

Aviation Safety Investigation – Factual Report

Controlled Flight Into Terrain – LPMA

Occurrence Details

Occurrence Number:	20050001	Location:	1.5nm SW Funchal, Portugal
Occurrence Date:	11 November 2005	State:	-
Occurrence Time:	1133 UTC	Highest Injury Level:	Fatal
Category:	Accident	Investigation Type:	Occurrence investigation
Occurrence Class:	Operational	Investigation Status:	Factual Report
Occurrence Type:	Collision	Release Date:	29 June 2006

Aircraft Details

Aircraft Manufacturer:	Boeing Co	Aircraft Model:	747-400
Aircraft Registration:	VH-OGU	Serial Number:	
Type of Operation:	Charter		
Damage to Aircraft:	Destroyed		
Departure Point:	Nouakchott	Departure Time:	0840 UTC
Destination:	Funchal		

SUMMARY

On November 11 2005, about 1133 UTC, a charter 747-400 operating for Worldflight Australia struck terrain 1.5nm short of the threshold of runway 05 at Madeira. The aircraft was totally destroyed. Visual meteorological conditions prevailed at the time of the flight, which was operated on an Instrument Flight Rules plan.

Information from the Flight Data Recorder was not available and all analysis of the event has been conducted from the Cockpit Video Recorder and ancillary video available to the investigation.

AIRFIELD

The Madeira airfield has notoriously difficult approaches due to high terrain immediately surrounding the airfield and wind variations associated with, or generated by this terrain. Operating limitations require an experienced PIC to have Level D simulator training or a line flight experience into the field before they are allowed to operate as PIC.

CREW

The usual flight crew for Worldflight charters comprises a Captain (PIC), First Officer and a Second Officer, who is present in a support and monitoring role during departure, approach and landing. Worldflight company procedures also permit non-operational staff to sit in the jumpseat, and the CVR reveals at least one flightdeck visitor was present throughout the approach.

The Captain and First Officer were qualified on type and the Captain (as PIC) had previously flown 747-400 aircraft into Madeira.

The workload for the crew during the arrival phase was high with poor ATC legibility and unusually high levels of traffic into the airfield. Several holds delayed the aircraft past the scheduled arrival time and along with concerns over fuel endurance added to the pressure on the crew.

AIRCRAFT

There were no known issues with the aircraft at the time of its dispatch from Nouakchott. No problems were reported by the crew to Dispatch or ATC during the flight.

AUTOMATION

The autopilot and autothrottle were engaged throughout the descent and final approach and were used to maneuver the aircraft horizontally, vertically and adjust its speed. Company procedures required the flight crew to fly the aircraft manually below 10,000ft, however the Captain has ultimate discretion to take into account factors such as crew workload in determining the use of automation in all flight regimes.

ACCIDENT NARRATION

(Times below are from the CVR loop and do not reflect the actual passing of time)

The flight departed Nouakchott 3 minutes ahead of schedule, with heavy traffic sharing the route to Funchal. The flight proceeded uneventfully, with several discussions on alternate approaches, concern over fuel endurance and expected holds.

The flight crew did not receive any arrival information during the initial descent, and shortly after switching over to the Approach controller, the flight crew queried the controller for expected arrival and runway at Madeira. They were cleared by the controller for a VOR DME approach for runway 05. There is no VOR DME approach for runway 05 at Madeira; the only VOR approach is the VOR / Visual (LPMA 13-1A) which is the chart used by the crew.

At 00:13:19 with the aircraft around 3000ft in altitude, the Second Officer commented that they 'jumped up 500' when the crew changed the QNH setting.

At 00:13:33 and 3000ft, approaching FUNOR intersection (8 DME FUN VOR) the Captain asked "Did we...did we get a heading from FUNOR or is it our own discretion"? An unidentified voice advised them they were cleared for the VOR DME approach, which was seconded by the First Officer. At 00:13:40 the Captain and First officer reviewed the charts and the Captain briefed a heading of 213 from FUNOR, then corrected himself to a heading of 213 from FUN VOR.

The crew were provided with the latest Jeppesen charts prior to departure. The charts show the VOR / Visual approach requires a tight 190 degree right hand turn onto a very short final approach, with a turn radius of only 1.2nm. With high terrain to the left of the final approach path, comments on the chart caution pilots not to fly to the left of the approach lights at the end of turn.

