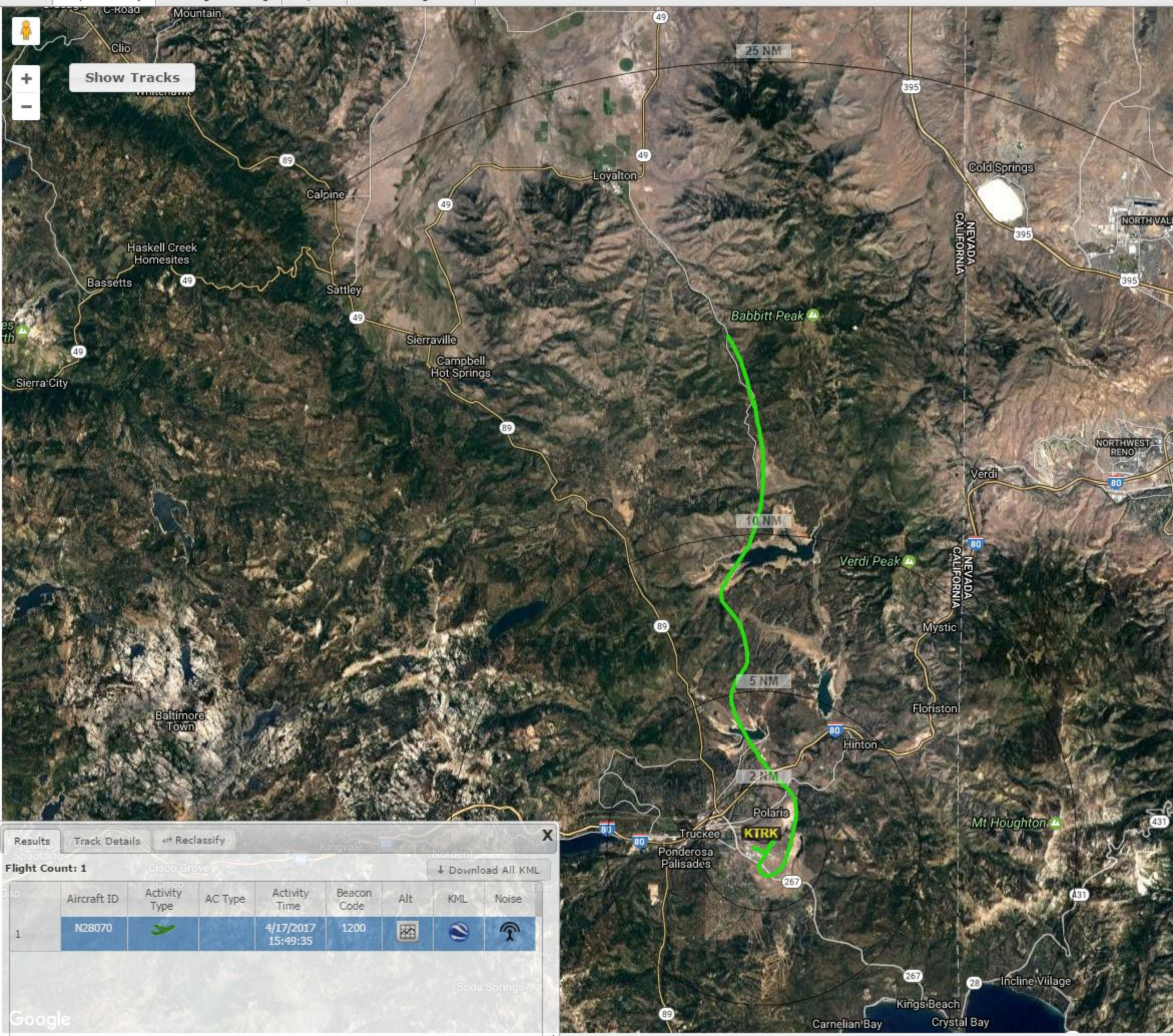
