

2020

基于飞马无人机管家

精灵4RTK数据处理流程

深圳飞马机器人科技有限公司





01. 精灵4RTK介绍02. 精灵4RTK数据处理流程





2018年大疆发布了新一代精灵4RTK,这款无人机在原机型的基础上更加了RTK\PPK功能, 使得精灵4RTK在一定条件下具备了少像控或者免像控的能力。同时为了给用户带来更好的服务体 验,飞马无人机管家也向用户免费提供精灵4RTK机型的后差分解算功能。









- 影像数据
- 基站GPS数据
- 飞机GPS数据
- 像控点



_4733471.GNS
 100_0001_EVENTLOG.bin
 100_0001_PPKRAW.bin
 100_0001_Rinex.obs
 100_0001_Timestamp.MRK

A32 534621.2456 4378675.408 -4.8253
A33 534697.5197 4378451.521 -4.5739
A19 534668.2771 4378426.872 -4.3234
A34 534789.5265 4378476.601 -4.5284
A1 534716.2158 4378271.781 -3.4362
A2 534850.7068 4378304.352 -2.8708
A3 534944.4648 4378341.633 -3.1666



格式转换

GPS解算

检查差分质量



①原始数据介绍

- 基站静态数据:格式取决于所用基站厂家,常见天宝.T02,中海达.GNS
- 机载GPS观测数据:格式为.obs
- 差分改正位置、曝光时间等记录文件:格式为.MRK

②Rinex格式转换

● 基站静态数据转换: 使用各厂家转换工具, 转换为Rinex3.02版本, 得到.O 和.P(或.n),截图中基站为飞马标配基站, 用rt27转换工具转换Rinex格式。

● 管家可以直接读取.obs格式的文件,无需数据转换



_4733471.GNS
 100_0001_EVENTLOG.bin
 100_0001_PPKRAW.bin
 100_0001_Rinex.obs
 100_0001_Timestamp.MRK



- 导入流动站文件:文件格式为.obs
- 勾选基准站,选择手动输入基站点坐标,格式为小数度或度分秒(该数据基站坐标选择Rinex头文件)
- 指定基准站观测文件:基站静态数据转换出的RINEX文件(o文件)
- 导航文件按照默认,无需更改,单击下一步
- 精灵4Pro默认解算方式为差分,GNSS系统按照默认即可
- 指定解算结果保存路径,点击确定,开始解算

| 导入GPS信息 | | | , 导入GPS信息 | | | GPS解算 | | | > |
|------------|---------------|---------------------------|--------------|----------------|-------------------------|--------|-------------|------------------|-----------------|
| 流动站 | | | 流动站 | | | 解算方式 | 🗌 单点 🔽 | 差分 📄 融合 | D |
| 观测文件 1. | 23D200构架航线数据及 | &p4rtk数据/100_0001_Rinex.c | 观测文件 1 | 1.23D200构架航线数据 | 居及p4rtk数据/100_0001_Rine | | 0 | | |
| □ 基准站 | | | ☑ 基准站 | | | GPS天线 | OD 0 | m P 0 | m F F |
| ③ Rinex 头文 | 件 〇 自动计算 〇 用 | 户输入 | ● Rinex 头3 | 文件 〇 自动计算 〇 | 用户输入 | | L 0 | m S 0 | m |
| 经度 | | (小数度或度:分:秒) | 经度 | 117.40300000 | (小数度或度:分:秒) | GPS天线 | ● 垂高 0 | m | s |
| 纬度 | | (小数度或度:分:秒) | 纬度 | 39.55706700 | (小数度或度:分:秒) | 偏心距 | D200-A600 | 0 🗸 | |
| 高度 (m) | | | 高度 (m) | -3.0070 | | GNSS系统 | GPS | 🗹 BeiDou | JSJF |
| 观测文件 | | | 观测文件 | .23D200构架航线数 | 数据及p4rtk数据/2019.1.28a3; | | GLONASS | SBAS | |
| 导航文件 | ◎ 流动站 | ○ 基准站 | 导航文件 | ◉ 流动站 | 〇 基准站 | 保存路径 | 23D200构架航线数 | 数据及p4rtk数据/p4rtk | 正摄构架3cm/002-ppk |
| | | 下一步 | | | 下一步 | | | 上一步 | 确定取消 |



