## Supplemental Data

Today is October $14^{\text {th }}, 2012$. Not wanting to go back to classes at Virginia Tech you decide to take a flight around the mountains on this Sunday. You decide to drive up to Roanoke Regional Airport (KROA) to rent your favorite airplane for the jaunt. You will stop at several airports today, as your two roommates went home for the weekend and want to be picked up. You haven't flown an airplane for a while because of your crazy schedule so you decide to be extra meticulous today. Your airplane of choice is the Cessna 206, a six seat non pressurized fixed gear single with a 286 HP engine.

You will first fly to Greenbrier Valley to pick up your first roommate, Phillip, and then to Raleigh County to pick up your other roommate Josh. You will then take them to Mountain Empire before returning back to Roanoke. Due to expensive fuel costs in Roanoke, you will top the plane off with fuel before leaving Mountain Empire.

## Airplane/Weight and Balance-Cessna TU206F Skywagon N1234R (Configuration IV)

Annual inspection/100 hour inspection completed 10/10/2011 at 1101.1 hours, now 1244.5 hours
ELT inspection completed 5/12/2012 with pitot static, Transponder completed 9/30/2010
Use sample basic empty weight and moment/1000 for this airplane
This aircraft is equipped with long range tanks and it is topped off at KROA before departure
You carry a 50 lb flight kit that will go in the baggage area
Use average arms for all occupants and baggage (Fuel arm is 48.0")
Phillip weighs 195 lbs and will sit up front with you. He has a 40 pound backpack with him. Josh weighs 175 lbs and has a 40 pound backpack with him. He will sit in the center passenger seat. Both backpacks go in the baggage area

Pilot Information-DOB November 6, 1992
First Class medical issued on 6/6/2010 (You weigh 185 lbs)
Private Pilot's License issued 10/1/2010
High performance and high altitude endorsements earned 7/8/2012

## Logbook Information-

7/17/2012-Cessna 206, 1.2 day hours, 1 full stop landing (KROA-KROA)
7/18/2012-Piper Super Cub, 1.0 day hours (with CFI), 1 full stop landing (KBCB-KBCB)
9/1/2012-Piper Seneca, 1.5 night hours (with CFI), 3 stop and go landings (KROA-KROA)
Performance-Climb-95 KTAS, 1100 FPM, 28 GPH (Include 2.0 gallons for start, and taxi)
Cruise-Use 10,000 Pressure Altitude Chart, Standard Temperature, 26" MP, 2500 RPM all legs
Descent-Cruise Groundspeed, 1000 FPM, 11 GPH
Assume all climbs and descents are from field elevation, and variation is 8 W for the whole flight It takes 3 minutes to start the engine and taxi to the runway, no extra time is added after landing Use KROA winds aloft for all calculations. Use 3000 foot winds for climb, interpolate for cruise For takeoff and landing distances, use maximum weight charts (round up to the next highest pressure altitude), interpolate for temperature (using specific METAR)

For $0^{\circ}$ flap landings add $15 \%$ to the calculated landing distance
Land on the runway most aligned with the wind, if available
Assume METARs are valid for the entire day
Sunrise is at $8: 05 \mathrm{am}$ local time, civil twilight $8: 45 \mathrm{am}$, Sunset is at $5: 05 \mathrm{pm}$, civil twilight $5: 45 \mathrm{pm}$

## Weather-

```
DATA BASED ON 141000Z
VALID 140000Z FOR USE 1200-2100Z. TEMPS NEG ABV 24000
FT 3000 6000 9000 12000 18000 24000 30000 34000 39000
ROA 1707 3011+16 2717+10 3109+06 3615-06 3417-18 291634 282244 263254
EKN 2411+14 2806+10 0213+06 3515-06 3323-18 312134 332044 362455
TRI 2610+16 2615+10 3208+06 0218-06 3613-18 331434 311543 281954
CRW 9900 2805+16 3205+10 0213+08 3517-06 3421-18 352434 362643 012854
DATA BASED ON 141000Z
VALID 141800Z FOR USE 2100-0300Z. TEMPS NEG ABV 24000
FT 3000 6000 9000 12000 18000 24000 30000 34000 39000
ROA 9900 3110+15 2718+09 2817+05 3214-06 3016-18 262234 243943 234653
EKN 2405+13 2908+09 2911+06 3315-07 3523-18 342035 311245 262254
TRI 2812+15 2713+09 2813+05 3614-06 3613-18 311134 262143 252553
CRW 9900 2908+14 3208+10 3310+07 3518-06 3521-19 341735 311245 311554
```