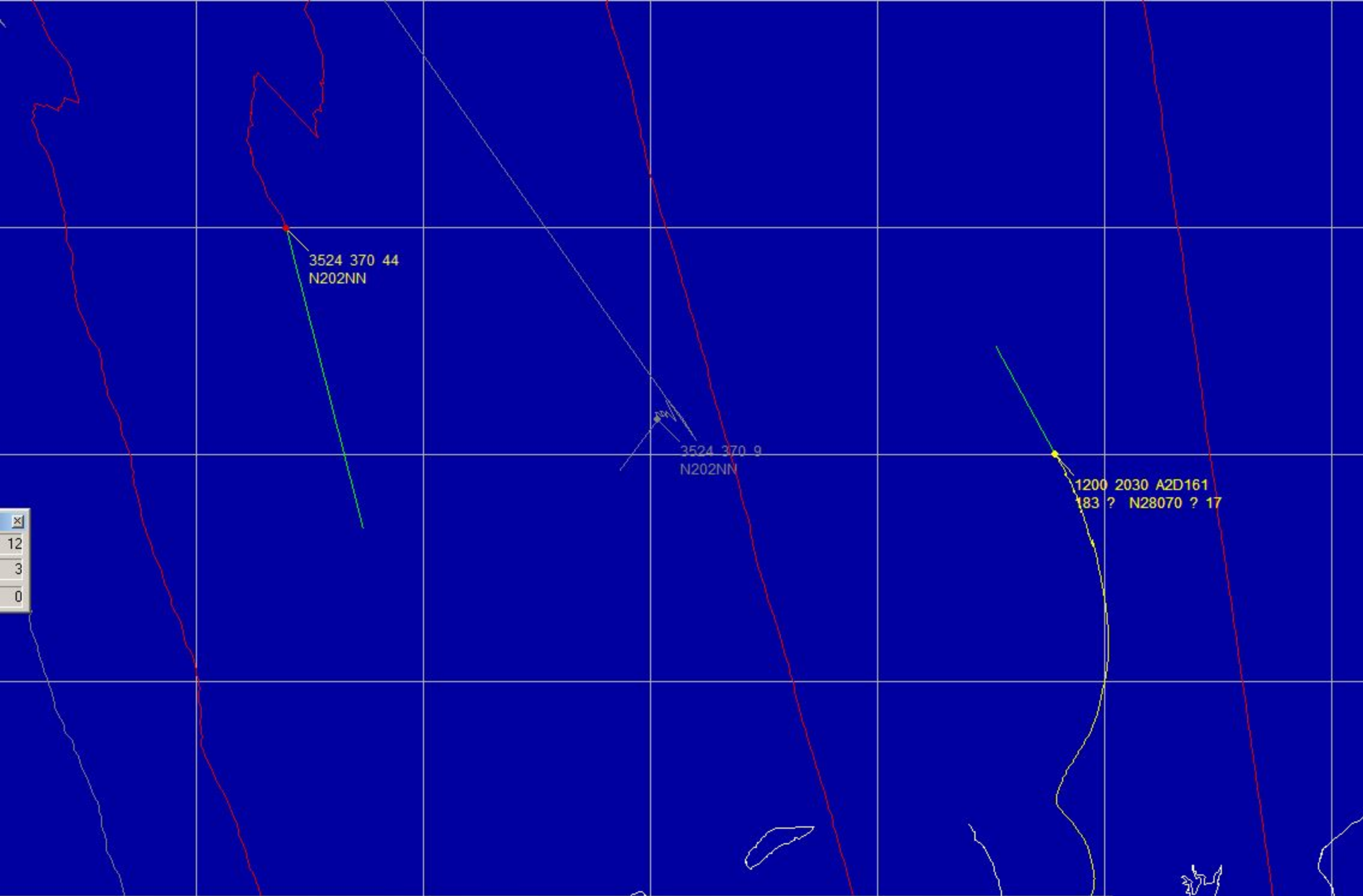




