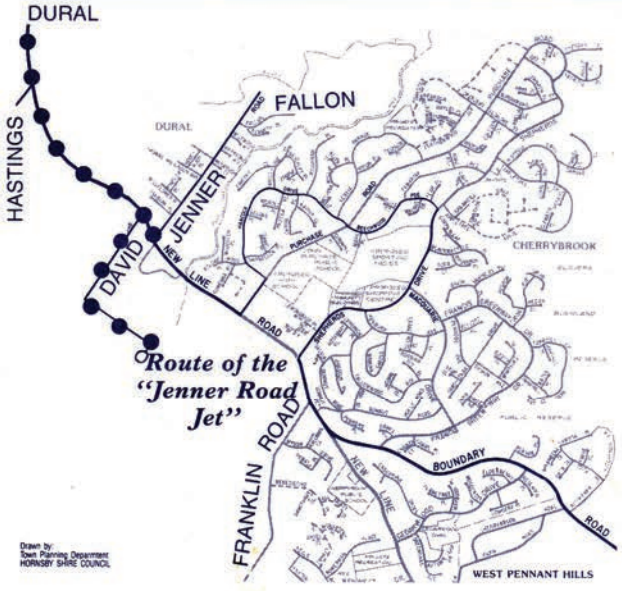
MONDAYS TO FRIDAYS

DURAL TO PENNANT HILLS STATION

Depart Dural	Arr/Dep David New Line	Arr/Dep Jenner Fallon	Arr/Dep Purchase Hancock	Arr/Dep Beechwood Shepherds	Arr/Dep Shepherds New Line	Arr/Dep Franklin New Line	Arr/Dep Francis Boundary	Arrive Pennant Hills
a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.
6.12	6.24	6.28	6.33	6.37	6.42	6.43	6.45	6.55
		7.11	7.16	7.20	7.25	7.26	7.28	7.38
S7.46 via Thompsons Corner to Pennant Hills Station.								
9.20	9.25	9.30	9.35	9.43	-	-	9.53	10.08
5.03	5.10	via New Line and Boundary Roads Express to Pennant Hills . . .						5.25

PENNANT HILLS STATION TO DURAL

Depart Pennant Hills	Arr/Dep Francis Boundary	Arr/Dep Franklin New Line	Arr/Dep Shepherds New Line	Arr/Dep Beechwood Shepherds	Arr/Dep Purchase Hancock	Arr/Dep Jenner Fallon	Arr/Dep David New Line	Arrive Dural
a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.	a.m.
6.56	7.01	7.03	7.04	-	-	7.11		
9.00	(Express bus to Dural which returns via New Line, David, Jenner, Greenway Estate)							9.20
4.21	4.29	4.31	4.32	4.37	4.42	4.47	4.52	5.02
4.37	4.45	via Greenway Estate			5.00	5.03	5.06	
5.34	5.42	5.44	5.45	5.50	5.55	6.00	6.03	6.10
6.22	6.30	via Greenway Estate			6.45	6.48	6.50	7.00



NO SERVICE SATURDAYS, SUNDAYS OR PUBLIC HOLIDAYS

DESCRIPTION OF ROUTE:

Unless otherwise marked, "**Jenner Road Jet**" buses operate from New Line and Old Northern Roads via New Line Road, David Road, Jenner Road, New Line Road, Purchase Road, Hancock Drive, Beechwood Parade, Shepherds Drive, New Line Road, Franklin Road, and Boundary Road express to and from Pennant Hills Station.

KEY:

———— Represents usual route of the "**Jenner Road Jet**"

● ● ● Passengers living in David Road should contact our office on 633-2181 (9am-4pm) for current details on our David Road services.

OUR LUXURY BUSES AND COACHES ARE ALSO AVAILABLE FOR CHARTER. PHONE 633-2181.

CUT THE FUSS AND CATCH THE BUS. TRY US!


