Training für Assistenz- & Rettungssysteme am Beispiel Cirrus

Tools für sicheres Fliegen

22. März 2024

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Ballistische Rettungssysteme

- Cirrus: ca. 9.500 Flugzeuge
- BRS: ca. 35.000 Luftfahrzeuge (inkl. Cirrus)

CAPS™

Cirrus Airframe Parachute System

09. Juni 2016

IFR Flight, Z-Flightplan
EDFB (Reichelsheim) to EDDH (Hamburg)
3 POB (1 Pilot, 2 Pax)
Takeoff 12:22

cleared IFR to Destination EDDH via direct WRB, there after FP route climb FL110, IFR starts when passing 4500ft

After passing FL090 an OIL PRESSURE warning came up on the PFD (11 minutes after takeoff)

OIL PRESS
BARO
RANGE
PAN
MENU
FPL
PROC
CLR
ENT
RPM 2390
Man "Hg 7.7
7.8
Gal FFlow GPH
Gal Used 7.3
OIL PSI 17
Batt1 A
28.1
CHT °F 366
EGT/TIT °F 965
ENGINE
MAP
OBS CDI DME XPDR IDENT TMR/REF NRST ALERTS
XPDR 5035 ALT
UTC 12:33:10
24.5 NM
FUL
NAV2
GPS TERM
006°
9500
9400
9300
9200
9100
9000
STD BARO
EDLW
EDLA
EDKD
EDKP
EDKF
EDKH
EDKI
EDRW
EDRE
EDRK
EDGA

hh:mm:ss	ident	ft msl	kt	kt	fpm	deg	gph	deg F	psi	rpm	%
Lcl Time	AtvWpt	AltMSL	IAS	GndSpd	VSpd	Pitch	E1 FFlow	E1 OilT	E1 OilP	E1 RPM	E1 %Pwr
12:31:08	WRB	8651.5	119.01	127.28				195.12	48.51	2480.0	1.00
12:31:13	WRB	8717.0	119.00	128.59	731.62	5.56	36.78	194.92	46.28	2481.9	1.00
12:31:18	WRB	8786.7	120.75	129.40	786.75	6.19	36.18	194.39	43.77	2480.5	1.00
12:31:24	WRB	8888.4	120.80	128.72	1033.44	6.51	36.52	192.91	38.58	2480.7	
12:31:34	WRB	9054.2	119.97	127.96	953.68	6.23	35.53	190.13	34.95	2477.6	
12:31:41	WRB	9162.7	119.56	128.06	896.17	5.93	34.92	188.06	33.17	2479.0	
12:31:48	WRB	9268.2	119.43	128.53	856.89	5.81	34.61	185.79	30.49	2477.5	0.97
12:31:56	WRB	9381.9	119.81	129.38	803.57	5.79	34.43	182.82	28.19	2476.6	0.97
12:32:10	WRB	9577.9	117.68	127.96	699.28	5.34	22.21	178.14	25.35	2484.8	0.65
12:32:17	WRB	9627.5	117.00	127.38	377.08	3.43	21.70	175.69	23.67	2486.5	0.67
12:32:24	WRB	9628.6	119.73	130.49	-51.39	1.21	21.59	173.54	21.93	2488.2	0.67
12:32:32	WRB	9576.1	123.72	135.23	-439.40	0.29	19.19	170.02	19.85	2485.1	0.53
12:32:39	WRB	9505.3	126.34	138.40	-641.53	0.64	17.13	166.23	19.01	2482.1	0.42
12:32:46	WRB	9484.1	124.87	137.10	-119.91	2.60	16.88	163.45	18.50	2481.6	0.41
12:32:52	WRB	9503.6	121.82	133.27	220.05	3.09	15.84	161.44	16.94	2479.3	0.36
12:32:59	WRB	9511.4	114.23	123.45	211.90	3.41	9.11	158.95	15.61	2479.6	0.14
12:33:07	WRB	9507.1	101.03	106.46	46.16	5.58	6.36	156.99	16.22	2394.4	0.08