④检查差分质量

• 差分解算结果共三个.txt文件,其中all是轨迹文件,POS是高精度差分POS文件,config是配置文件

#01 · 100 008

● 差分解算固定率(Q1值) > 98%, 否则视为解算不合格

9 100_0002_Rinex_all.txt 9 100_0002_Rinex_config.txt

100_0002_Rinex_pos.txt

| π 🖌 | - | • | 101 | ••• | | • | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---------------------------------------|--|--|---|---|---|--|--|--|--|--|--|---|---|--|---|---|--|---|--|--|---|---|--|---|---|---|---|--|--|---|--|---|--|---|--|
| #I | D | LO | NG: | ITI | UDE | 2 | LAT | CI1 | U | DE | | HF | ΞI | GH | Т | | Qu | a: | li | ty | 7 (| GP | S | Т | IM | Е | | | | | | | | | | |
| 1 | 11 | 7. | 402 | 203 | 327 | 76 | 14 | 39 |). | 55 | 75 | 25 | 50 | 71 | 8 | 1 | 05 | | 27 | 64 | 1 | 1 | 2(| 01 | 9/ | 01 | L/ | 23 | 0 | 3: | 3 | 9: | 52 | .9 | 31 | |
| 2 | 11 | 7. | 402 | 21(| 632 | 23 | 23 | 39 | ١. | 55 | 75 | 55 | 54 | 11 | 7 | 1 | 05 | | 22 | 89 |) : | 1 | 2(| 01 | 9/ | 01 | L/ | 23 | 0 | 3: | 3 | 9: | 55 | .6 | 12 | 2 |
| 3 | 11 | 7. | 402 | 24: | 139 | 94 | 02 | 39 | ١. | 55 | 76 | 04 | 19 | 76 | 5 | 1 | 05 | | 28 | 12 | | 1 | 2(| 1 | 9/ | 01 | L/ | 23 | 0 | 3: | 3 | 9: | 58 | .3 | 32 | 2 |
| 4 | 11 | 7. | 402 | 26 | 561 | 14 | 13 | 39 |). | 55 | 76 | 53 | 33 | 02 | 1 | 1 | 05 | . : | 34 | 28 | | 1 | 2(| 1 | 9/ | 01 | L/ | 23 | 0 | 3: | 4 | 0: | 01 | .0 | 13 | 3 |
| 5 | 11 | 7. | 402 | 29(| 011 | 13 | 39 | 39 | ١. | 55 | 77 | 02 | 23 | 11 | 3 | 1 | 05 | | 39 | 02 | | 1 | 2(| 01 | 9/ | 01 | L/ | 23 | 0 | 3: | 4 | 0: | 03 | .7 | 32 | 2 |
| 6 | 11 | 7. | 40: | 314 | 427 | 72 | 51 | 39 |). | 55 | 77 | 50 |)4 | 42 | 8 | 1 | 05 | . : | 36 | 76 | 5 3 | 1 | 2(| 01 | 9/ | 01 | L/ | 23 | 0 | 3: | 4 | 0: | 06 | .4 | 13 | 3 |
| 7 | 11 | 7. | 40: | 33 | 879 | 95 | 32 | 39 |). | 55 | 77 | 99 | 92 | 58 | 3 | 1 | 05 | . : | 31 | 88 | | 1 | 2(| 01 | 9/ | 01 | L/ | 23 | 0 | 3: | 4 | 0: | 09 | .1 | 27 | 1 |
| 8 | 11 | 7. | 40: | 36 | 316 | 58 | 68 | 39 |). | 55 | 78 | 47 | 17 | 49 | 9 | 1 | 05 | . : | 33 | 97 | | 1 | 2(| 01 | 9/ | 01 | L/ | 23 | 0 | 3: | 4 | 0: | 11 | .8 | 19 |) |
| 9 | 11 | 7. | 40: | 38' | 748 | 33 | 17 | 39 |). | 55 | 78 | 96 | 53 | 95 | 9 | 1 | 05 | | 27 | 70 |) : | 1 | 2(| 1 | 9/ | 01 | L/ | 23 | 0 | 3: | 4 | 0: | 14 | .5 | 12 | 2 |
| 10 | 1 | 17 | . 40 | 04: | 120 | 06 | 334 | 4 3 | 39 | .5 | 57 | 94 | 16 | 12 | 35 | 5 | 10 | 5 | . 2 | 41 | .3 | 1 | | 20 | 19 | 10 | 1 | /2 | 3 | 03 | 3: | 40 | :1 | 7. | 23 | 33 |
| 11 | 1 | 17 | . 40 | 04: | 361 | 17 | 810 | 0 3 | 39 | .5 | 57 | 99 | 95 | 59 | 95 | 5 | 10 | 5 | . 2 | 55 | 57 | 1 | | 20 | 19 | 10 | 01 | /2 | 3 | 03 | 3: | 40 | :1 | 9. | 92 | 20 |
| 12 | 1 | 17 | . 40 | 04(| 606 | 55 | 810 | 0 3 | 39 | .5 | 58 | 04 | 14 | 57 | 74 | ł | 10 | 5 | . 2 | 77 | 5 | 1 | | 20 | 19 | 10 | 01 | /2 | 3 | 03 | 3: | 40 | :2 | 2. | 62 | 24 |
| 13 | 1 | 17 | . 40 | 048 | 849 | 90 | 903 | 3 3 | 39 | .5 | 58 | 09 | 92 | 74 | 02 | 2 | 10 | 5 | . 3 | 01 | .5 | 1 | 1 | 20 | 19 | 10 | 01 | /2 | 3 | 03 | 3: | 40 | :2 | 5. | 31 | 1 |
| 14 | 1 | 17 | . 40 | 05 | 092 | 21 | 458 | 8 3 | 39 | .5 | 58 | 14 | 1 | 27 | 86 | 5 | 10 | 5 | . 3 | 27 | 1 | 1 | | 20 | 19 | 10 | 01 | /2 | 3 | 03 | 3: | 40 | :2 | 8. | 00 |)2 |
| 15 | 1 | 17 | . 40 | 05: | 339 | 91 | 605 | 5 3 | 39 | .5 | 58 | 19 | 90 | 46 | 06 | 5 | 10 | 5 | . 3 | 56 | 57 | 1 | | 20 | 19 | 10 | 01 | /2 | 3 | 03 | 3: | 40 | :3 | ο. | 72 | 27 |
| 16 | 1 | 17 | . 40 | 05 | 583 | 35 | 615 | 5 3 | 39 | .5 | 58 | 23 | 39 | 30 | 43 | 3 | 10 | 5 | . 3 | 45 | 64 | 1 | | 20 | 19 | 10 | 01 | /2 | 3 | 03 | 3: | 40 | :3 | з. | 41 | 8 |
| 17 | 1 | 17 | . 4(| 05 | 827 | 70 | 622 | 2 3 | 89 | .5 | 58 | 28 | 88 | 32 | 02 | 2 | 10 | 5 | . 3 | 38 | 2 | 1 | | 20 | 19 | 10 |)1 | /2 | 3 | 03 | 3: | 40 | :3 | 6. | 11 | 1 |
| | #1 2345678910 11213 14 15 | #ID : 1 11' 2 11' 3 11' 4 11' 5 11' 6 11' 6 11' 7 11' 8 11' 9 11' 10 1 11 1: 12 1 13 1: 14 1 15 1: 14 1 15 1: 16 1: 17 1 | #ID LO 1 117. 2 117. 3 117. 4 117. 5 117. 6 117. 6 117. 7 117. 8 117. 9 117. 