Results								
Track Details								
↔ Reclassify								
Flight Count: 1								
Download All KML								
	Aircraft ID	Activity Type	AC Type	Activity Time	Beacon Code	Alt	KML	Noise
1	NZ8070			4/17/2017 15:49:35	1200			



12
3
0

Properties for 1200 (101:2030)

PropertiesAltitude

Property	Unit	Value
Number		101:2030
Time		15:57:50.03
Position		39° 35' 27.03" N, 120° 09' 48.64" W (V)
Map pos. X,Y,s	m	4386190, 743579, 40
Pos. precision (...)	m	115.0, 330.8, 0.0
RMS	m	350.2
Altitude (mode C)	ft	
Altitude (mode S)	ft	18300
Altitude (GNSS)	ft	
Altitude (GNSS) ...	ft	
Altitude (sensor)	ft	7783
Altitude (sensor...)	ft	1110.57
Speed	kt	177
Azimuth	°	330
Azimuth to targ.	°	355.87
Speed (GNSS)	kt	
Speed (GNSS) p...	kt	
On ground sign		
Number of posit...		1643 / 1643
SSR - Mode 3/A		1200 VL (0/3)
Mode S - Address		A2D161 (5/7)
Tacan	cha...	
RL - Type		
Flight Plan - Identifi...		
User DB - Priority		
Priority		3
Operator note		
Figure Of Merit		0

Target table 1: 15 Targets								
Sensor	Track. time	Altitude (sensor) precision	Altitude	Speed	Mode C	SSR - Mode 3/A	Mode S - Address	Mod S - Tail number
01	0:18:44	1308.00	26000	407	6031 V	6374 V L	A6DBBC	N541B
01	0:18:34	338.50	18300	177	3110 V	1200 V L	A2D161	N28070
01	0:10:37	301.00	36000	298		1325 V L	A67538	N515NK
01	0:10:40	381.50	35975	490	6073 V	7342 V L	A47D05	N389DA
01	0:10:00	808.00	31202	635	4063 V	3760 V L	A41E94	N36476
01	0:09:08	80.50	34000	449	6023	7312 V	A105E8	N165SY
01	0:06:25	38.50	28000	316	6061	1073 V		
01	0:06:08	42.50	28000	332	1720		ABA8EB	N850SC
01	0:05:20	40.50	37025	568	0073	3716 V	A2A3B6	N26967
01	0:01:14	104.50	37000	91		3524 V	A19AAA	N202NN
01	0:00:41	354.00	33000	495		7024 V L		
01	0:00:21	717.00	33000	325		2624 V L		
01	0:00:24	446.50	33000	296			A80552	N616CZ
01	0:01:16	84.00	37000	443	0073	3524 V	A19AAA	N202NN
01	0:00:09	232.00	15125	333	1221	4563 V	AC6D74	N90GL