Öldruck sinkt rapide ab

Reduzierung Power (gem. Checkliste)

hh:mm:ss	ident	ft msl	kt	kt	fpm	deg	gph	deg F	psi	rpm	%
Lcl Time	AtvWpt	AltMSL	IAS	GndSpd	VSpd	Pitch	E1 FFlow	E1 OilT	E1 OilP	E1 RPM	E1 %Pwr
12:41:55	EDFB	1776.6	87.18	101.02	16.13	5.20	10.[illegible]	[illegible]	[illegible]	2244.2	0.31
12:41:56	EDFB	1766.7	87.59	100.57	-221.45	4.43	6.69	183.78	3.63	1902.2	0.10
12:41:58	EDFB	1743.1	91.46	99.04	-321.27	1.31	3.10	182.59	2.52	1600.8	0.06
12:41:59	EDFB	[illegible]	90.82	98.67	-489.44	2.13	2.79	182.63	2.54	1604.6	0.06
12:42:01	EDFB	[illegible]	91.19	98.01	-901.62	1.68	2.01	183.99	3.10	1565.7	0.06
12:42:02	EDFB	[illegible]	90.53	97.83	-900.61	-0.09	1.94	184.95	3.13	1597.5	0.05
12:42:03	EDFB	[illegible]	90.38	97.99	-1070.07	0.09	1.95	185.15	3.11	1653.0	0.05
12:42:05	EDFB	1613.4	91.83	98.67	-1209.86	0.15	1.97	184.71	3.19	1694.9	0.05
12:42:06	EDFB	1592.7	91.97	99.19	-1189.78	0.67	1.96	184.22	3.37	1699.9	0.04
12:42:07	EDFB	1571.3	91.82	99.76	-1185.54	-1.14	1.98	183.37	3.44	1708.0	0.05
12:42:08	EDFB	1546.2	92.47	99.74	-1246.61	-5.92	1.98	182.62	3.41	1727.7	0.05
12:42:09	EDFB	1513.2	88.60	95.42	-1452.77	-7.19	2.09	181.03	3.04	1695.1	0.05
12:42:10	EDFB	1478.5	75.18	78.30	-1883.08	-7.01	2.18	178.24	1.96	1455.5	0.05
12:42:11	EDFB	1438.5	58.47	62.49	-1872.46	0.46	2.07	175.52	0.91	1090.5	0.05
12:42:12	EDFB	1392.6	54.69	46.85	-1245.57	13.34	1.89	174.14	0.39	678.9	0.04
12:42:13	EDFB	1333.1	44.88	35.32	-1424.28	-11.78	1.59	175.62	0.03	287.5	0.02