10 117 11 117 12 117 13 117 14 117 15 117 16 117 17 117 | #ID LONG: 1 117.402 2 117.402 3 117.402 3 117.402 5 117.402 5 117.402 6 117.402 6 117.403 8 117.403 8 117.403 9 117.403 10 117.40 11 117.40 11 117.40 13 117.40 14 117.40 15 117.40 15 117.40 16 117.40 17 117.40 | #ID LONGIT I 117.40203 2 117.4021 3 117.4024 4 117.4024 5 117.4024 5 117.4029 6 117.4031 7 117.4033 8 117.4033 9 117.4038 10 117.404 11 117.404 11 117.404 11 117.404 13 117.405 15 117.405 16 117.405 | #ID LONGITUDE 1 117.4020327 2 117.4021632 3 117.4024139 4 117.4026561 5 117.4029011 6 117.4031427 7 117.4033879 8 117.4036316 9 117.4036316 9 117.404363 10 117.404466 11 117.404466 13 117.404849 14 117.405033 15 117.405339 16 117.40583 17 117.40582 | <pre>#ID LONGITUDE 1 117.40203276 2 117.40216323 3 117.40241394 4 117.40265614 5 117.40290113 6 117.40314272 7 117.40338795 8 117.40363168 9 117.40363168 9 117.4043617 12 117.4043617 12 117.4043617 12 117.40448490 14 117.4050921 15 117.4053391 16 117.4058270</pre> | <pre>#ID LONGITUDE LAT I 117.4020327614 2 117.4021632323 3 117.4024139402 4 117.4026561413 5 117.4029011339 6 117.4031427251 7 117.4033879532 8 117.4036316868 9 117.4036316868 9 117.4038748317 10 117.4043617810 11 117.4043617810 12 117.4043617810 13 117.4048490903 14 117.4050921458 15 117.4053391603 16 117.4055835613 17 117.4058270623</pre> | <pre>#ID LONGITUDE LATIT 1 117.4020327614 39 2 117.4021632323 39 3 117.4024139402 39 4 117.4026561413 39 5 117.4029011339 39 6 117.4031427251 39 7 117.4033879532 39 8 117.4036316868 39 9 117.4036316868 39 9 117.4043617810 3 11 117.4043617810 3 12 117.4046065810 3 13 117.4048490903 3 14 117.4050921458 3 15 117.4053391605 3 16 117.4055835615 3 17 117.4058270622 3 </pre> | <pre>#UL 1000000000000000000000000000000000000</pre> | <pre>#ID LONGITUDE LATITUDE 1 117.4020327614 39.55 2 117.4021632323 39.55 3 117.4024139402 39.55 4 117.4026561413 39.55 5 117.4029011339 39.55 6 117.4031427251 39.55 6 117.4031427251 39.55 7 117.403879532 39.55 8 117.4036316868 39.55 9 117.4036316868 39.55 9 117.4043617810 39.5 11 117.4043617810 39.5 12 117.4046065810 39.5 13 117.4048490903 39.5 14 117.4050921458 39.5 15 117.4053391605 39.5 16 117.405835615 39.5 17 117.4058270622 39.5</pre> | <pre>#ID LONGITUDE LATITUDE I 117.4020327614 39.5575 2 117.4021632323 39.5575 3 117.4024139402 39.5576 4 117.4026561413 39.5576 5 117.4029011339 39.5577 6 117.4031427251 39.5577 7 117.403879532 39.5577 8 117.4036316868 39.5578 9 117.4036316868 39.5578 10 117.4043617810 39.557 11 117.4043617810 39.557 11 117.4046065810 39.558 13 117.4048490903 39.558 14 117.4050921458 39.558 15 117.4053391605 39.558 16 117.405835615 39.558 17 117.4058270622 39.558</pre> | <pre>#ID LONGITUDE LATITUDE HE 1 117.4020327614 39.557525 2 117.4021632323 39.557555 3 117.4024139402 39.557604 4 117.4026561413 39.557653 5 117.4029011339 39.557702 6 117.4031427251 39.557750 7 117.403879532 39.557799 8 117.4036316868 39.557847 9 117.4036316868 39.55789 10 117.4043617810 39.55799 11 117.4043617810 39.55799 12 117.4046065810 39.55809 14 117.4048490903 39.55809 14 117.4050921458 39.55819 15 117.4053391605 39.55819 16 117.405835615 39.55828</pre> | <pre>#UD LONGITUDE LATITUDE HEI 1 117.4020327614 39.5575250 2 117.4021632323 39.5575554 3 117.4024139402 39.5576049 4 117.4026561413 39.5576533 5 117.4029011339 39.5577023 6 117.4031427251 39.5577504 7 117.403879532 39.5577992 8 117.4036316868 39.5578477 9 117.4036316868 39.5578477 9 117.4038748317 39.5578963 10 117.4041206334 39.557946 11 117.4043617810 39.557995 12 117.4046065810 39.558044 13 117.4048490903 39.558092 14 117.4050921458 39.558140 15 117.4053391605 39.558190 16 117.405835615 39.558239 17 117.4058270622 39.558288</pre> | <pre>#UD LONGITUDE LATITUDE HEIGH 1 117.4020327614 39.557525071 2 117.4021632323 39.557555411 3 117.4024139402 39.557604976 4 117.4026561413 39.557653302 5 117.4029011339 39.557702311 6 117.4031427251 39.557750442 7 117.403879532 39.557799258 8 117.4036316868 39.557847749 9 117.4036316868 39.557896395 10 117.4041206334 39.557896395 10 117.4043617810 39.55799659 11 117.4043617810 39.55799559 12 117.4046065810 39.55804457 13 117.4048490903 39.55809274 14 117.4050921458 39.55814127 15 117.4053391605 39.55819046 16 117.405835615 39.55823930 17 117.4058270622 39.55828832</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT 1 117.4020327614 39.5575250718 2 117.4021632323 39.5575554117 3 117.4024139402 39.5576049765 4 117.4026561413 39.5576533021 5 117.4029011339 39.5577023113 6 117.4031427251 39.5577504428 7 117.403879532 39.5577992583 8 117.4036316868 39.5578477499 9 117.4036316868 39.5578963959 10 117.4041206334 39.5579963959 10 117.4043617810 39.5579955995 12 117.4046065810 39.5580445774 13 117.4048490903 39.5580927402 14 117.4050921458 39.5581904606 15 117.405835615 39.5581904606 16 117.4058270622 39.5582883202</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT 1 117.4020327614 39.5575250718 1 2 117.4021632323 39.5575554117 1 3 117.4024139402 39.5576049765 1 4 117.4026561413 39.5576533021 1 5 117.4029011339 39.5577023113 1 6 117.4031427251 39.5577504428 1 7 117.403879532 39.5577992583 1 8 117.4036316868 39.5578477499 1 9 117.4038748317 39.5578963959 1 