(All times from here ARE contiguous and DO correctly reflect the passage of time)

At 00:15:07, outbound from the FUN VOR, the crew contacted the tower controller and were cleared for the Visual approach runway 05. Already at flap 20, the gear was then lowered at 00:15:28.

At 00:15:31, the Second Office advised the Captain to 'Watch your speed...'

At 00:15:43, the Captain turned the Heading Select knob on the MCP. At the same time, he advised the First Officer he wanted him to 'steer him around on the heading select', as the aircraft began a turn to the right.

At 00:16:00, the First Officer reached for the heading select, and in response to the First Officers Query, the Captain said 'yeah I want you to take me onto that FUN one'; at this point in the approach there were no aids or fixes on the chart labeled FUN apart from the VOR already passed. The First Officer continued to adjust the MCP heading as the aircraft continued a turn to the right.

At 00:16:06 an unidentified person again warned the crew to "Watch your bricks", possibly alluding to flying at a dangerously low speed – 2 seconds later the First Officer stated "Yep watch your speed". The captain adjusted the MCP speed, and made an uncertain comment containing the phrase '...haven't we got VREF...?'

During the turn, at 00:16:06, an unidentified person again alerted the crew to their airspeed. At 00:16:15 the Second Officer advised the crew to extend more flap, and at 00:16:19, during the turn, flap 25 was selected by the Captain. At 00:16:33 the Captain commented they were now picking up speed.

At 00:16:46 as the aircraft began to roll out of the right hand turn the Captain commented that they were not in exactly the right position and needed to be "...to the right of that headland...", pointing the formation out to the First Officer through the right hand window. At 00:16:53 he added "We need to keep going round I think", and the First Officer adjusted the commanded heading using the Heading Select knob on the MCP.

During this adjustment, the First Officer was distracted by a comment from an unidentified person regarding the range settings on the Navigational Display. Meanwhile the aircraft appeared to roll slightly to the right and initiate a slight turn in response to the commanded change in heading.

At 00:17:00 the Captain made a comment that is not captured clearly, but contains the word 'speed'; he again adjusted the commanded speed on the MCP.

After checking the ND range, the First Officer briefly moved his hand back to the Heading Select knob, then at 00:17:03 he commenced the Final Approach checklist.

At 00:17:10, after a turn of only a few degrees, the aircraft had rolled back to wings level.

At 00:17:12 the Captain realized they were not descending, and after adjusting the altitude in the MCP, pressed the FLCH button, commanding the autopilot to initiate descent. In response, the autopilot commenced a descent by reducing thrust and lowered the nose.

At 00:17:26, with the autopilot still engaged, the Captain turned the control column to the right and held it there – the aircraft, still flown by the autopilot on the assigned heading in the MCP, remained wings level. The control column remained in this deflected state until 00:17:40.

At 00:17:29, the Ground Proximity Warning System activated and the alert “Terrain Terrain – Whoop Whoop – Pull Up!” was announced. This warning continued until the end of the tape.

At 00:17:30, the autopilot was disengaged, and the plane immediately began to roll to the right. At the same time the Captain activated his seat controls, while the First Officer initially reached for the speed knob on the MCP, before quickly moving his hand to the throttles and pressing the TOGA switches at 00:17:37 and manually advancing the throttle to the firewall.

Moments later The Captain called for ‘Gear up’; the First Officer did not respond, but held the throttles at full power against the driving autothrottle, before disengaging the autothrottle via the thumb switches at 00:17:40.

By 00:17:40 the aircraft bank angle has reached almost 45 degrees to the right, at which time the Captain moved his control column from a right turn to the hard left position.

At 00:17:41 an uncertain remark was made by an unknown person similar to ‘push it in’.

At 00:17:42 a “Sink Rate” alert was announced.

Four seconds later, the aircraft had reached wings level at level pitch, but, still descending, impacted trees then the top of a ridgeline at 00:17:46, several hundred feet to the left of the required approach path for runway 05. The aircraft was totally destroyed.

FLIGHTPLAN DETAILS

WF523 10/11/05	GQNN/ STD 0840	ETD 0840	ATD 0837
B744 VHOJU	LPMA/ STA 1110	ETA 1110	ATA -

ROUTE: GQNN KC UA600 PE MAURI UB600 DKH ROYAL GDV UN729 BIMBO FUN LPMA

WEATHER

METAR reports at the time of the incident;

LPMA 111130Z 04016KT 9999 BKN016 BKN030 19/13 Q1028 RS0216KT 050215G25KT 230314G28KT RMK
LPMA 111110Z 111812 04013KT 9999 SCT018 TEMPO 1812 04020G30KT BKN016 PROB30 TEMPO 1812 8000 -
SHRA BKN013 RMK

CVR ANALYSIS

Transcript of a solid-state cockpit video recorder and ancillary video recording equipment, fitted to a Boeing 747-400 which crashed on Funchal 1.5 miles south west of the Madeira Airport.