Ausfall des Motors

CAPS Aktivierung
1.700 ft AGL

Lcl Time	AtvWpt	AltMSL	IAS	GndSpd	VSpd	Pitch	E1 FFlow	E1 OilT	E1 OilP	E1 RPM	E1 %Pwr
12:42:03	EDFB	1653.6	90.38	97.99	-1070.07	0.09	1.95	185.15	3.11	1653.0	0.05
12:42:05	EDFB	1613.4	91.83	98.67	-1209.86	0.15	1.97	184.71	3.19	1694.9	0.05
12:42:07	EDFB	1571.3	91.82	99.76	-1185.54	-1.14	1.98	183.37	3.44	1708.0	0.05
12:42:09	EDFB	1513.2	88.60	95.42	-1452.77	-7.19	2.09	181.03	3.04	1695.1	0.05
12:42:11	EDFB	1438.5	[illegible]	[illegible]	-1872.46	0.46	2.07	175.52	0.91	1090.5	0.05
12:42:13	EDFB	1333.1	44.88	35.32	-1424.28	-11.78	1.59	175.62	0.03	287.5	0.02
12:42:15	EDFB	1203.1	38.81	17.36	-3306.07	-33.97	1.20	180.06	-0.30	13.6	0.00
12:42:17	EDFB	1131.7	22.42	10.59	-3862.59	-69.15	4.24	181.71	-0.35	0.0	-0.00
12:42:18	EDFB	1099.3	-0.59	15.03	-3187.02	-76.81	4.59	180.69	-0.37	0.0	-0.00
12:42:19	EDFB	1062.9	5.53	20.39	-2655.78	-73.15	4.65	179.42	-0.36	0.0	0.00
12:42:20	EDFB	1026.8	29.93	24.34	-2232.34	2.32	4.17	177.98	-0.36	0.0	0.00
12:42:21	EDFB	991.3	34.00	29.84	-1845.62	7.86	2.92	176.32	-0.35	0.0	0.00
12:42:24	[illegible]	[illegible]	[illegible]3.62	24.96	-1789.39	9.73	2.46	173.23	-0.31	0.0	0.00
12:42:29	[illegible]	[illegible]	[illegible]0.05	22.47	-1403.64	3.21	1.57	172.03	-0.33	0.0	0.00
12:42:33	[illegible]	[illegible]	[illegible]0.00	20.94	-1431.26	-12.05	0.41	170.46	-0.32	0.0	0.00
12:42:38	EDFB	576.9	0.00	18.89	-1561.06	10.34	0.41	168.76	-0.30	0.0	0.00
12:42:39	EDFB	547.5	0.00	20.10	-1577.50	11.20	0.42	168.55	-0.32	0.0	0.00
12:42:40	EDFB	513.5	-0.00	22.10	-1579.34	7.64	0.40	168.41	-0.32	0.0	0.00

650 ft bis Level

<40 sec unter dem Fallschirm

lay (k)

CARBON

D-EZBS

GTS
BS

CAPS Saves

#7 Loss of Control

#8 Stall-Spin

#9 Loss of control

#10 Loss of control

#11 Spatial Disorientation

#12 Wx Turbulence

CAPS Saves

#13 Fuel Exhaustion

#14 Wx Icing

#17 Engine Power Loss

#18 Engine Power Loss

CAPS Saves

#19 Wx Icing

#20 Loss of Control

#21 Engine Power Loss

#22 Loss of Control

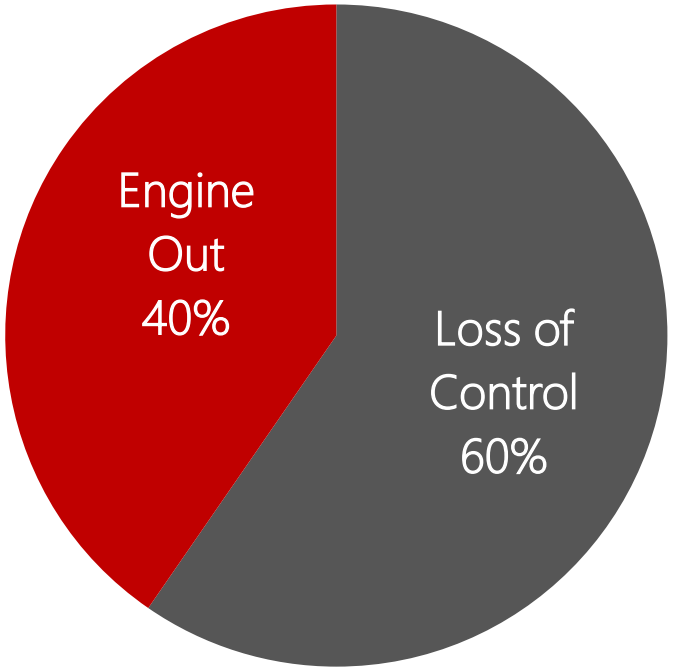
#23 Engine Power Loss

#24 Spatial Disorientation

Typische CAPS Szenarien

- Engine out
  - Engine Power Loss
  - Fuel Exhaustion
- Loss of Control
  - Spatial Disorientation
  - Weather - Turbulence
  - Weather - Icing
  - Maintenance
  - Stall – Spin
  - Midair Collision
  - Pilot incapacitation

