SHMS Test Stand Replays and Online Monitoring

	Replay?	onlineGUI?	PARAM documented?
Aerogel	y	y	?
Drift Chambers	y	y	?
Cherenkov Efficiency	y	y	?
Heavy Gas Cherenkov	y	y	?
Noble Gas Cherenkov	y	y	?
Hodoscope	y	almost	?
SHMS Stack	y	almost	?
SHMS Online Analysis	y	almost	?
Raster	n	n	?
Trigger	y	y	?

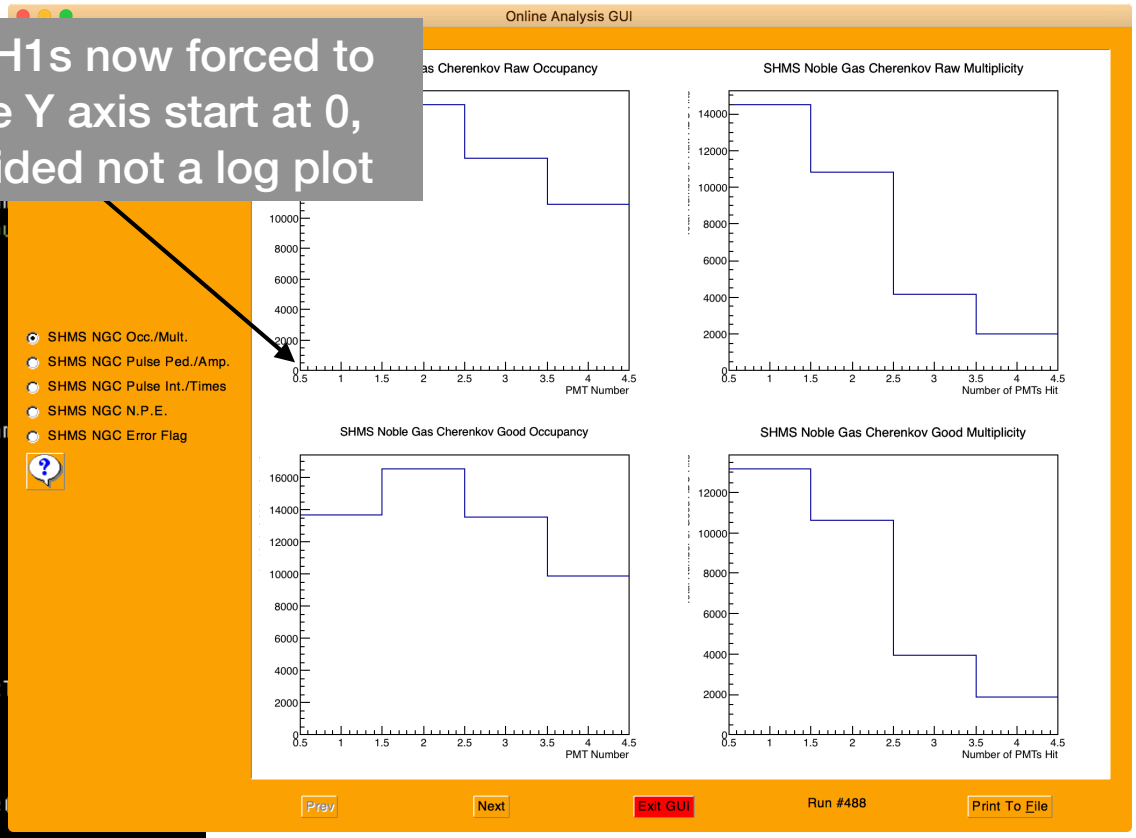
Common problems

- Mismatch between DEF-file and onlineGUI configuration
  - (onlineGUI looking for a histogram that doesn't exist in the root file)
  - e.g. `pngcer_pmt_vs_good_pi` vs `pngcer_good_pi_vs_pmt`
- Data outside the histogram limits in the DEF-file
- Errors in macros
  - Variable defined multiple times, variable not declared, etc.