10 117.4041206334 39.5579461235 11 117.4043617810 39.5579955995 12 117.4046065810 39.5580445774 13 117.4048490903 39.5580927402 14 117.4050921458 39.5581412786 15 117.4053391605 39.5581904606 16 117.405835615 39.5582393043 17 117.4058270622 39.5582883202</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Qu I 117.4020327614 39.5575250718 105 2 117.4021632323 39.5575554117 105 3 117.4024139402 39.5576049765 105 4 117.4026561413 39.5576533021 105 5 117.4029011339 39.5577023113 105 6 117.4031427251 39.5577504428 105 7 117.403879532 39.5577992583 105 8 117.4036316868 39.5578477499 105 9 117.4038748317 39.5578963959 105 10 117.4041206334 39.5579461235 10 11 117.4043617810 39.5579955995 10 12 117.4046065810 39.5580445774 10 13 117.4048490903 39.5580927402 10 14 117.4050921458 39.5581412786 10 15 117.4053391605 39.5581904606 10 16 117.405835615 39.5582393043 10 17 117.4058270622 39.5582883202 10</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT Qual I 117.4020327614 39.5575250718 105.3 2 117.4021632323 39.5575554117 105.3 3 117.4024139402 39.5576049765 105.3 4 117.4026561413 39.5576533021 105.3 5 117.4029011339 39.5577023113 105.3 6 117.4031427251 39.5577504428 105.3 6 117.4031427251 39.5577992583 105.3 8 117.4036316868 39.5578477499 105.3 9 117.4038748317 39.5578963959 105.3 10 117.4041206334 39.5579461235 105 11 117.4043617810 39.5579955995 105 12 117.4046065810 39.5580445774 105 13 117.4048490903 39.5581904606 105 14 117.4053391605 39.5581904606 105 16 117.405835615 39.5582393043 105 17 117.4058270622 39.5582883202 105</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT Quali I 117.4020327614 39.5575250718 105.27 2 117.4021632323 39.5575554117 105.22 3 117.4024139402 39.5576049765 105.28 4 117.4026561413 39.5576533021 105.34 5 117.4029011339 39.5577023113 105.39 6 117.4031427251 39.5577504428 105.36 7 117.403879532 39.5577992583 105.31 8 117.4036316868 39.5578477499 105.33 9 117.4038748317 39.5578963959 105.27 10 117.4041206334 39.5579461235 105.2 11 117.4043617810 39.5579955995 105.2 12 117.4046065810 39.5580445774 105.2 13 117.4048490903 39.5580927402 105.3 14 117.4050921458 39.5581412786 105.3 15 117.4053391605 39.5581904606 105.3 16 117.405835615 39.5582393043 105.3 17 117.4058270622 39.5582883202 105.3</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT Quality 1 117.4020327614 39.5575250718 105.2764 2 117.4021632323 39.5575554117 105.2289 3 117.4024139402 39.5576049765 105.2812 4 117.4026561413 39.5576533021 105.3428 5 117.4029011339 39.5577023113 105.3902 6 117.4031427251 39.5577504428 105.3676 7 117.403879532 39.5577992583 105.3188 8 117.4036316868 39.5578477499 105.3397 9 117.4038748317 39.5578963959 105.2770 10 117.4041206334 39.5579461235 105.241 11 117.4043617810 39.5579955995 105.255 12 117.4046065810 39.5580445774 105.277 13 117.4048490903 39.5580927402 105.301 14 117.4050921458 39.5581412786 105.327 15 117.4053391605 39.5581904606 105.356 16 117.405835615 39.5582393043 105.345 17 117.4058270622 39.5582883202 105.338</pre> | <pre>#U 1000000 #ID LONGITUDE LATITUDE HEIGHT Quality (1 117.4020327614 39.5575250718 105.2764 1 2 117.4021632323 39.5575554117 105.2289 1 3 117.4024139402 39.5576049765 105.2812 1 4 117.4026561413 39.5576533021 105.3428 1 5 117.4029011339 39.5577023113 105.3902 1 6 117.4031427251 39.5577504428 105.3676 1 7 117.4036316868 39.5578477499 105.3397 1 9 117.4038748317 39.5578963959 105.2770 1 10 117.4043617810 39.5579955995 105.2557 1 11 117.4043617810 39.5580445774 105.2775 1 11 117.4046065810 39.5580445774 105.2775 1 11 117.4048490903 39.5580927402 105.3015 1 14 117.4053391605 39.5581904606 105.3567 1 15 117.405835615 39.5582393043 105.3454 1 17 117.4058270622 39.5582883202 105.3382</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GP 1 117.4020327614 39.5575250718 105.2764 1 2 117.4021632323 39.5575554117 105.2289 1 3 117.4024139402 39.5576049765 105.2812 1 4 117.4026561413 39.5576533021 105.3428 1 5 117.4029011339 39.5577023113 105.3902 1 6 117.4031427251 39.5577504428 105.3676 1 7 117.4033879532 39.5577992583 105.3188 1 8 117.4036316868 39.5578477499 105.3397 1 9 117.4038748317 39.5578963959 105.2770 1 10 117.4041206334 39.5579461235 105.2413 1 11 117.4043617810 39.5579955995 105.2557 1 12 117.4046065810 39.5580445774 105.2775 1 13 117.4048490903 39.5580445774 105.3015 1 14 117.4053391605 39.5581412786 105.3271 1 15 117.405835615 39.5582393043 105.3454 1 17 117.4058270622 39.5582883202 105.3382 1</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT Quality GPS 1 117.4020327614 39.5575250718 