METAR KROA 141854Z 11011KT 10SM FEW038 SCT060 29/22 A3005 RMK AO2 SLP164
60005 T 02940217102942023950001

METAR KLWB 141855Z AUTO 33004KT 10SM FEW050 25/18 A3013 RMK AO2
METAR KBKW 141851Z AUTO 27010KT 10SM FEW026 24/18 A3014 RMK AO2 SLP171 60016 T02440178 102562019451007 TSNO

METAR KMKJ $141855 Z$ AUTO 13013KT 10SM SCT045 27/21 A3015 RMK AO2 T02680214

TAF KROA $141723 Z 1418 / 151808006 \mathrm{KT}$ P6SM SCT050
FM142100 06005 KT P6SM BKN060
FM150300 00000KT 6SM BR OVC025
FM150700 02003KT 4SM -RADZ BR SCT005 OVC012
FM151500 VRB03KT P6SM OVC035
TAF KLWB $211723 Z 1418 / 1518$ 24003KT P6SM SCT040 OVC080
FM142000 32003KT P6SM BKN060
FM150300 00000KT 6SM BR SCT015 OVC025
FM150600 00000KT 3SM BR OVC003
FM151700 VRB03KT P6SM OVC035
TAF KBKW 141726 Z 1418/1518 31004KT P6SM SCT015
FM141900 28008KT P6SM BKN090
FM150100 00000KT P6SM BKN080
FM150300 00000KT P6SM SCT250
TAF KMKJ 141723Z 1418/1518 25006KT P6SM SCT050
FM142100 VRB03KT P6SM BKN090
FM150300 00000KT 6SM BR OVC022
FM150700 00000KT 4SM -RADZ BR SCT005 OVC012
FM151600 VRB03KT P6SM OVC035

ROA 10/002 ROA RCO FREQ 122.6/122.2 OTS TIL 1210311000
ROA 10/005 ROA OBST TOWER 1976 (230 AGL) 4.90 SSE LGTS OTS (ASR 1049890) UFN
LWB 01/028 LWB NAV RWY 4 ILS GP UNUSBL CPD APCH BLW 2700
LWB 08/004 LWB OBST TOWER 3034 (356 AGL) 11.68 E LGTS OTS (ASR 1264048) TIL
1210191128
LWB 04/014 LWB TWY A ADJ TO RAMP NON MOVEMENT AREA
BKW 07/022 BKW NAV VORTAC OTS TIL 1210302359
BKW 12/049 BKW OBST VORTAC 2516 (40 AGL) 3746N08107W LGTS OTS
BKW 10/002 BKW RWY 10/28 CLOSED TIL 1210152000
BKW 07/042 BKW OBST CRANE UNKN (250 AGL) 3.00 SW FLAGGED AND LGTD
MKJ 04/005 MKJ NAV RWY 26 ILS LLZ UNUSBL BYD 15 DEG LEFT OF COURSE

TAKEOFF DISTANCE

CONDITIONS:
Flaps $20^{\circ}$
2700 RPM and 32.5 inches Hg Prior to Brake Release
Mixture Set at 28 GPH
Cowl Flaps Open
Paved, Level, Dry Runway
Zero Wind

NOTES:

1. Maximum performance technique as specified in Section 4.
2. Decrease distances $10 \%$ for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by $10 \%$ Decrease distances
for each 2.5 knots.
3. For operation on a dry, grass runway, increase distances by $15 \%$ of the "ground roll" figure.

