

HOW HIGH CAN YOU FLY?

SCOTT CROSBY

2770+ HRS TOTAL TIME 540+ HRS IFR

N422SP 1978 CESSNA 182Q

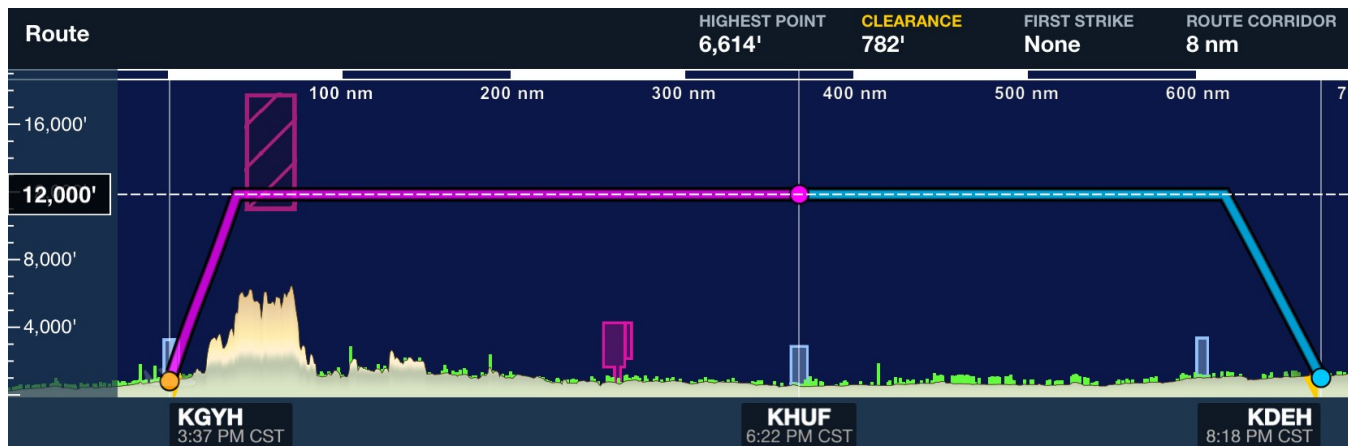
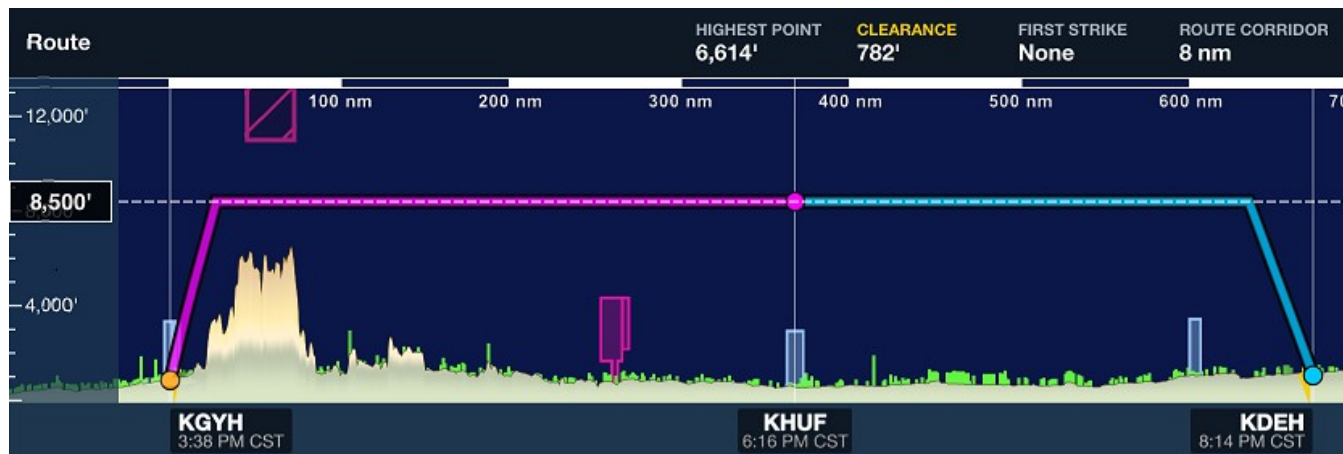




WESTBOUND AT 12,000 FEET – WHY?

OVER THE SMOKIES

12,000 FT VS. 8,500 FT



9,000 FT INBOUND



33 KNOT TAILWIND

<5 HR NON-STOP, >4 HR @11,000FT VS. 6 HR + STOP



SUNRISE AT 11,000 FT !