Info

4355801 : 793850

15/1510km x 10km

15:58:11 18.04.201725807

Replay

Socata accident - follow-up questions / clarifications

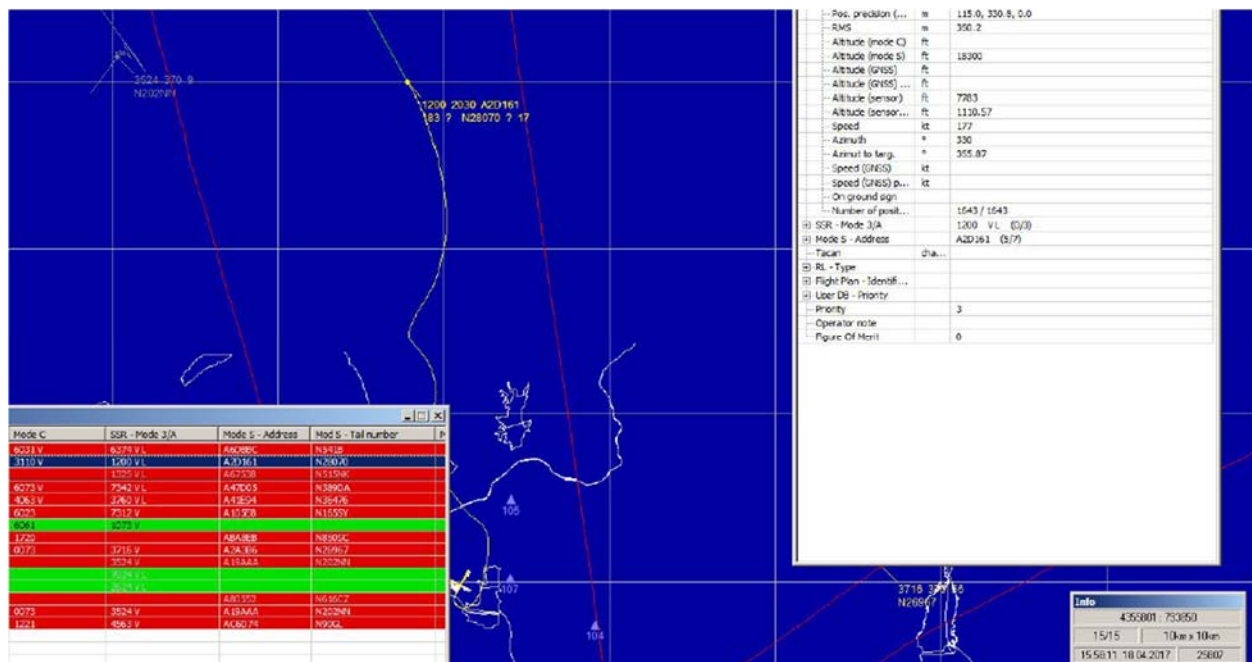
Subject: Flight N2807 Date 4/17/2017 10:48:58 AM PST – 10:57:58 AM PST

Asterix File: 20170417_220000_TP1Cat20.ast

The following picture represents the Asterix file which contains the subject flight and addresses the question from NTSB Tom Little as it relates to the Mode S altitude.

Tom's Statement / Quote:

“Also, with respect to the “track point” data panel, which is attached to this email as well, the Altitude (mode S) reads **18,300 ft**, which wouldn’t be our airplane’s altitude. Not sure I see our airplane’s altitude here. Could you please clarify?”



Response: As Tom stated the Mode S altitude as captured and reported by the system was 18,300 feet. This altitude is in fact erroneous and not accurate as displayed in the MLAT property box for the aircraft involved in the incident. The aircraft was flying with a Mode S transponder with a Mode C altitude encoder.

