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First experience with the new CRD ILRS NP data format

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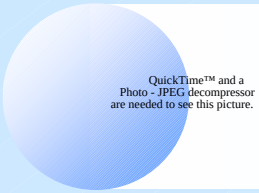
Motivation

- New ILRS format to replace all previously used formats "soon"
  - ILRS ACs must be prepared to switch to CRD seamlessly
  - Need for s/w that will interface CRD and analysis packages
  - Understand the additional info/precision in CRD, and
  - Give feedback to design group for possible improvements



Tests performed

- Test data provided by UT/CSR in CRD and ILRS NP format for MLRS for the month of May 2007.
- In a first step, in order to be able to use the data, we generated s/w that converted the CRD data back to ILRS FR format, which is directly readable by our analysis s/w (GEODYN)
  - All quantities were converted using the IFRF precision
  - Met data were used without interpolation

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CRD to ILRS FR (MERIT2)

```
h1 CRD  0 2007  9  5 13
h2 MDOL       7080 24 19 4
h3 LAGEOS1     7603901 1155     8820 0 0
h4  1 2007  5 11 23 53 33 2007  5 11  0  2 14  0 0 0 0 1 0 2
c0 0 532.000 std ml1 mcp mt1
c1 0 ml1 Nd-Yag 1064.00 10.00 -1.00 200.0 -1.00 1
c2 0 mcp mcp 532.000 -1.00 3800.0 0.0 unknown -1.0 3.00 -1.0 35.0 none
c3 0 mt1 TAC TAC MLRS_CMOS_TMRB_TD811 na 467300000.0
60 std 5 2
40 86013.4523810 0 std 47 46 -1.000 -831.7 0.0 59.4 0.118 -0.837 203.4 3 3
20 86023.457  803.09 296.26  32.                                  > MET RECORD for next 2 data
11 86023.456666973740     0.045600077128 std  2  120     22   92.5   1.503  -0.308  -47.9   1.83
11 86090.485491141153     0.044884749423 std  2  120     89  109.7   1.519  -0.342   17.3   7.42
20 86338.192  803.09 296.06  32.                                  > MET RECORD for 1 data
11 86338.192059406327     0.042824226301 std  2  120     99   85.0   1.588  -0.002  -60.8   8.25
20    71.549  803.09 296.26  33.                                  > MET RECORD for next 2 data
11    71.549406949766     0.042137743997 std  2  120     47   84.2   1.551  -0.110  -73.2   3.92
11   131.175048712525     0.041934327881 std  2  120      2   46.1   0.354  -2.750  -29.3   0.17
50 std    94.1   1.616   0.060   22.9 0
h8
h9
```

```
MERIT from CRD file:
760390107131860234566670702419      0     00456000771280000092532008031296203 2     0     0
760390107131860904854911702419      0     00448847494230000109532008031296203 2     0     0
760390107131863381920594702419      0     00428242263010000085532008031296003 2     0     0
760390107132000715494070702419      0     00421377439970000084532008031296203 3     0     0
760390107132001311750487702419      0     00419343278810000046532008031296203 3     0     0
```

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ILRS NP to ILRS FR

```
NP for the same data
99999
760390107131708024195320-0000832000000000597465200940431
860234566670045600077126000009308031296203200220000043
860904854911044884749423000011008031296403200890000069
863381920594042824226300000008508031296003200990000056
000715494069042137743997000008408031296403200470000062
001311750487041934327877000004708031296203200020000041
```

```
MERIT from NP file:
760390107131860234566670708024190456000771260000093532008031296203276039010713186090485491170802419044884749423000011053200803129640327603901071318633819205947080241904282422630000000855320080312960327603901071320007154940697080241904213774399700000845320080312964327603901071320013117504877080241904193432787700000475320080312962032
```

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RMS of fit for MLRS May '07

	NO.WTD	WTD-MEAN	WTD-RMS	TYPE	CONFIGURATION STATION	SATELLITE	ARC
L1	17	-0.0000	0.0069	CRD	MLRS7080	7603901	070506
	17	0.0000	0.0069	NP	MLRS7080	7603901	
	47	-0.0000	0.0106	CRD	MLRS7080	7603901	070513
	47	0.0000	0.0107	NP	MLRS7080	7603901	
	19	0.0000	0.0079	CRD	MLRS7080	7603901	070520
	20	-0.0000	0.0084	NP	MLRS7080	7603901	
	57	-0.0000	0.0117	CRD	MLRS7080	7603901	070527
	57	0.0000	0.0117	NP	MLRS7080	7603901	
L2	34	0.0000	0.0121	CRD	MLRS7080	9207002	070506
	34	-0.0000	0.0119	NP	MLRS7080	9207002	
	37	-0.0000	0.0102	CRD	MLRS7080	9207002	070513
	37	-0.0000	0.0100	NP	MLRS7080	9207002	
	2	0.0199	0.0305	CRD	MLRS7080	9207002	070520
	2	0.0195	0.0301	NP	MLRS7080	9207002	
	14	0.0000	0.0056	CRD	MLRS7080	9207002	070527
	16	0.0000	0.0060	NP	MLRS7080	9207002	
E1	9	-0.0000	0.0064	CRD	MLRS7080	8900103	070520
	9	-0.0000	0.0066	NP	MLRS7080	8900103	
E2	6	-0.0000	0.0038	CRD	MLRS7080	8903903	070506
	6	0.0000	0.0038	NP	MLRS7080	8903903	

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Summary

- We have successfully used NP data in the new CRD format in GEODYN
- No major issues with the format, nearly identical results, $|\Delta \upsilon_R| \leq 0.5\ mm$
- More tests needed:
  - Use current test files to evaluate the effect of the higher precision available
  - Adopt rules of use, e.g. should met data be interpolated linearly or not?
  - More data types in test files to examine FR, QL and engineering data
  - We need to examine what other quantities analysts would like to include to improve analysis of more accurate data expected from future stations & s/c