LEGEND

CAM	Cockpit area microphone voice or sound source
INT	Flight crew audio panel intercom voice or sound source
RDO	Radio transmissions
ATC	Radio transmission from Air Traffic Controller
-1	Voice identified as the Captain
-2	Voice identified as the First Officer
-3	Voice identified as the Second Officer
-A	Aircrafts crew alert system mechanical voice sound source
?	Voice unidentified
()	Questionable insertion
[]	Editorial insertion

NOTES

Note 1: The recording is not contiguous and taken from several sources. Due to the non contiguous nature **the time shown is relative to the duration of the recording, bearing little relationship to the actual timeline of the incident.**

Note 2: Generally, only radio transmissions to and from the accident aircraft were transcribed.

Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 4: Breaks in the recording where data is missing are indicated by *DISCONTINUITY*

TRANSCRIPT

Video Time	Source	Content
00:00:40	ATC	Qantas 25 holding details (Unintelligible)
00:00:46	CAM-2	Qantas 25 go ahead
00:00:54	ATC	Qantas 25 hold at Funchal, distance- (break in recording) <i>DISCONTINUITY</i>
00:01:02	CAM-2	Qantas 25 to hold at the Funchal 163 Radial, um, 60 ah DME right hand pattern ah 1 minute
00:01:13	CAM-3	Here's the BIMBO2A arrival, STAR, if he gives it to you that's, that's the visual, VOR approach <i>DISCONTINUITY</i>
00:02:01	CAM-1	(Unintelligible)
00:02:01	CAM-3	Oh, Just leave it till you get there
00:02:03	CAM-2	Sorry?
00:02:04	CAM-3	Just leave it till you get there
00:02:05	CAM-2	You've got enough fuel for 4 holds
00:02:06	CAM-2	Qantas 25 will advise
00:02:09	?	How long ? 4?
00:02:10	CAM-2	4 holds. (Unintelligible) I, I err...
00:02:19	CAM-2	Qantas 25 will it be at our em ah, FL160 the holds? <i>DISCONTINUITY</i>
00:02:30	CAM-1	You put it now ah..
00:02:33	CAM-2	You've got a few in there though
00:02:34	CAM-1	Yeah -only, only most of these ones come down - no matter where we come as long as we get back to these two - on final
00:02:40	CAM-2	Well I guess, I guess as soon as we get it, put in an end point, y'kn, program the first couple and then just move on from, from there <i>DISCONTINUITY</i>
00:02:50	CAM-2	(Unintelligible sounds like "it's the same thing...")
00:02:51	CAM-3	133 now 132
00:02:57	CAM-3	Have you set up the approach yet?
00:02:59	CAM-2	Yeah we're doing that now
00:03:05	CAM-2	And ah wha, what, we haven't been given an approach
00:03:10	CAM-3	No sorry, well, no you haven't, but ask him if it's an approach or ah what procedure, what
00:03:16	CAM-1	Are we expecting a visual approach (Unintelligible sounds like "for") that's what we need to know
00:03:18	CAM-2	Yeah

Video Time	Source	Content
00:03:19	CAM-3	Well you gotta set a procedure
00:03:21	?	(Unintelligible)
00:03:22	CAM-1	said..said Approach would give us that
00:03:24	CAM-2	Yeah, said...
00:03:25	CAM-3	Alright
00:03:25	CAM-2	I - I don't think Robs providing that service so he doesn't want to tread on the toes of the -
00:03:29	CAM-3	oh it's a local is it
00:03:30	CAM-2	- the country local.
00:03:31	CAM-1	yeah
00:03:35	CAM-3	So (Unintelligible)
00:03:35	CAM-2	The, the exit is armed,
00:03:37	CAM-1	Yes
00:03:37	CAM-2	okay ? So take that Execute
00:03:39	CAM-1	Yes
00:03:49	CAM-2	Okay we've been cleared to Funchal FL160 1 6 0 set in the ah the MCP
00:03:58	CAM-1	So I want flaps 30 then
00:03:59	CAM-2	right okay
		<i>DISCONTINUITY</i>
00:04:04	CAM-2	..5 is ah now exiting the ah 4th hold
00:04:09	ATC	Qantas 25 Break...
00:04:10	CAM-1	I figured he wanted us to go direct before
00:04:14		[sound like seat adjustment]
		<i>DISCONTINUITY</i>
00:04:33	RDO-2	Qantas 2 say again - Qantas 25, say again
00:04:38	ATC	Qantas 25 Descend FL150
00:04:42	RDO-2	1 5 0 Qantas 25
00:04:31		(Spill mopup discussion)
00:05:33	ATC	Qantas 25 report endurance
00:05:38	RDO-2	Qantas 25 Standby
00:05:41	CAM-1	(Unintelligible)
00:05:46	CAM-2	What's out endurance
00:05:49	CAM-3	How far you can go...you..
00:05:51	CAM-2	Yeah we got another uh I'd say another... err fi... err... probably another 9 0 minutes