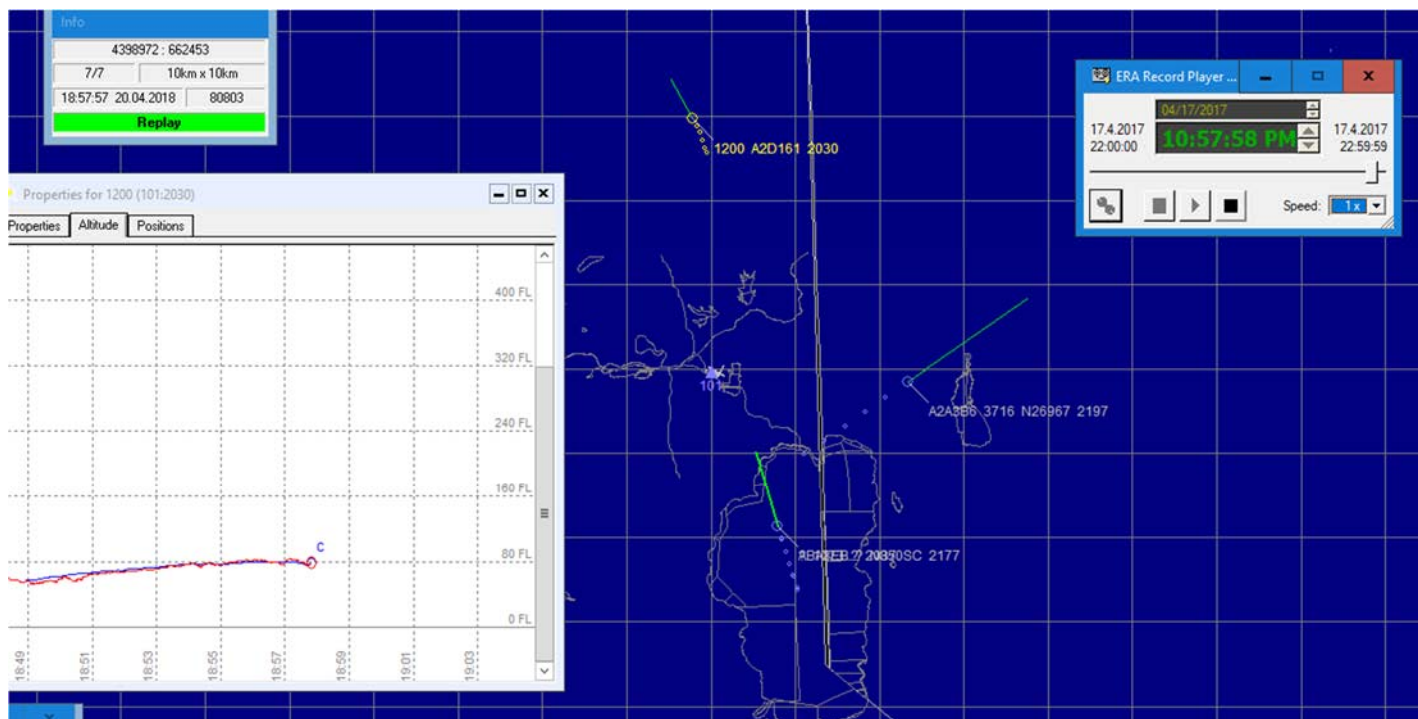


Socata accident - follow-up questions / clarifications

Deregistered Aircraft			
Deregistered Aircraft 1 of 2			
Aircraft Description			
Serial Number	WB2	Certificate Issue Date	None
Manufacturer Name	WILLOWBROOK	Mode S Code (base 8 / oct)	50550541
Model	VOLKSPLANE WE-1	Mode S Code (base 16 / hex)	A2D161
Year Manufacturer	None	Cancel Date	None
Reason for Cancellation	Unknown	Export To	None
Type Registration	Unknown		

The aircraft was reporting its Mode C encoded altitude which was being interrogated and captured by the MLAT system. In addition, the MLAT system uses its precision altitude calculation from the MLAT sensors and then plots them both (Mode C and Sensor Precision) as seen in the below screen shot. Please note that the KTRK interrogator does not use selective interrogations of Mode S transponders. The KTRK interrogator is operating in the all call mode, this coupled with the aircraft approaching and flying outside the optimum geometry of the MLAT ground stations which can be seen by the high RSM value (283) as well as close proximity to the ground cause the erroneous Mode S altitude report.

When the Asterix file was played back showing the altitude as reported by the Mode C encoder and MLAT sensor precision see picture below. The Mode C altitude being reported and MLAT Sensor precision overlay each other and should be considered as the aircraft altitude for this investigation.



If the NTSB requires a further break out of the data into an excel spreadsheet which has all ICAO Meta data decoded, this can be done using the Asterix 20 conversion tools.



Socata accident - follow-up questions / clarifications

Reference Material: Mode S interrogation and reply formats

Refer to **Figure 1**. The Mode S selective interrogation transmitted on a 1030 MHz carrier comprises a two pulse preamble, followed by a data lead in period. A sync phase reversal in the 1030 MHz carrier references the start of a 56-bit or 112-bit DPSK (Differential Phase Shift Keying) data block. The second preamble, pulse P2, will suppress Mode A/C transponders from replying.