105.2764 1 20 2 117.4021632323 39.5575554117 105.2289 1 20 3 117.4024139402 39.5576049765 105.2812 1 20 4 117.4026561413 39.5576533021 105.3428 1 20 5 117.4029011339 39.5577023113 105.3902 1 20 6 117.4031427251 39.5577504428 105.3676 1 20 7 117.4033879532 39.5577992583 105.3188 1 20 8 117.4036316868 39.5578477499 105.3397 1 20 9 117.4038748317 39.5578963959 105.2770 1 20 10 117.4041206334 39.5579461235 105.2413 1 2 11 117.4043617810 39.5579955995 105.2557 1 2 11 117.4046065810 39.5580445774 105.2775 1 2 13 117.4048490903 39.5580927402 105.3015 1 2 14 117.4053391605 39.5581904606 105.3567 1 2 15 117.405835615 39.5582393043 105.3454 1 2 17 117.4058270622 39.5582883202 105.3382 1 2 </pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS T 1 117.4020327614 39.5575250718 105.2764 1 201 2 117.4021632323 39.5575554117 105.2289 1 201 3 117.4024139402 39.5576049765 105.2812 1 201 4 117.4026561413 39.5576533021 105.3428 1 201 5 117.4029011339 39.5577023113 105.3902 1 201 6 117.4031427251 39.5577504428 105.3676 1 201 7 117.4033879532 39.5577992583 105.3188 1 201 8 117.4036316868 39.5578477499 105.3397 1 201 9 117.4038748317 39.5578963959 105.2770 1 201 10 117.4043617810 39.5579955995 105.2557 1 20 11 117.4043617810 39.5579955995 105.2557 1 20 12 117.4046065810 39.5580445774 105.2775 1 20 13 117.4048490903 39.5580927402 105.3015 1 20 14 117.4053391605 39.5581904606 105.3567 1 20 15 117.405835615 39.5582393043 105.3454 1 20 17 117.4058270622 39.5582883202 105.3382 1 20</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIM 1 117.4020327614 39.5575250718 105.2764 1 2019/ 2 117.4021632323 39.5575554117 105.2289 1 2019/ 3 117.4024139402 39.5576049765 105.2812 1 2019/ 4 117.4026561413 39.5576533021 105.3428 1 2019/ 5 117.4029011339 39.5577023113 105.3902 1 2019/ 6 117.4031427251 39.5577504428 105.3676 1 2019/ 7 117.4033879532 39.5577992583 105.3188 1 2019/ 8 117.4036316868 39.5578477499 105.3397 1 2019/ 9 117.4038748317 39.5578963959 105.2770 1 2019/ 10 117.4041206334 39.5579461235 105.2413 1 2019/ 11 117.4043617810 39.5579955995 105.2557 1 2019 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2019/01 15 117.405835615 39.5582393043 105.3454 1 2019/01 17 117.4058270622 39.5582883202 105.3382 1 2019/01</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/ 2 117.4021632323 39.5575554117 105.2289 1 2019/01/ 3 117.4024139402 39.5576049765 105.2812 1 2019/01/ 4 117.4026561413 39.5576533021 105.3428 1 2019/01/ 5 117.4029011339 39.5577023113 105.3902 1 2019/01/ 6 117.4031427251 39.5577504428 105.3676 1 2019/01/ 6 117.4033879532 39.5577992583 105.3188 1 2019/01/ 8 117.4036316868 39.5578477499 105.3397 1 2019/01/ 9 117.4038748317 39.5578963959 105.2770 1 2019/01/ 10 117.4041206334 39.5579461235 105.2413 1 2019/01/ 11 117.4043617810 39.5579955995 105.2557 1 2019/01 12 117.4046065810 39.5580927402 105.3015 1 2019/01 13 117.4048490903 39.5581904606 105.3567 1 2019/01 14 117.4053391605 39.5581904606 105.3567 1 2019/01 15 117.405835615 39.5582393043 105.3454 1 2019/01 17 117.4058270622 39.5582883202 105.3382 1 2019/01</pre> | <pre>#UD LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/23 2 117.4021632323 39.5575554117 105.2289 1 2019/01/23 3 117.4024139402 39.5576049765 105.2812 1 2019/01/23 4 117.4026561413 39.5576533021 105.3428 1 2019/01/23 5 117.4029011339 39.5577023113 105.3902 1 2019/01/23 6 117.4031427251 39.5577504428 105.3676 1 2019/01/23 7 117.4033879532 39.5577992583 105.3188 1 2019/01/23 8 117.4036316868 39.5578477499 105.3397 1 2019/01/23 9 117.4038748317 39.5578963959 105.2770 1 2019/01/23 10 117.4041206334 39.5579461235 105.2413 1 2019/01/2 11 117.4043617810 39.5579955995 105.2557 1 2019/01/2 12 117.4046065810 39.5580445774 105.2775 1 2019/01/2 13 117.4048490903 39.5580927402 105.3015 1 2019/01/2 14 117.4053391605 39.5581904606 105.3567 1 2019/01/2 15 117.405835615 39.5582393043 105.3454 1 2019/01/2 17 117.4058270622 39.5582883202 105.3382 1 2019/01/2</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/23 0 2 117.4021632323 39.5575554117 105.2289 1 2019/01/23 0 3 117.4024139402 39.5576049765 105.2812 1 2019/01/23 0 4 117.4026561413 39.5576533021 105.3428 1 2019/01/23 0 5 117.4029011339 39.5577023113 105.3902 1 2019/01/23 0 6 117.4031427251 39.5577504428 105.3676 1 2019/01/23 0 7 117.4033879532 39.5577992583 105.3188 1 2019/01/23 0 8 117.4036316868 39.5578477499 105.3397 1 2019/01/23 0 9 117.4038748317 39.5578963959 105.2770 1 2019/01/23 0 9 117.4038748317 39.5579461235 105.2413 1 2019/01/23 0 10 117.4043617810 39.5579955995 105.2557 1 