| $\begin{gathered} \text { WEIGHT } \\ \text { LBS } \end{gathered}$ | TAKEOFF SPEED KIAS |  | $\begin{gathered} \text { PRESS } \\ \mathrm{ALT} \\ \mathrm{FT} \end{gathered}$ | $0^{\circ} \mathrm{C}$ |  | $10^{\circ} \mathrm{C}$ |  | $20^{\circ} \mathrm{C}$ |  | $30^{\circ} \mathrm{C}$ |  | $40^{\circ} \mathrm{C}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{aligned} & \text { GRND } \\ & \text { ROLL } \end{aligned}$ | TOTAL TO CLEAR 50 FT OBS | GRND ROLL | TOTAL TO CLEAR 50 FT OBS | $\begin{aligned} & \text { GRND } \\ & \text { ROLL } \end{aligned}$ | TOTAL TO CLEAR 50 FT OBS | GRND ROLL | TOTAL TO CLEAR 50 FT OBS | GRND ROLL | TOTAL TO CLEAR 50 FT OBS |
|  | $\begin{aligned} & \text { LIFT } \\ & \text { OFF } \end{aligned}$ | $\begin{gathered} \mathrm{AT} \\ 50 \mathrm{FT} \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |
| 3600 | 54 | 64 | S.L. | 800 | 1580 | 870 | 1730 | 950 | 1895 | 1035 | 2085 | 1130 | 2300 |
|  |  |  | 1000 | 845 | 1665 | 925 | 1820 | 1005 | 2000 | 1100 | 2200 | 1200 | 2435 |
|  |  |  | 2000 | 900 | 1755 | 980 | 1920 | 1070 | 2110 | 1165 | 2325 | 1275 | 2575 |
|  |  |  | 3000 | 950 | 1845 | 1040 | 2025 | 1135 | 2225 | 1240 | 2460 | 1355 | 2725 |
|  |  |  | 4000 | 1010 | 1950 | 1100 | 2135 | 1205 | 2355 | 1315 | 2600 | 1440 | 2890 |
|  |  |  | 5000 | 1075 | 2055 | 1170 | 2260 | 1280 | 2490 | 1400 | 2755 | 1530 | 3065 |
|  |  |  | 6000 | 1140 | 2175 | 1245 | 2390 | 1360 | 2635 | 1490 | 2920 | 1630 | 3260 |
|  |  |  | 7000 | 1215 | 2300 | 1325 | 2530 | 1450 | 2795 | 1585 | 3105 | 1740 | 3470 |
|  |  |  | 8000 | 1290 | 2435 | 1415 | 2685 | 1545 | 2970 | 1690 | 3300 | 1855 | 3695 |

Figure 5-4. Takeoff Distance (Sheet 1 of 2)
-

## LANDING DISTANCE

CONDITIONS:
Flaps $40^{\circ}$
Flaps $40^{\circ}$
Power Off
Power Off
Paved, Level, Dry Runway
Zero Wind
NOTES:

1. Maximum performance technique as specified in Section 4.
2. Decrease distances $10 \%$ for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by $10 \%$ for each 2.5 knots.
3. For operation on a dry, grass runway, increase distances by $40 \%$ of the "ground roll" figure.

| $\begin{aligned} & \text { WEIGHT } \\ & \text { LBS } \end{aligned}$ | $\begin{aligned} & \text { SPEED } \\ & \text { AT } \\ & 50 \mathrm{FT} \\ & \text { KIAS } \end{aligned}$ | PRESS ALT FT | $0^{\circ} \mathrm{C}$ |  | $10^{\circ} \mathrm{C}$ |  | $20^{\circ} \mathrm{C}$ |  | $30^{\circ} \mathrm{C}$ |  | $40^{\circ} \mathrm{C}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{array}{\|l} \text { GRND } \\ \text { ROLL } \end{array}$ | TOTAL TO CLEAR 50 FT OBS | GRND ROLL | TOTAL TO CLEAR 50 FT OBS | $\begin{aligned} & \text { GRND } \\ & \text { ROLL } \end{aligned}$ | $\begin{gathered} \text { TOTAL } \\ \text { TO CLEAR } \\ 50 \text { FT OBS } \end{gathered}$ | $\begin{array}{\|l\|} \text { GRND } \\ \text { ROLL } \end{array}$ | TOTAL TO CLEAR 50 FT OBS | GRND ROLL | TOTAL TO CLEAR 50 FT OBS |
| 3600 | 64 | S.L. | 695 | 1340 | 720 | 1375 | 750 | 1415 | 775 | 1450 | 800 | 1490 |
|  |  | 1000 | 720 | 1375 | 750 | 1415 | 775 | 1450 | 800 | 1490 | 830 | 1530 |
|  |  | 2000 | 750 | 1415 | 775 | 1455 | 805 | 1495 | 830 | 1530 | 860 | 1575 |
|  |  | 3000 | 775 | 1455 | 805 | 1495 | 835 | 1540 | 865 | 1580 | 890 | 1615 |
|  |  | 4000 | 805 | 1495 | 835 | 1540 | 865 | 1580 | 895 | 1625 | 925 | 1665 |
|  |  | 5000 | 835 | 1540 | 870 | 1585 | 900 | 1630 | 930 | 1675 | 960 | 1715 |
|  |  | 6000 | 870 | 1590 | 900 | 1630 | 935 | 1680 | 965 | 1725 | 995 | 1770 |
|  |  | 7000 | 905 | 1635 | 935 | 1680 | 970 | 1730 | 1000 | 1775 | 1035 | 1825 |
|  |  | 8000 | 940 | 1690 | 970 | 1730 | 1005 | 1780 | 1040 | 1830 | 1075 | 1880 |