→ Loss of control accounts for the majority of CAPS usage



CAPS Event History

CIRRUS OWNERS & PILOTS ASSOCIATION

ABOUT US | SAFETY | FORUMS | PUBLICATIONS | EVENTS | STORE

CAPS Event #152

CAPS Save #129

Mar. 16, 2024
Reidsville, GA, USA

Aircraft:	SR22 N469GB
Injuries:	9 Minor, 9 Serious, 2 Uninjured
Weather:	VMC
Forum Thread(s):	CAPS save #129 in SR22 N469GB near Reidsville, GA [16 March 2024]

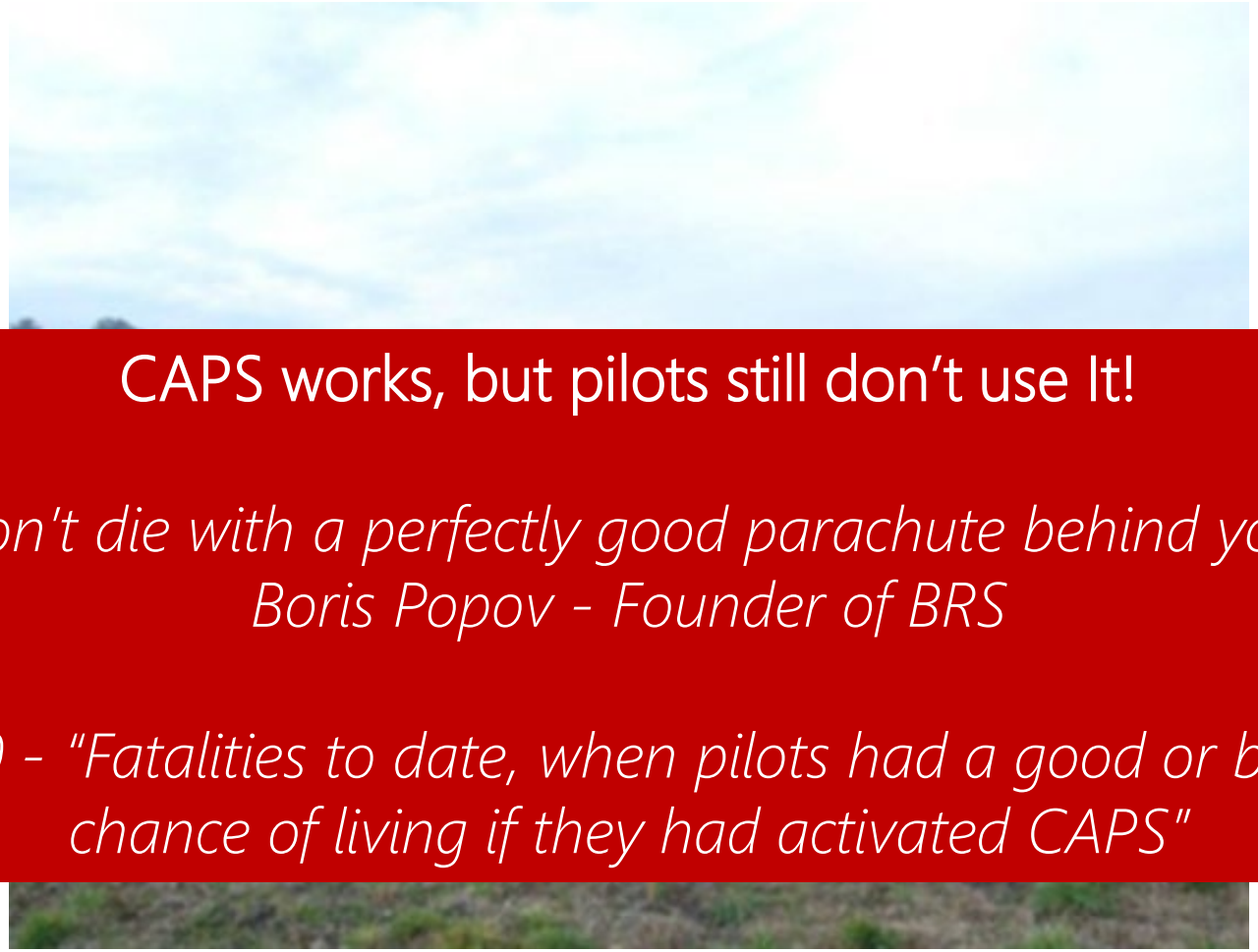
As of 16 March 2024 there have been
129 saves with 265 survivors in aircraft equipped
with the Cirrus Airframe Parachute System (CAPS)