2019/01/23 11 117.4043617810 39.5580445774 105.2775 1 2019/01/23 13 117.4048490903 39.5581412786 105.3271 1 2019/01/23 14 117.4053391605 39.5581904606 105.3567 1 2019/01/23 15 117.405835615 39.5582393043 105.3454 1 2019/01/23 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/23 03: 2 117.4021632323 39.5575554117 105.2289 1 2019/01/23 03: 3 117.4024139402 39.5576049765 105.2812 1 2019/01/23 03: 4 117.4026561413 39.5576533021 105.3428 1 2019/01/23 03: 5 117.4029011339 39.5577023113 105.3902 1 2019/01/23 03: 6 117.4031427251 39.5577504428 105.3676 1 2019/01/23 03: 7 117.4033879532 39.5577992583 105.3188 1 2019/01/23 03: 8 117.4036316868 39.5578477499 105.3397 1 2019/01/23 03: 9 117.4038748317 39.5578963959 105.2770 1 2019/01/23 03: 10 117.4041206334 39.5579461235 105.2413 1 2019/01/23 03: 11 117.4043617810 39.5579955995 105.2557 1 2019/01/23 03: 12 117.4046065810 39.5580445774 105.2775 1 2019/01/23 03: 13 117.4048490903 39.5580927402 105.3015 1 2019/01/23 03: 14 117.4053391605 39.5581904606 105.3567 1 2019/01/23 03: 15 117.405835615 39.5582393043 105.3454 1 2019/01/23 03: 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03: 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03: 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03: 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03: 17 117.4058270622 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17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:4 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/23 03:39: 2 117.4021632323 39.5575554117 105.2289 1 2019/01/23 03:39: 3 117.4024139402 39.5576049765 105.2812 1 2019/01/23 03:39: 4 117.4026561413 39.5576533021 105.3428 1 2019/01/23 03:40: 5 117.4029011339 39.5577023113 105.3902 1 2019/01/23 03:40: 6 117.4031427251 39.5577504428 105.3676 1 2019/01/23 03:40: 7 117.403879532 39.5577992583 105.3188 1 2019/01/23 03:40: 8 117.4036316868 39.5578477499 105.3397 1 2019/01/23 03:40: 9 117.4038748317 39.5578963959 105.2770 1 2019/01/23 03:40: 10 117.4041206334 39.5579965959 105.2557 1 2019/01/23 03:40: 11 117.4043617810 39.5579955995 105.2557 1 2019/01/23 03:40 12 117.4046065810 39.5580445774 105.2775 1 2019/01/23 03:40 13 117.4048490903 39.5580927402 105.3015 1 2019/01/23 03:40 14 117.4050921458 39.5581412786 105.3271 1 2019/01/23 03:40 15 117.4053391605 39.5581904606 105.3567 1 2019/01/23 03:40 16 117.4055835615 39.5582893043 105.3454 1 2019/01/23 03:40</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/23 03:39:52 2 117.4021632323 39.5575554117 105.2289 1 2019/01/23 03:39:55 3 117.4024139402 39.5576049765 105.2812 1 2019/01/23 03:39:58 4 117.4026561413 39.5576533021 105.3428 1 2019/01/23 03:40:01 5 117.4029011339 39.5577023113 105.3902 1 2019/01/23 03:40:03 6 117.4031427251 39.5577504428 105.3676 1 2019/01/23 03:40:06 7 117.403879532 39.5577992583 105.3188 1 2019/01/23 03:40:09 8 117.4036316868 39.5578477499 105.3397 1 2019/01/23 03:40:01 9 117.4038748317 39.5578963959 105.2770 1 2019/01/23 03:40:11 9 117.4043617810 39.5579955995 105.2557 1 2019/01/23 03:40:1 11 117.4043617810 39.5580445774 105.2775 1 2019/01/23 03:40:2 13 117.4048490903 39.5580445774 105.3015 1 2019/01/23 03:40:2 14 117.4050921458 39.5581412786 105.3271 1 2019/01/23 03:40:2 15 117.4053391605 39.5581904606 105.3567 1 2019/01/23 03:40:3 16 117.405835615 39.5582393043 105.3454 1 2019/01/23 03:40:3 17 117.4058270622 39.5582883202 105.3382 1 2019/01/23 03:40:3</pre> | <pre>#ID LONGITUDE LATITUDE HEIGHT Quality GPS TIME 1 117.4020327614 39.5575250718 105.2764 1 2019/01/23 03:39:52.9 2 117.4021632323 39.5575554117 105.2289 1 2019/01/23 03:39:55.6 3 117.4024139402 39.5576049765 105.2812 1 2019/01/23 03:39:58.3 4 117.4026561413 39.5576533021 105.3428 1 2019/01/23 03:40:01.0 5 117.4029011339 39.5577504428 105.3676 1 2019/01/23 03:40:03.7 6 117.4031427251 39.5577504428 105.3676 1 2019/01/23 03:40:03.7 6 117.403879532 39.5577992583 105.3188 1 2019/01/23 03:40:09.1 8 117.4036316868 39.5578477499 105.3397 1 2019/01/23 03:40:09.1 8 117.4036316868 39.5578477499 105.2770 1 2019/01/23 03:40:11.8 9 117.4038748317 39.5578963959 105.2770 1 2019/01/23 03:40:14.5 10 117.4041206334 39.5579461235 105.2413 1 2019/01/23 03:40:14.5 10 117.4043617810 39.5579955995 105.2557 1 2019/01/23 03:40:22. 13 117.4048490903 39.5580445774 105.2775 1 2019/01/23 03:40:22. 13 117.4048490903 39.5580445774 105.3015 1 2019/01/23 03:40:25. 14 117.4053391605 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- ◆ 打开智拼图,选择新建工程,输入工程名称,选择机型为其他
- ◆ 由于没有相机报告, 软件默认给出初始的相机报告
- ◆ 其他新建工程操作参见第一节课-无人机管家TDOM数据处理流程