Figure 5-10. Landing Distance
²－s

|  | N | N్ర్ర | 合 | N̈̀ | 3 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | ONNAN | NN®N | NANN | NANNOM | $\frac{3}{5}$ |  |  |  |  |
|  |  | ¢ ¢ 89\％${ }^{\text {O }}$ | ソั゙ず̊ | のコブ行 | 咢 ${ }^{\text {2 }}$ | 年～ |  |  |  |
|  | $\vec{\checkmark} \vec{\sim}$ |  |  |  | 歪 |  |  |  |  |
|  | $\begin{aligned} & \vec{\circ} \overrightarrow{\vec{\rightharpoonup}} \vec{N} \vec{N} \vec{A} \\ & \text { in or } \end{aligned}$ | $\overrightarrow{0} \stackrel{\rightharpoonup}{\omega} \stackrel{\rightharpoonup}{\stackrel{\rightharpoonup}{\omega}} \stackrel{\rightharpoonup}{\mathrm{~N}}$ | $\vec{N} \vec{\omega} \vec{~} \vec{\sigma}$ |  | 뭊 |  |  |  |  |
|  |  |  | ํㅗㅇ응 | ตูゴ |  |  |  |  |  |
|  |  | 可 $\vec{\omega} \overrightarrow{0} \vec{\omega}$ | $\vec{\omega} \vec{\omega} \overrightarrow{\text { 灾 }} \overrightarrow{ \pm}$ |  | $\begin{aligned} & \text { 즌 } \\ & \text { in } \end{aligned}$ | － |  |  |  |
|  | $\begin{aligned} & \vec{\circ} \vec{\rightharpoonup} \vec{\rightharpoonup} \vec{N} \vec{\omega} \\ & 0.0 \\ & 0 \\ & 0 \end{aligned}$ |  | $\vec{\sim} \stackrel{\rightharpoonup}{\omega} \stackrel{\rightharpoonup}{\vec{N}} \stackrel{\rightharpoonup}{\omega}$ | $\vec{N} \vec{\omega}$ vone | $\stackrel{\square}{\text { ¢ }}$ |  |  |  |  |
|  | $\pm$ A ¢ ¢ ¢ ¢ \％ |  | ¢두요 | 옹¢ㅐㅇํํㅇ | 弪 20 | － |  |  |  |
|  |  | $\vec{\omega} \vec{\omega} \vec{\sim}$ | 芯何念合 |  | 硆 |  |  |  | 苞 |
|  | $\omega \overrightarrow{0} \overrightarrow{\vec{\omega}} \vec{N} \vec{N}$ जैんNo |  |  | $\stackrel{\rightharpoonup}{\stackrel{\rightharpoonup}{0}} \stackrel{\rightharpoonup}{\stackrel{\rightharpoonup}{\omega}} \vec{\omega}$ | 8 |  |  |  |  |
|  | ） | ） |  |  | $\bigcirc$ |  |  |  |  |




Figure 6-7. Sample Loading Problem

C.G.

I.

II.

III.

IV.