Personal Notes

- **HYPOXIA IS INSIDIOUS.**
 - **AM I BORED OR NOT ENOUGH OXYGEN? BOTH?**
- **WHEN FLYING, I:**
 - **SAY ALPHABET BACKWARD**
 - **INCREASE MY SCAN, TAKE PICTURES, EAT, ...**
 - **DO CALCULUS IN MY HEAD**
(ACCELERATION, VELOCITY, DISTANCE OVER TIME)
- **BEING A PASSENGER IS BORING.**
 - **BUT MY WIFE VIRTUALLY NEVER NAPS.**

Is 12,000 FT SAFE?

WHAT ARE THE FACTS?

BLOOD OXYGEN LEVELS

NORMAL – OVER 95%

BELOW 90% – ALARM: MEDICAL SYMPTOM!

AT 8,000 FT, 90% – 74% O₂ / BREATH

AT 12,000 FT? 64% O₂ / BREATH

THE ATMOSPHERE

Inches Hg to Millibars to Altitude conversion (standard pressure)														
29.92"	=	1013 mb	=	0000'	23.09"	=	0782 mb	=	7000'	14.76"	=	0500 mb	=	FL 180
28.85"	=	0977 mb	=	1000'	22.24"	=	0753 mb	=	8000'	11.81"	=	0400 mb	=	FL 240
27.82"	=	0942 mb	=	2000'	21.38"	=	0724 mb	=	9000'	8.86"	=	0300 mb	=	FL 300
26.81"	=	0908 mb	=	3000'	20.58"	=	0697 mb	=	10,000'	6.64"	=	0225 mb	=	FL 360
25.84"	=	0875 mb	=	4000'	19.19"	=	0650 mb	=	12,000'	5.17"	=	0175 mb	=	FL 420
24.89"	=	0843 mb	=	5000'	18.66"	=	0632 mb	=	12,500'	3.69"	=	0125 mb	=	FL 480
23.98"	=	0812 mb	=	6000'	17.23"	=	0583 mb	=	14,000'					

ATMOSPHERIC PERCENT OF SEA LEVEL:

8,000 FT = 74%

12,000 FT = 64%

14,000 FT = 58%

THE EXPERIMENT

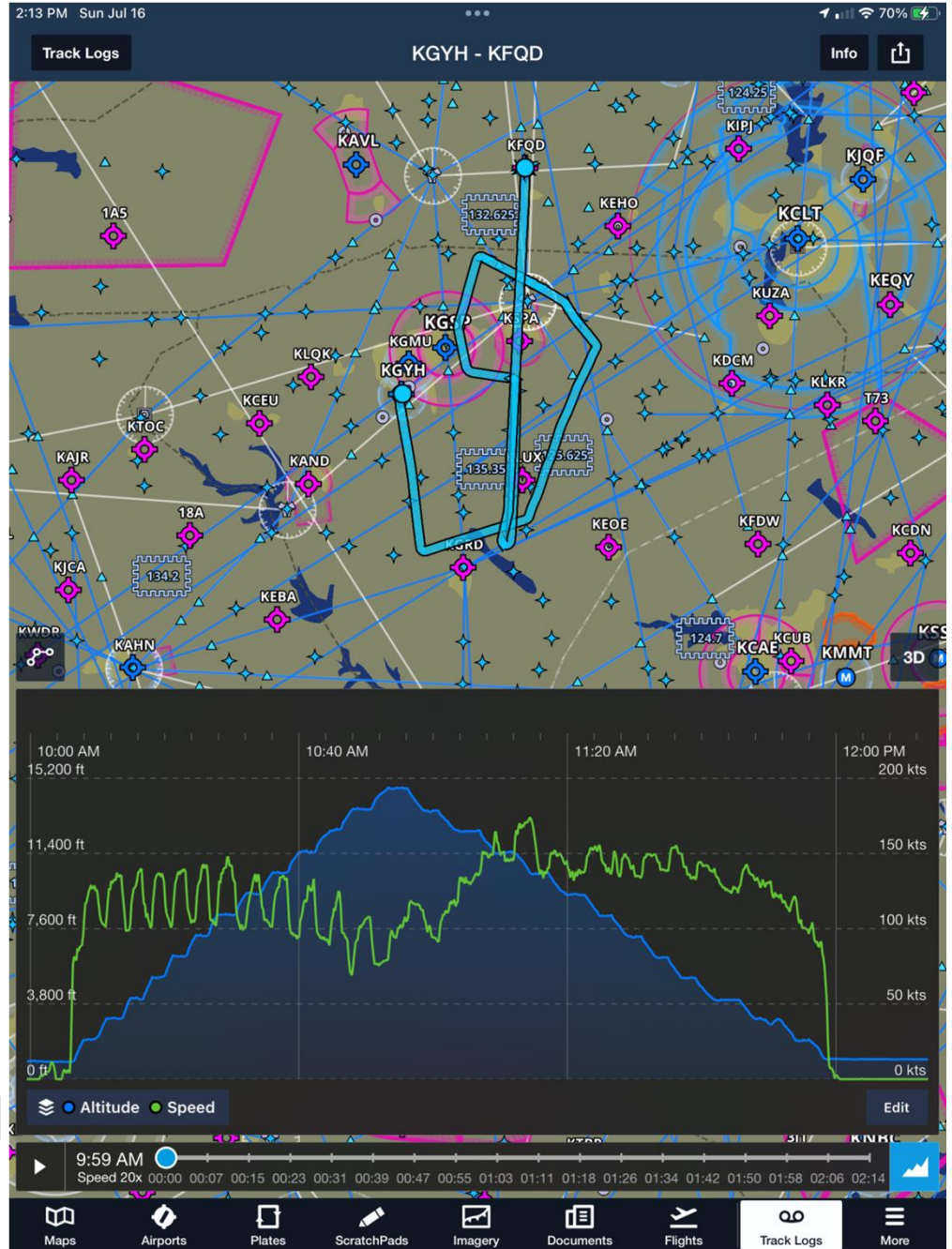
**OXIMETER
FROM SPORTY'S
ABOUT \$35**



- **FLY OUR 182 UP TO THE HIGHEST LEGAL ALTITUDE — 14,000 FT**
- **RECORD OXYGEN LEVELS FOR BOTH PILOT AND PASSENGER AT EACH 1,000 FT — DURING ASCENT AND DESCENT**

WHAT WE DID

- **VFR, BUT
IFR ALTITUDES**
- **COORDINATED WITH
GSP APPROACH
BEFOREHAND**
- **APPROACH, CENTER
ASSIGNED HEADINGS
CLEAR OF TRAFFIC**
- **WE INFORMED
APPROACH OR
CENTER BEFORE EACH
ALTITUDE CHANGE**



THE RESULTS

THE RAW DATA:



WE RECORDED PULSE RATE
AND BLOOD OXYGEN.

BLOOD OXYGEN DOWN TO
75% AND 83%
AT 14,000 FT.

NOTE:

AGES ARE 71 AND 75;
AGE IS NOT A FACTOR.

Altitude	Scott		Manifold Pressure	Rhoda		
	Pulse Rate	Blood Oxygen		Pulse Rate	Blood Oxygen	
1000	89	94	28	78	94	
2000	88	90	23	79	93	
3000	81	93	23	77	93	
4000	85	91	23	77	92	
5000	82	90	23	78	92	
6000	84	91	22	78	91	
7000	83	90	21	78	91	
8000	84	91	20	76	91	
9000	81	87	19	75	89	
10,000	77	86	19	74	89	
11,000	82	83	18	74	87	
12,000	81	77	17	77	83	
13,000	81	82	16	77	83	
14,000	82	75	16	78	83	
13,000	77	77	16	76	82	
12,000	76	79	17	73	83	
11,000	75	82	18	72	85	
10,000	75	83	19	73	87	
9000	74	84	20	72	88	
8000	74	87	20.5	71	90	
7000	72	91	21	71	92	
6000	77	91	22	70	93	
5000	77	93	23	69	93	
4000	75	94	23	72	94	
3000	78	93	23	74	94	
2000	83	98	23	73	95	
1000	82	95	28	71	96	

CONCLUSIONS

- **FLYING UP TO 12,000 FEET, DAY OR NIGHT, WORKS FOR US – PROVEN BY ACTUAL EXPERIENCE.**
- **BLOOD OXYGEN BELOW 90% IS NOT AN ISSUE.**
- **A FRIEND WITH ASTHMA CAN ONLY GO UP TO 5,500 FEET**
- **SOME PILOTS GET HEADACHES AT HIGHER ALTITUDES – INDICATIVE OF A PHYSICAL LIMITATION**
- **HYPOXIA IS INSIDIOUS – CAUTION!**
- **THERE IS SIGNIFICANT PERSONAL VARIATION IN THE ABILITY TO FLY AT HIGHER ALTITUDES – CAUTION!**

QUESTIONS?