→ CAPS funktioniert!

Reports:	aviation-safety.net wikibase 352852
Forum Thread(s):	CAPS Save #128 in SR22 N2824M near Shelter Cove, CA [8 March 2024]

CAPS Event History (cirruspilots.org)

Die Herausforderung…



CAPS works, but pilots still don’t use It!

“Don't die with a perfectly good parachute behind you.”
Boris Popov - Founder of BRS

>150 - “Fatalities to date, when pilots had a good or better chance of living if they had activated CAPS”

Der Pilot versuchte, die Landebahn zu erreichen, aber das Flugzeug schlug beim Endanflug 300 Meter vor der Landebahn auf dem Boden auf.

Herausforderung → Mindset Change (Piloten & besonders Fluglehrer)

Herausforderung → Mindset Change (Piloten & besonders Fluglehrer)

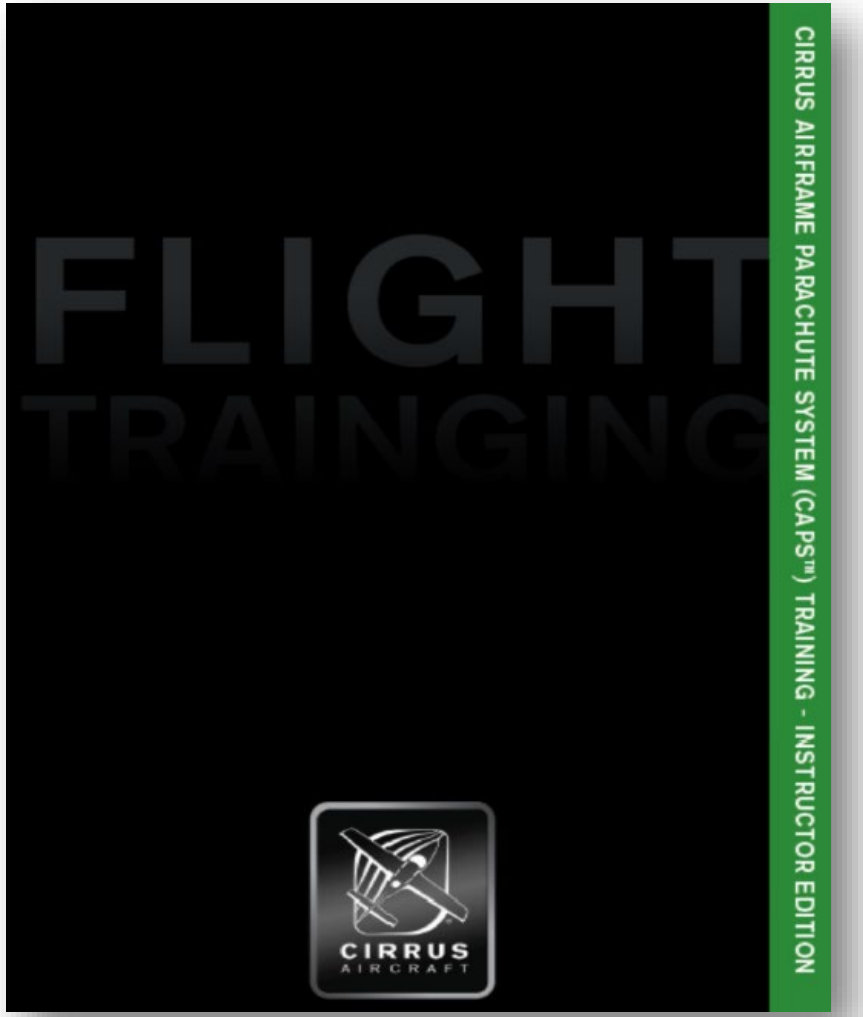
CIRRUS

CIRRUS ABBREVIATED CHECKLIST MODEL SR22T

Before Takeoff

1. Doors ..... LATCHED
2. CAPS Handle ..... VERIFY PIN REMOVED

Cirrus Training für CAPS



CAPS Syllabus - Instructor Edition

	CAPS Course Briefing System Knowledge, Scenarios, Human Behavior Factors, Muscle Memory		Required Tasks
CAPS Emphasis Areas	**CAPS Passenger Briefing** Briefed passengers before startup, CAPS procedures		Required Tasks
CAPS Emphasis Areas	**CAPS Takeoff Briefing** 500' (600' G5), 2,000' AGL considerations		Required Tasks