Figure 6-3. Loading Arrangements



ROANOKE RGNLWOODRUM FIELD (ROA) 3 NW UTC-5(-4DT)
Cімсімматі

1175 B S4 FUEL 100LL, JET A OX 1, 2, TPA-1975(800) NOTAM FILE ROA
RWY 06-24: H6800X150 (ASPH-GRVD) S-150, D-200, 2S-175, 2D-310 HIRL
RWY 06: REIL. MALSR. VASI(V4L)-GA $3.0^{\circ} \mathrm{TCH} 58^{\prime}$. RWY 24: REIL. Thld dspled 790'.
RWY 16-34: H5810X150 (ASPH-GRVD) S-150, D-200, 2S-175, 2D-310 HIRL 0.4\% up NW
RWY 34: MALSR. PAPI (P4L)-GA $3.0^{\circ}$ TCH 56'. Tower.
RUNWAY DECLARED DISTANCE INFORMATION
RWY 06: TORA-6800 TODA-6800 ASDA-6800 LDA-6800
RWY 16: TORA-5810 TODA-5810 ASDA-5810 LDA-5810
RWY 24: TORA-6800 TODA-6800 ASDA-6800 LDA-6010 RWY 34: TORA-5810 TODA-5810 ASDA-5810 LDA-5810
ARRESTING GEAR/SYSTEM RWY 34: EMAS
AIRPORT REMARKS: Attended continuously. Large flocks of birds invof arpt. Take off Rwy 34 and landings Rwy 16 not authorized at night nor during IFR conditions due to terrain. Rwy 34 visual glideslope indicator and glidepath not coincident. Transient pilots ctc FBO
 UNICOM freq 122.95 for acft parking and escort.
WEATHER DATA SOURCES: ASOS (540) 265-0680. LLWAS.
COMMUNICATIONS: ATIS 132.375 UNICOM 122.95
ROANOKE RCO 122.6122 .2 122.1R 109.4T (LEESBURG RADIO)
(R) ROANOKE APP/DEP CON 126.9 (Rwy 16-34 $151^{\circ}-359^{\circ}$, Rwy $06075^{\circ}-234^{\circ}$ ) 118.15 (Rwy 16-34 $360^{\circ}-150^{\circ}$, Rwy $06235^{\circ}-074^{\circ}$ )
TOWER 118.3 GND CON 121.9 CLNC DEL 119.7
AIRSPACE: CLASS C svc continuous ctc APP CON
RADIO AIDS TO NAVIGATION: NOTAM FILE ROA.
(L) VORTAC 109.4 ROA Chan $31 \quad \mathrm{~N}^{2} 7^{\circ} 20.61^{\prime} \mathrm{W} 80^{\circ} 04.22^{\prime} \quad 107^{\circ} 4.7 \mathrm{NM}$ to fld. $3072 / 04 \mathrm{~W}$. DME unusable $270^{\circ}-005^{\circ}$ beyond 20 NM below $6000^{\prime}$.
WOODRUM (T) YORW 114.9 ODR N37¹9.45' W79º $58.74^{\prime}$ at fld.
VINTON NDB (MHW) 277 VIT N37 $12.24^{\prime}$ W79 $9^{\circ} 52.90^{\prime} \quad 336^{\circ} 8.6$ NM to fld. NDB unusable beyond 11 NM. ILS 109.7 I-ROA Rwy 34. CLASS IB.
LDA/DME 111.1 I-SZK Chan 48 Rwy 06 . LDA located $1202^{\prime}$ inboard of Rwy 06 thld and $1100^{\prime}$ right of rwy centerline, offset angle $14^{\circ} 41^{\prime \prime}$. GS aimed parallel to localizer course. ILS unusable 1.4 DME (JOKNI) inbound. DME unusable byd $30^{\circ}$ left of course.

## MARION/WYTHEVILLE

MOUNTAIN EMPIRE (MKJ) 9 NE UTC-5(-4DT) $\mathrm{N}_{3} 36^{\circ} 53.69^{\prime} \mathrm{W} 81^{\circ} 21.00^{\prime}$
CINCINNATI
2558 B S4 FUEL 100LL, JET A NOTAM FILE MKJ H-9B, 12H, L-26I RWY 08-26: H5252X75 (ASPH) S-20 MIRL 1.1\% up W IAP
RWY 08: REIL. PAPI(P2L)-GA $3.0^{\circ}$ TCH $40^{\prime}$. Trees.
RWY 26: REIL. PAPI(P2L)-GA $3.75^{\circ} \mathrm{TCH} 47^{\prime}$. Road.
AIRPORT REMARKS: Attended Apr-Oct Mon-Fri 1230-0100Z $\ddagger$, Sat $1300-0000 Z \ddagger$, Sun 1800-0000Z $\ddagger$, Nov-Mar Mon-Fri $1230-0000 \mathrm{Z} \ddagger$, Sat $1300-0000 \mathrm{Z} \ddagger$, Sun $1800-0000 \mathrm{Z} \ddagger$. Located 9 NM NE Marion. MIRL Rwy 08-26 preset low ints, ACTIVATE higher ints-CTAF.
WEATHER DATA SOURCES: AWOS-3 123.875 (276) 686-6420. Dewpoint unreliable.
COMMUNICATIONS: CTAF/UNICOM 122.7
(R) ATLANTA CENTER APP/DEP CON 127.85

RADIO AIDS TO NAVIGATION: NOTAM FILE PSK.
PULASKI (H) VORTAC 116.8 PSK Chan 115 N37 ${ }^{\circ} 05.26^{\prime}$ W80 ${ }^{\circ} 42.77^{\prime} \quad 256^{\circ} 32.7$ NM to fld. 2120/06W. HIWAS.
SUZZE NDB (MHW/LOM) 335 MK N3655.21' W81 ${ }^{\circ} 14.60^{\prime} \quad 260^{\circ}$ 5.4 NM to fld. NOTAM FILE MKJ. Unmonitored when arpt unattended.
ILS 110.5 I-MKJ Rwy 26. LOM SUZZE NDB. (LOC only.) LOC unmonitored when arpt unattended. LOC unusable byd $15^{\circ}$ left of course.