| 工程信息 | | × | | | > |
|-------|--------------------|--------|-----------------------|----------|-----------------------|
| 工程名称: | 精灵4rtk | (*必填) | 相机名称 FC6310R | | Î |
| 作业人员: | | | 相机模型 | | • |
| 作业日期: | 2020/2/27 13:27:36 | | 相机设置 | 安置角 | a: 0° ✓ |
| 数据类型: | 可见光 | | 焦距 (px): 3647.714644 | 8.800 mm | † ^y |
| 无人机: | 其他 | | 影像宽 (px): 5472 | | |
| 描述: | | | 影像喜(m) . 2649 | | ►x |
| | | | 家∕緣雨(px): 3048 | - | |
| | | | CCD宽 (mm) : 13.201033 | 像主点 | X (px) : 2735.500000 |
| | | | CCD高 (mm) : 8.800688 | 像主点 | iY (px) : 1823.500000 |
| | | | 畸变参数 | | |
| | | | К1: 0 | K2: 0 | КЗ: О |
| | | | K4: 0 | P1: 0 | P2: 0 |
| | | | A: 0 | B: 0 | v |
| | | | | | 确定取消 |
| | | 下一步 退出 | | | |



①在【一键处理】界面,点击【运行】 运行
②勾选【特征提取与匹配】、【空三计算】、【PPK】。
③自由网空三计算完成,此时绿色点代表参与空三计算,橙色的点代表未参与空三计算
④自由网空三完成,点击3D视图,看空三是否正常





