Results from ILRS GNSS Tracking Campaigns

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ILRS Network Participation
Campaigns 1, 2, 3
Weekly GNSS Tracking by Campaign Constellation

[Graph showing weekly GNSS tracking by campaign and constellation, with data for different campaigns and constellations such as GLONASS and Galileo.]
Campaign 1 Summary
August 01 – September 30, 2014 (2 months/8 weeks/61 days)

• Instructions:
  – Track all GNSS satellites on current ILRS priority list (18 satellites); can track more if able (total of 33 satellites available, 24 GLONASS/5 Galileo/4 Beidou)
  – Acquire three sets of two normal points distributed over that transit of each satellite; normal point includes 1000 FR points or last 5 minutes, whichever is shorter; no need to obtain more than 1000 FR points
  – Cycle through all of the GNSS satellites (GLONASS, Galileo, and Beidou); and track the full cycle at least three times per week
  – Attempt some daytime passes if conditions are favorable

• Conclusions:
  – Number of stations tracked all of the satellites
  – Few stations tracked a thousand or more pass segments and a few thousand normal points
  – Several stations averaged 2 – 4 passes a week on all of the satellites
  – Largest data yield was achieved by the Yarragadee site
  – Increased GNSS tracking did not appear to noticeably reduce LAGEOS and LEO data yield
  – Few stations got more than one segment per pass
  – Small amount of data in daylight
Campaign 1
August 01 – September 30, 2014 (2 months/8 weeks/61 days)

N = Average number GNSS pass segments per satellites per week

N=4
N=3
N=2
N=1
Campaign 1
August 01 – September 30, 2014 (2 months/8 weeks/61 days)
Campaign 2 Summary
November 22, 2014 – February 28, 2015  (3 months/14 weeks/99 days)

• Instructions:
  – Track six GLONASS only: GLONASS-123, -125, -129, -130, -131, and -132 (first priority)
  – Track Beidou and Galileo as second priority
  – Tracking remaining GLONASS satellites as third priority
  – At minimum, stations obtain three segments along each pass, with three NPTs in each segment
  – Include daylight data, even if it is just a couple of hours after sunrise and a couple of hours before sunset

• Conclusions:
  – Some stations obtained 2 and 3 segments and daylight data on some passes
  – Need more sectors covered for the six higher priority GLONASS satellites and Galileo and M class Compass satellites. More important to get 2 and 3 sectors of data in the higher priority GLONASS satellites than to track the lower priority GLONASS satellites
  – Need more data in daylight, or at least around sunrise and sunset
Campaign 2
November 22, 2014 – February 28, 2015 (3 months/14 weeks/99 days)

N = Average number GNSS pass segments per satellites per week

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Campaign 2
November 22, 2014 – February 28, 2015 (3 months/14 weeks/99 days)

Number of Pass Segments

- Compass Segments (4 satellites)
- Galileo Segments (5 satellites)
- GLONASS Segments (6 satellites)

Stations:
- Yarragadee
- Changchun
- Mount Stromlo
- Shanghai
- Herstmonceux
- Monument Peak
- Matera
- Komsomol
- Graz
- Altay
- Greentube
- Zeppelin
- Beijing
- Arkhyz
- Whitehorse
- Brasilia
- Baikonur
- Badary
- Tahtit
- Potsdam

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Percentage of the passes tracked that included one, two, and three segments for GLONASS.
Campaign 2: Pass Distribution Analysis

Percentage of the pass segments distributed within pass (B-beginning, M-middle, E-end)
Campaign 3 Summary
August 20 – October 16, 2015 (2 months/8 weeks/58 days)

• Instructions:
  – Track six GLONASS only: GLONASS-123, -125, -128, -129, -133, and -134 (first priority)
  – Track Compass-M3 and Galileo-101, -102, -103, and -104 (second priority)
  – Tracking remaining GLONASS satellites as third priority but less important
  – Obtain nine NPTs over the pass;
    • 3 during the ascending or early region of the pass
    • 3 in the central region of the pass
    • 3 in the descending or late region of the pass
  – NPTs in each region may be taken together of separately whichever is better for your operation
  – Obtain more daylight ranging even if it is around sunrise and sunset

• Conclusions:
  – TBD, but
  – High data yields can be expected when conditions are very good
  – Need more data in daylight, or at least around sunrise and sunset
  – May have same issues as with previous campaigns
Campaign 3
August 20 – October 16, 2015 (2 months/8 weeks/58 days)

\( N = \text{Average number GNSS pass segments per satellites per week} \)
Campaign 3
August 20 – October 16, 2015 (2 months/8 weeks/58 days)

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It appears that a GNSS campaign yields more data for both GNSS and LAGEOS. This trend is consistent for all three GNSS campaigns.