Fixed TH1 y-axis

```
1505  // Determine dimensionality of histogram, then dra
1506  if(command.objtype.Contains("TH1")) {
1507      // Operation for TH1
1508      fRootFile.RootFile->cd();
1509      if(fDir) fDir->cd();
1510      fRootFile.mytemp1d = (TH1D*)gDirectory->Get(co
1511      if(!fRootFile.mytemp1d) BadDraw(command.variable+" not fo
1512      if(fRootFile.mytemp1d->GetEntries()==0) {
1513          BadDraw("Empty Histogram");
1514      } else {
1515          if(showGolden) {
1516              fGoldenFile.RootFile->cd();
1517              if(fDir) fDir->cd();
1518              fGoldenFile.mytemp1d = (TH1D*)gDirectory->Get(com
1519              fGoldenFile.mytemp1d->SetLineColor(30);
1520              fGoldenFile.mytemp1d->SetFillColor(30);
1521              Int_t fillstyle=3027;
1522              if(fPrintOnly) fillstyle=3010;
1523              fGoldenFile.mytemp1d->SetFillStyle(fillstyle);
1524              fRootFile.mytemp1d->SetStats(showStat);
1525              fGoldenFile.mytemp1d->SetStats(kFALSE);
1526              fGoldenFile.mytemp1d->Draw();
1527              if(!htitle.IsNull()) fGoldenFile.mytemp1d->SetTit
1528              fRootFile.mytemp1d->Draw("sames"+type);
1529          } else {
1530              fRootFile.mytemp1d->SetStats(showStat);
1531              if(!htitle.IsNull()) fRootFile.mytemp1d->SetTitle
1532              fRootFile.mytemp1d->Draw(type);
1533
1534              // Force TH1s' y-axis to start at 0 if not logy
1535              if(gStyle->GetOptLogy() == 0)
1536                  fRootFile.mytemp1d->SetMinimum(0);
1537          }
1538      }
1539      return;
1540  }
1541
1542  if(command.objtype.Contains("TH2")) {
1543      // Operation for TH2
```

All TH1s now forced to have Y axis start at 0, provided not a log plot



hallc_replay/onlineGUI/onlineGUI_v1.2.1/online.C

Small hcana edit for hodoscope macros

```
for(UInt_t ip = 0; ip < NPLANES; ip++) {
    TString base2_name = SPECTROMETER+"."+DETECTOR+"."+plane_names[ip];
    TString ndata_name = "Ndata."+base2_name+".GoodPaddle";
    T->SetBranchAddress(ndata_name, &nhits[ip]);
    TString paddle_name = base2_name+".GoodPaddle";
    T->SetBranchAddress(paddle_name, &paddles[ip][0]);
    // cout << ip << " " << paddle_name << endl;
    for(UInt_t iside = 0; iside < NSIDES; iside++) {
        for(UInt_t isignal = 0; isignal < NSIGNALS; isignal++) {
```

- Macros/SHMS/HODO/gooddraw_2d_phodo.C wants branches like `P.hod.1x.GoodPaddle` but they were commented out in hcana's THcScintillatorPlane.cxx (line 405)

```
400     {"totNumGoodNegTdcHits", "Total Number of Good Negative TDC Hits",    "fTotNumGoodNegTdcHits"}, // Hodo- g
401     {"totNumGoodTdcHits",    "TotalNumber of Good TDC Hits Per PMT",      "fTotNumGoodTdcHits"},    // Hodo go
402
403
404
405     {"GoodPaddle",          "List of Paddle Numbers (passed TDC && ADC Min and Max cuts for either end)",
406
407     {"GoodPosAdcPed",  "List of Positive ADC pedestals (passed TDC && ADC Min and Max cuts for either end)",
408     {"GoodNegAdcPed",  "List of Negative ADC pedestals (passed TDC && ADC Min and Max cuts for either end)",
409
410     {"GoodNegTdcTimeUnCorr",   "List of negative TDC values (passed TDC && ADC Min and Max cuts for either end
```

- I have a table of onlineGUI configuration files with replay scripts and root files they pair with. Should something like this be publicly available?

CONFIG	RUNS?	Appropriate axes?	Notes	replay script	root f
O/aero_stand.cfg	y	y		SHMS/TEST_STANDS/replay_paero_test_stand.C	
/pcalo_stand.cfg	y	y		SHMS/TEST_STANDS/replay_pcal_test_stand.C	
/shms_cer_eff.cfg	y	y		SHMS/PRODUCTION/replay_production_shms.C	shms_replay_production ot
odc_stand.cfg	y	y		SHMS/TEST_STANDS/replay_pdc_test_stand.C	
ER/phgcer_stand.cfg	y	y		SHMS/TEST_STANDS/replay_phgcer_test_stand.C	
ER/pngcer_stand.cfg	y	y		SHMS/TEST_STANDS/replay_pngcer_test_stand.C	
O/phodo_stand.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodo_1x.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodo_1y.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodo_2x.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodo_2y.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodo_2d.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodo_2d_pad.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/raw_phodoana.cfg	y	y		SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/good_phodo_2d.cfg	n		Y2 histos empty Only 1x1,2x1,1y1,histos filled (other paddles empty)	SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
O/good_phodo_2d_dis.cfg	n		same as above	SHMS/TEST_STANDS/replay_phodo_test_stand.C	phodo_replay_XXXXX.ro
/hallc_onlana.cfg	mostly	n (notes)	"HGC/NGC Sums" is a little funny	SHMS/STACK/replay_shms.C	shms_replay_XXXXX_50
/shms_stack.cfg	mostly (notes)	y	page titles don't show up on laptop screen; do they on desktop?	SHMS/STACK/replay_shms.C	shms_replay_XXXXX_50