Video Time	Source	Content
00:05:58	CAM-1	Is it on here? Does it give you on here?
00:06:02	?	Nah it's 50 minutes left?
00:06:03	CAM-3	Nah, you - you have to leave enough to go around if you have to
00:06:08	CAM-2	We've got 11 - we've got 12 tonnes - I reckon we've got 90 minutes endurance
00:06:10	CAM-3	you want enough to spare ...go straight in
00:06:14	?	(Unintelligible - like "control the gear down")
00:06:17	RDO-2	Qantas 25 ah, Endurance 9 0 minutes
00:06:22	?	Yeah that's right down to zero David
00:06:24	CAM-1	Yeah with no reserve
00:06:27	CAM-1	I Like ah 30 - 30 <chuckle>
00:06:27	ATC	Qantas 25 say again
00:06:30	CAM-2	You want some reserves?
00:06:32	CAM-1	Bloody Oath
00:06:33	RDO-2	Qantas 25 ah endurance 6 0 minutes
00:06:36	CAM-2	And dropping <chuckle>
00:06:38	ATC	Qantas 25. Break..
00:06:42	?	<sigh>
00:06:48	CAM-1	sure we've got about 20 tonne
00:06:54	CAM-2	We can reduce our speed if you want
00:06:58	?	(Unintelligible)
00:06:59	CAM-1	We've only got 5 miles to go
00:07:06		(Discussion of spill in cockpit)
00:07:50	ATC	Qantas 25 do you want to proceed to St Charles - previous aircraft still experiencing delays
00:07:58	CAM-1	Didn't hear it
00:08:00	RDO-2	err Qantas 25 um say again ?
00:08:04	CAM-2	What does he want us to do?
00:08:05	ATC	Qantas 25 disregard
00:08:07	CAM-2/1	Yeah.. (Unintelligible)
00:08:11	?	Something about another aircraft in front of you guys experiencing delays
00:08:13	?	Yeah...
00:08:15	ATC	Qantas 25 cross your fingers... contact Madeira Approach 1 1 9 2
00:08:19	RDO-2	1 1 9 2 Madeira Approach thanks and ah, we will Qantas 25
00:08:23	CAM-1	(Unintelligible)

Video Time	Source	Content
00:08:26	CAM-2	1 1 9 2 selected, across...
00:08:28	CAM-3	you're in
00:08:29	CAM-2	thanks
00:08:30	CAM-3	in now
00:08:34	RDO-2	Qantas err, correction Madeira Approach Qantas 25 with you maintaining FL150 - direct Funchal
00:08:46	ATC	Qantas 25 good afternoon and welcome to Madeira Approach, err, you can err track direct Foxtrot Uniform November Oscar Romeo err down to FL080 expect 05
00:09:03	RDO-2	Direct Funchal FL080 Qantas 25
00:09:11	CAM-2	Okay we're already direct Funchal...
00:09:13	ATC	Qantas 25 correction that is not Funchal it's FUNOR Foxtrot Uniform November Oscar Romeo repeat Foxtrot Uniform November Oscar Romeo and er down to FL 080
00:09:15	CAM-1	no... its ff... its FUNOR... it's a, it's a waypoint
00:09:20	CAM-3	Oscar Romeo
00:09:26	?	Foxtrot Uniform November Oscar Romeo
00:09:28	RDO-2	Foxtrot Uniform November Oscar Romeo FL080 Qantas 25
00:09:24	?	(Unintelligible - sounds like "not speaking very well...")
00:09:40	CAM-2	Ok Flight Level - Flight Level 080 set
00:09:41	CAM-1	There's the....
00:09:44	CAP-CP	There it is
00:09:46	CAM-3	you're not descending yet
00:09:47	CAM-2	Flight level 8000, set
00:09:48	CAM-2	yes
00:09:49		[sound like a MCP button push]
00:09:50	CAM-2	okay - Down we go
00:09:55	CAM-2	Okay so we leave the disco there just in case they give us radar vectoring
00:09:58	CAM-1	Now we put those, put those, those other two FUN, those GELO and.. whatsaname in ..
00:10:05	CAM-2	Yep - Yep.
00:10:16		[sounds like papers rusting -continues for 20 seconds]
00:10:24	CAM-2	You right to add them in or do you want me to? Its up to you
00:10:26	CAM-1	I can do it...
00:10:27	CAM-2	Do you want to add em in?
00:10:30	CAM-1	ummm...I'm just looking to see what they are
00:10:31	CAM-2	Okay
00:10:32	CAM-1	I've written em down (though?)