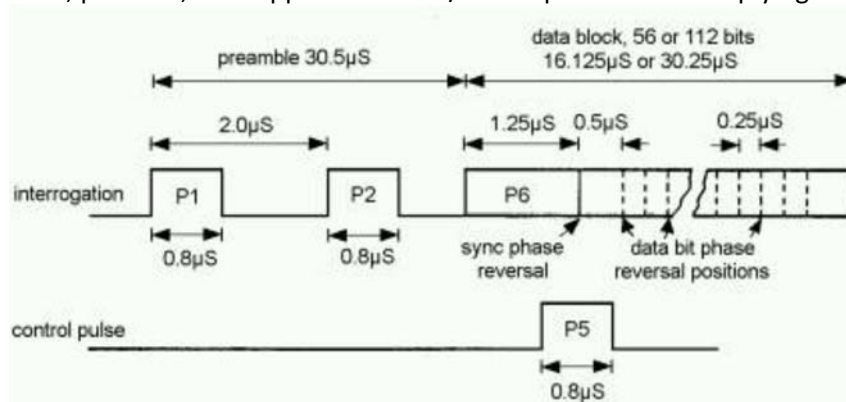


Figure 1: Mode S selective interrogation format

Refer to **Figure 2**. The ATCRBS/Mode S All-Call format consists of two 0.8 μs pulse P1 and P3, that identify the Mode group A or C, with a 0.8 μs P2 ISLS (interrogation Side Lobe Suppression) or control pulse, followed by a P4 pulse that may be 0.8 μs (all-call short) or 1.6 μs (all-call long). Mode S transponders only reply to the all-call long, whereas Mode A/C (ATCRBS) transponders will ignore the P4 pulse and reply to both all-call short and all-call long.

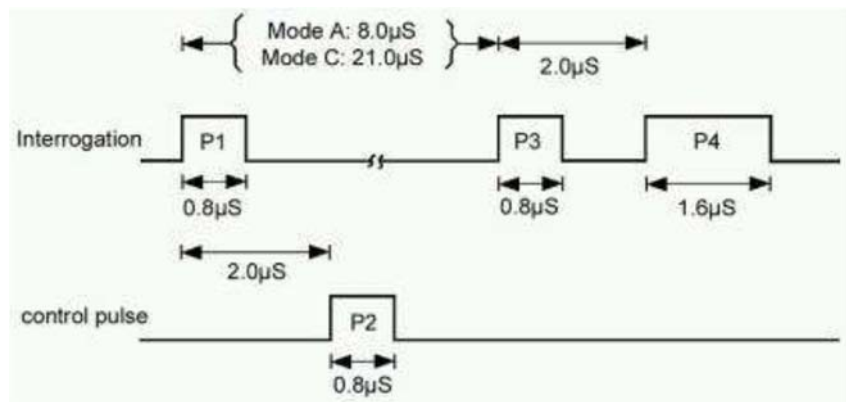


Figure 2: ATCRBS/Mode S All-Call format

All-Call and Selective (Roll-Call) periods

The Mode S ground interrogator provides surveillance of both Mode A/C and Mode S equipped aircraft, with minimal mutual interference. The 1030 MHz interrogation channel is divided into distinct and non-overlapping periods of Mode A/C and Mode S activity, known as the 'all-call' period and Mode S selective interrogation activity, known as the 'roll-call' period. Interrogations during the all-call period elicit replies from Mode A/C aircraft and acquire Mode S aircraft via acquisition of the 24-bit ICAO aircraft address and the position of the aircraft. During the roll-call period (also known as the Mode S period), selective surveillance interrogations are sent to Mode S aircraft. Once an aircraft has been acquired during the all-call period, surveillance is then carried out discretely during the roll-call period.



Socata accident - follow-up questions / clarifications