CAPS Emphasis Areas	**CAPS Call Out** Announces at 500' (600' G5) CAPS available		Required Tasks
CAPS Emphasis Areas	**CAPS Management** Pilot maintains situational awareness at all time, used CAPS at an appropriate time		Required Tasks
CAPS Scenarios	**Engine Failure - Over a Runway** Timely decision, simulated within altitude/airspeed limits,		Pick Three
CAPS Scenarios	**Engine Failure - Takeoff** Timely decision, simulated within altitude/airspeed limits		Pick Three
CAPS Scenarios	**Engine Failure - No Ruwnay within Gliding Distance** Timely decision, simulated within altitude/airspeed limits		Pick Three
CAPS Scenarios	**Engine Failure - IMC/Night** Timely decision, simulated within altitude/airspeed limits		Pick Three
CAPS Scenarios	**Spin Recovery** Timely decision, simulated within altitude/airspeed limits		Pick Two
CAPS Scenarios	**Severe Icing** Timely decision, simulated within altitude/airspeed limits		Pick Two
CAPS Scenarios	**Loss of Control** Timely decision, simulated within altitude/airspeed limits		Pick Two
CAPS Scenarios	**Structural Failure** Timely decision, simulated within altitude/airspeed limits		Pick Two
CAPS Scenarios	**Midair Collision** Timely decision, simulated within altitude/airspeed limits		Pick Two