Video Time	Source	Content
00:10:41	CAM-1	2 th.. I know what they are.... 2 3 4.... slash 7 point 4. Oh I shouldn't put it there should I...
00:10:56	CAM-2	I don't think it likes the 7 point 4
00:10:58	ATC	And Qantas 25 heavy you can expect a short hold at FUNOR intersection and uh we'll get you in as quickly as possible
00:11:07	CAM-3	What are you trying to put in?
00:11:08	RDO-2	Expect a hold at FUNOR, Roger Qantas 25
00:11:11	CAM-1	Trying to put in a ah, Lat Long , sorry a D M, a VOR radial distance waypoint.
00:11:18	?	That's right but I don't - it doesn't do decimals does it
00:11:21	CAM-2	Yeah it doesn't do decimal on the distance John that was correct be no decimal on the distance
00:11:26	?	Just make it a bit further out usually
00:11:34		[sound like cockpit door opening]
00:11:36	?	ATC's advised to slow down as much as possible otherwise they won't get in
00:11:41	CAM-2	I got it John you keep going there
00:11:52	CAM-2	What was the... ATC should be telling us to slow down
00:11:55	?	Nah its just an advisory you can fly whatever you like but their just letting you know you really need to...
00:11:57	CAM-2	Oh okay...
00:12:03	?	...watch your speed
00:12:04	CAM-2	yep
00:12:13	CAM-3	Ask him what your approach is likely to be; you can set something up
00:12:20	RDO-2	ah, Qantas 25 ah, request?
00:12:25	ATC	Qantas 25 go ahead
00:12:27	RDO-2	Qantas 25 ah can you provide an indication of what approach were likely to err, have, for uh our arrival
00:12:39	ATC	Qantas 25 you can expect VOR DME approach- (break in recording) <i>DISCONTINUITY</i>
00:12:50	CAM-1	What was our Fuel
00:12:53	?	1 0 3 2
00:12:59	?	(Unintelligible - sounds like "too low fuel")
00:13:10	?	Approaching
00:13:11	CAM-2	Approaching 3000 <i>DISCONTINUITY</i>
00:13:19	CAM-1	It's only because you jumped up 500 when you...
00:13:23	CAM-2/3	changed the QNH

Video Time	Source	Content
00:13:29	CAM-1	Now at FUN...
00:13:30	CAM-2	Okay yep
00:13:32	CAM-3	Now the fun begins
00:13:33	CAM-1	Did we...Did we get a heading from FUNOR or is it our own discretion?
00:13:36	?	It's a VOR DME approach your cleared for
00:13:38	CAM-1	oh
00:13:39	CAM-2	It's our own VOR DME approach they said
00:13:40	CAM-1	that's this one here
00:13:42	CAM-1	so is just to follow this down here -
00:13:43	CAM-2	Its the FUNOR4
00:13:44	CAM-1	which is the ... which is to go to -
00:13:45	CAM-2	FUN
00:13:46	CAM-1	-go to FUN
00:13:47	CAM-2	Yep
00:13:48	CAM-1	and then track that 2 1 3 radial
00:13:52	CAM-1	from FUNOR... (Unintelligible) there
00:13:56	CAM-3	yep that's right
00:13:57	CAM-1	a heading of ah say 2 1 3 from FUNOR, ah, from FUN
00:14:01	CAM-2	Yep
00:14:02	CAM-3	There you go
00:14:04	CAM-2	That's mine is it?
00:14:05	CAM-3	yep
00:14:06	CAM-2	So 2 1 3
00:14:10	?	(Unintelligible)
00:14:11	CAM-2	...yep...2 1 3
00:14:17	CAM-1	Now at FUN I want to be down to... (Unintelligible)
00:14:23	CAM-2	We've got 2 1 3 programmed in for LNAV so- (break in recording)
		<i>DISCONTINUITY</i>
00:14:43	CAM-3	Information DELTA from the tower
00:14:45	CAM-2	Sorry?
00:14:46	CAM-1/3	Information Delta / from the Tower
00:14:47	CAM-3	Thanks