①点击【GCP】,进入刺点界面,导入像控点,全局视图下查看像控点与影像套合情况





②激活其中一个像控点进行刺点,绿色十字标是软件根据POS预测的像控点位置,蓝色十字标是人工刺点 位置,刺完当前界面中9张影像,点击 ② ③ 进行翻页继续刺点,直到刺完。





6.控制网平差-无控空三

①将全部控制点设为检查点,右键-【全部设为检查点】
②在【一键处理】界面,点击【运行】 运行
③勾选【空三计算】、【PPK】、【控制点】,点击【确定】

| 控 | 制 点:信, | | | | | | | |
|----|---------------|-----|-----|-------|----|----|------|---|
| | 激活 | ID | 检查点 | 类型 | 度 | 预测 | 2 | > |
| 4 | ۲ | A34 | | XY2 - | 15 | 16 | 5347 | |
| 5 | 0 | A1 | | XY2 - | 8 | 8 | 5347 | |
| 6 | 0 | A2 | | XY2 - | 0 | 5 | 5348 | |
| 7 | 0 | A3 | | XY2 - | 0 | 10 | 5349 | |
| 8 | 0 | A4 | | XY2 - | 0 | 5 | 5350 | |
| 9 | 0 | A5 | | XY2 - | 10 | 10 | 5351 | |
| 10 | 0 | A18 | | XY2 - | 8 | 9 | 5345 | |
| 11 | 0 | A17 | | XY2 - | 0 | 0 | 5344 | |
| 12 | 0 | A16 | | XY2 - | 0 | 0 | 5343 | Ŷ |
| < | | | | | | | > | |



6.控制网平差-无控空三

平面中误差0.052m, 高程中误差1.399m, 且为系统误差

原因: 旋翼机姿态太稳+云台帮助相机稳定姿态, 导致前方交会存在系统差

常见此误差的测区情况:地形无起伏的平原或起伏不大的丘陵,等高飞行。

控制点残差

| ID | TYPE | DX | DY | DZ |
|--------|-------|--------|--------|-------|
| A1 | СНК | -0.002 | -0.047 | 1.431 |
| A10 | СНК | 0.073 | 0.056 | 1.443 |
| A18 | СНК | 0.024 | -0.030 | 1.398 |
| A34 | СНК | 0.017 | -0.021 | 1.374 |
| A5 | СНК | 0.009 | 0.024 | 1.345 |
| 控制点中误差 | | | | |
| ID | DX | DY | DXY | DZ |
| ALL | 0.035 | 0.038 | 0.052 | 1.399 |

7.控制网平差-带控空三

解决方案:由于是上述原因所造成的的系统差,自由网空三正确,仅用1个点消除该系统差,

达到精度要求。

勾选【空三计算】、【PPK】、【控制点】,点击【确定】

控制点残差

| ID | TYPE | DX | DY | DZ |
|-----|------|--------|--------|--------|
| A34 | XYZ | 0.023 | -0.026 | -0.010 |
| A1 | СНК | -0.007 | -0.041 | 0.058 |
| A10 | СНК | 0.088 | 0.045 | 0.063 |
| A18 | СНК | 0.028 | -0.032 | 0.010 |
| A5 | СНК | 0.014 | 0.007 | -0.018 |

控制点中误差

| ID | DX | DY | DXY | DZ |
|-----|-------|-------------------------|-------|-------|
| ALL | 0.043 | 0.033 | 0.054 | 0.040 |
| < | > | 117.4010398, 39.5559963 | ~ * * | |



空三精度满足要求,可输出空三成果和TDOM&DSM



前方高能:

●该方法与利用多个像控点进行控制网平差的区别:
该方法是利用1个点,将空三前方交会所产生的高程
系统误差消除,类似于GPS当中的【点校正】功能;
控制网平差,是以控制点为基础进行定向,目的在于
获得控制网平差后影像外方位元素以及加密点坐标,
两者从原理上是截然不同的。

● 应用场景

①空三存在系统误差

②测区范围较小