Beispiel: Take Off Briefing

CAPS TAKEOFF RECOMMENDATION

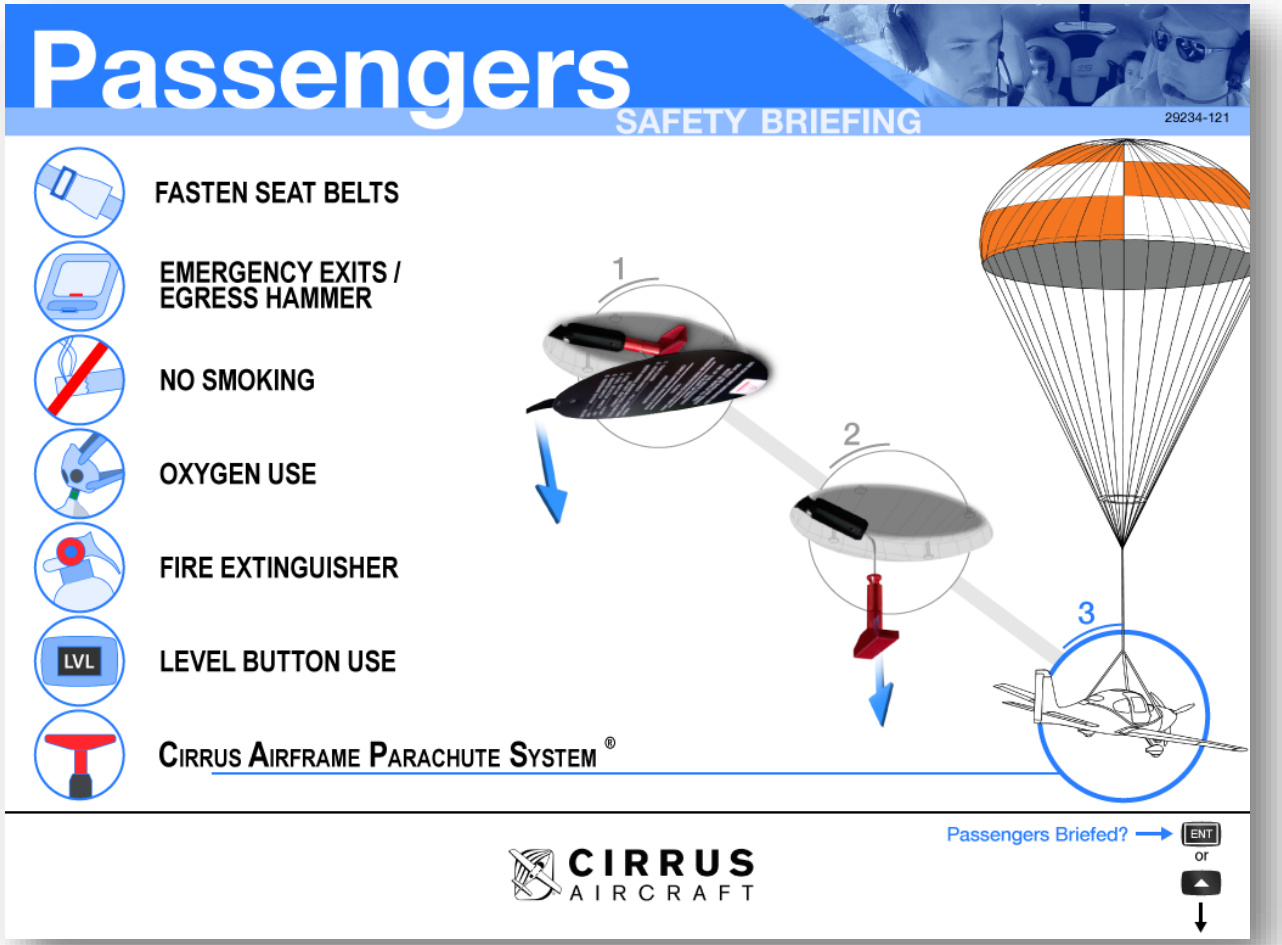
Follow these recommendations in the event of a total loss of engine power during the initial climb out considering the aircraft's altitude.

HEIGHT ABOVE GROUND LEVEL (AGL)		RECOMMENDED RESPONSE
G5, G6 G3, SR20 G6	0' - 600' 0' - 500'	Land straight ahead*
G5, G6 G3, SR20 G6	600' - 2,000' 500' - 2,000'	CAPS immediately
All Models	2,000' or greater	Troubleshoot, use CAPS as required

Beispiel: Take Off Briefing

Beispiel: Decision Altitude

Beispiel: Passenger Briefing & Partner in Command Training



Herzlichen Dank!
Weitere Informationen

- Link zu kostenlosem CAPS Kurs (ca. 1,5h)
- Link zu Cirrus Flight Ops Manual (iFOM)
- Download: CAPS Guide
- Download für Fluglehrer: CAPS Syllabus

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