Video Time	Source	Content
00:14:48	RDO-2	Tower ah, Qantas 25 with you ah with information DELTA, we're uh, outbound from the Funchal ah VOR
00:15:02	ATC	Qantas 25 Good morning, this is Madeira Approach, correction Madeira Tower you cleared for visual, visual approach runway 05 number 2, number 1 on short finals, report on finals
00:15:17	RDO-2	Copied number 2 cleared for the approach will call on finals Qantas 25
00:15:22	CAM-1	Right now we want uh Gear Down
00:15:26	CAM-2	Gear Down
00:15:28		[sound like landing gear lever being moved]
00:15:30	CAM-1	Now I want you to...I want you to...
00:15:31	CAM-3	Watch your speed John we're right on the very, uh...
00:15:31		[Sound like gear lowering]
00:15:32	CAM-1	I want you to ah...
00:15:38	?	(Unintelligible)
00:15:41	CAM-1	I'll get you to steer me round on the heading select
00:15:45		[Sound like FMC chime]
00:15:46	CAM-2	Okay
00:15:47	CAM-3	Insufficient Fuel message ignore
00:15:49	CAM-2	yep
00:15:51	?	Watch your speed bricks
00:15:53	CAM-2	Yep watch your speed
00:15:59	CAM-2	You want me to
00:16:00	CAM-1	Okay yeah I want you to take me onto that FUN one
00:16:02	CAM-2	Yep copy that
00:16:04	CAM-1	I'll go ah... (Unintelligible sounds like "1 4")
00:16:06	?	Watch your speed
00:16:09	CAM-1	why wasn't it... haven't we got VREF (covered?)? Why isn't it...(Unintelligible)
00:16:15	CAM-3	Flaps down guys
00:16:17	CAM-1	More flaps, flaps 25
00:16:19		[Sound like flap lever moving]
00:16:22	CAM-1	Flaps 25
00:16:31	CAM-1	Now we're picking up speed
00:16:39	CAM-1	Okay , yeah that came round pretty quick that headland
00:16:44	CAM-2	Yep we got it, we nailed it
00:16:46	CAM-1	Just gotta watch it out there. wasn't exact... we gotta, we gotta be to the right of that headland there see that headland there with the white cliff

Video Time	Source	Content
00:16:52	CAM-2	okay yep, yep yep
00:16:53	CAM-1	We need to keep going round I think
00:16:55	CAM-2	We're were... okay, right
00:16:57	?	Zoom in a bit more John ("on that"?)
00:16:58		[Sound like datalink chime]
00:17:00	CAM-1	(Unintelligible sounds like "speed still"?)
00:17:01	CAM-2	We've zoomed right in as much as what we can
00:17:03	CAM-2	Okay we've got Flaps 25, Gear down, checks for landing
00:17:09	?	(Unintelligible sounds like "okay")
00:17:11	CAM-2	-cabin notification
00:17:12	CAM-1	Oh we've gotta go down
00:17:17	CAM-2	is complete Landing Gear down 3 green -
00:17:19		[Sound like MCP button press]
00:17:20	CAM-2	-Speedbrakes, can we arm the Speedbrakes? ah Flaps -
00:17:25	CAM-3	They're armed
00:17:27	CAM-2	- planned we got flaps to go
00:17:29	CAM-A	"Terrain Terrain - Whoop Whoop - Pull Up" -(continues to end of recording)
00:17:34		[Sound like chair adjustment]
00:17:34	?	(Unintelligible)
00:17:37		[Sound similar to TOGA button push]
00:17:37	CAM-1	uh - Gear Up
00:17:38	?	(Unintelligible sounds like "where she going"?).
00:17:40		[Sound similar to repeated autothrottle disconnect]
00:17:41	?	(Unintelligible sounds like "push it in"?)
00:17:42	CAM-A	"Sink Rate"
00:17:42	CAM-1	Okay...
00:17:46		[Sound of impact]
00:17:46		[End of recording]