CHERRYBROOK EXPRESS 91
1
Countess of Cherrybrook
CHERRYBROOK EXPRESS
MO 7694
© PETEKANE 1987 - HARRIS PARK TRANSPORT CO mo7694

List of lines served by passenger (including employees') trains within New South Wales as at 30 June 1943

ROSS WILLSON

Operated by NSW Railways

Central-St. James
Illawarra Junction-Nowra
Erskineville Junction-Alexandria Sidings
Sydenham-Sefton Park Junctions
Wolli Creek Junction-East Hills
Sutherland-Cronulla
Sutherland-Woronora Cemetery
Loftus Junction-The National Park
Coniston-Port Kembla
Unanderra-Moss Vale Junction
Lidcombe-Sefton Park Junctions-Cabramatta Junction
Granville-Wodonga
Warwick Farm Junction-Warwick Farm Racecourse
Liverpool-Anzac Rifle Range
Campbelltown-Camden
Picton-Mittagong Junction
Goulburn-Crookwell
Roslyn-Taralga
Joppa Junction-Bombala
Bungendore Junction-Captain's Flat
Queanbeyan-Canberra
Yass Junction-Yass Town
Galong-Boorowa
Demondrille Junction-Blayney
Koorawatha- Grenfell
Cowra-Eugowra
Cootamundra-Tumut
Gilmore-Batlow-Kunama
Cootamundra-Lake Cargelligo
Stockinbingal-Parkes
Temora-Roto
Barmedman-Rankin's Springs
West Wyalong-Burcher
Ungarie-Naradhan
Junee-Hay
Narrandera-Tocumwal
Yanco-Griffith
Wagga Wagga-Tumbarumba
Uranquinty-Kywong
The Rock-Oaklands
The Rock-Westby
Henty-Rand
Culcairn-Corowa
Culcairn-Holbrook
Sydney-Bourke
Flemington Goods Junction-Campsie
Chullora Junctions-Sefton Park Junctions
Chullora Junctions-Electric Car Workshops
Chullora Junctions-Signal Workshops
Lidcombe-Brickworks-Abattoirs
Flemington Goods Junctions
Lidcombe-Rookwood Cemetery
Clyde-Carlingford
Camellia-Sandown
Blacktown-Kurrajong
St. Mary's-Rope's Creek
Wallerawang-Gwabegar
Craboon-Coolah
Binnaway-Werris Creek Junction
Tarana-Oberon
Orange-Broken Hill
Molong-Dubbo East Junction
Goobang Junction-Narromine
Bogan Gate-Tottenham
Dubbo-Coonamble
Troy Junction-Merrygoen
Nevertire-Warren
Nyngan-Cobar
Byrock-Brewarrina
Central-North Sydney-Hornsby
Strathfield-Wallan-garra
Gosford-Gosford Racecourse
Fassifern-Toronto
Adamstown-Belmont
Hamilton Junction-Islington Junction
Newcastle-Woodville Junction
Sandgate-Sandgate Cemetery
East Maitland-Morpeth
West Maitland-Cessnock
West Maitland-South Brisbane
Glenreagh-Dorrigo
Casino-Murwillumbah
Booyong Junction-Ballina
Rutherford Junction-Rutherford
Muswellbrook-Merriwa
Werris Creek-Mungindi
Narrabri Junction-Walgett
Burren-Pokataroo
Moree-Inverell
Camurra-Boggabilla
West Tamworth-Barraba

Operated by Victorian Railways

Wodonga-Albury
Moama-Deniliquin
Yarrawonga-Oaklands
Barnes-Balranald

Operated by Queensland Railways

Coolangatta-Tweed Heads

Operated by Silverton Tramway Company

Cockburn-Broken Hill


IS YOUR JOURNEY REALLY NECESSARY?
TICKETS
IS YOUR JOURNEY REALLY NECESSARY?
BERT THOMAS
RAILWAY EXECUTIVE COMMITTEE
No. 545
PRINTED IN GREAT BRITAIN