Warning to investigate

- Output from hcana for all replay scripts, at least on my MacBook
- Warning about missing header in `THcConfigEvtHandler::Analyze()`

```
Starting analysis
------------------
  Event type 125
THcConfigEvtHandler: 4
ADC information: Block level 1
ADC thresholds for slots  3 4 5 6 7 8 9 10 13 14 15 16 17 18 19 20
------------------
  Event type 125
THcConfigEvtHandler: 6
TDC information
------------------
  Event type 125
THcConfigEvtHandler: 2
ADC information: Block level 1
ADC thresholds for slots  3 4 5 6 7 8 9 10 13 14
TDC information
Expected header missing
202 d0000000
1000
2000
3000
4000
5000
```

```
85  // Three possible blocks of config data
86  // 0xdafadc01 - FADC information for the crate
87  // 0xdafadcff - Set of threshold by slot/channel
88  // 0xdedc1190 - 1190 TDC information for the crate
89  while(ip<evlen) {
90    thisword = evdata->GetRawData(ip);
91    if (thisword == 0xdafadcff) {
92      ip++;
93      thisword = evdata->GetRawData(ip);
94      cout << "ADC thresholds for slots ";
95      while((thisword & 0xfffff000)==0xfadcf000) {
96        Int_t slot = thisword&0x1f;
97        // Should check if this slot has already been SDC_WIRE_CENTER
98        cinfo->FADC250.nmodules++;
99        cout << " " << slot;
100       Int_t *thresholds = new Int_t [16];
101       cinfo->FADC250.thresholds.insert(std::make_pair(slot, thresholds));
102       for(Int_t i=0;i<16;i++) {
103         thresholds[i] = evdata->GetRawData(ip+1+i);
104       }
105       ip +=18;
106       if(ip>=evlen) {
107         if(ip>evlen) {
108           cout << endl << "Info event truncated" << endl;
109         }
110         break;
111       }
112       thisword = evdata->GetRawData(ip);
113     }
114     cout << endl;
115   } else if((thisword&0xffffff00) == 0xdafadc00) { // FADC250 information
116     cout << "ADC information: Block level " << (thisword&0xff) << endl;
117     cinfo->FADC250.present = 1;
118     cinfo->FADC250.blocklevel = thisword&0xff;
119     cinfo->FADC250.daq_level = evdata->GetRawData(ip+2);
120     cinfo->FADC250.threshold = evdata->GetRawData(ip+3);
121     cinfo->FADC250.mode = evdata->GetRawData(ip+4);
122     cinfo->FADC250.window_lat = evdata->GetRawData(ip+5);
123     cinfo->FADC250.window_width = evdata->GetRawData(ip+6);
124     cinfo->FADC250.nsb = evdata->GetRawData(ip+7);
125     cinfo->FADC250.nsa = evdata->GetRawData(ip+8);
126     cinfo->FADC250.np = evdata->GetRawData(ip+9);
127     cinfo->FADC250.nped = evdata->GetRawData(ip+10);
128     cinfo->FADC250.maxped = evdata->GetRawData(ip+11);
129     cinfo->FADC250.nsat = evdata->GetRawData(ip+12);
130     ip += 13;
131   } else if (thisword == 0xdedc1190) { // CAEN 1190 information
132     cout << "TDC information" << endl;
133     cinfo->CAEN1190.present = 1;
134     cinfo->CAEN1190.resolution = evdata->GetRawData(ip+2);
135     cinfo->CAEN1190.timewindow_offset = evdata->GetRawData(ip+3);
136     cinfo->CAEN1190.timewindow_width = evdata->GetRawData(ip+4);
137     ip += 6;
138   } else {
139     cout << "Expected header missing" << endl;
140     cout << ip << " " << hex << thisword << dec << endl;
141     ip = evlen;
142   }
143 }
```

```
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------------------
  Event type 125
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