Orbit test comparisons

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Generated Solutions

• Three different integrations were performed
• Results were given in both ECI and ECF (velocities in SP3 optional, not needed)

1. Basic model
   • Label: [ACid]_[eci/ecf]_wot.sp3
   • Example: esoc_eci_wot.sp3

2. Basic model but no Ocean Tides
   • Label: [ACid]_[eci/ecf]_not.sp3
   • Example: esoc_eci_not.sp3

3. Basic model but no Ocean Tides and No Solid Earth Tides
   • Label: [ACid]_[eci/ecf]_not_nst.sp3
   • Example: esoc_eci_not_nst.sp3
Description of Basic Model (ESOC)

- Gravity field until $n \times n$
  - ESOC: EIGEN-6S2ext, degree and order 12x12
    - C21 and S21 from EIGEN-6S2ext, not based on IERS2010 equation, i.e. not using mean pole

- Effects of Sun and Moon

- Planets
  - ESOC: All including Pluto

- No relativistic corrections

- No SRP, No Earth radiation, No antenna thrust

- Solid Earth tides (not to be used for solution 3)
  - ESOC: IERS2010 elastic Earth model but no pole tide

- Ocean tides (only to be used for solution 1)
  - ESOC: EOT11a, degree and order 12x12
    - 12 largest constituents per degree and order

- No pole tide nor ocean pole tide
Description of Basic Model (JPL)

- Gravity field until $n \times n$
  - JPL: EGM2008, degree and order 12x12
- Effects of Sun and Moon
- Planets
  - JPL: All including Pluto
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
  - JPL: IERS2010
- Ocean tides (only to be used for solution 1)
  - JPL: got4p8acconvdelta+opole_30.txt
- Including pole tide
Description of Basic Model (MIT)

- Gravity field until n x n
  - MIT: EGM2008, degree and order 12x12
- Effects of Sun and Moon
- Planets
  - Only Jupiter and Venus
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
  - JPL: IERS2010
- Ocean tides (only to be used for solution 1)
  - JPL: FES2004
- no pole tide
Description of Basic Model (TUG)

- Gravity field until n x n
  - TUG: GOCO05s, degree and order 20x20
- Effects of Sun and Moon
- Planets
  - TUG: All except Uranus, Neptune, Pluto
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
  - TUG: IERS2010 anelastic Earth model
- Ocean tides (only to be used for solution 1)
  - TUG: FES2014b degree and order 10x10
- No pole tide no ocean pole tide
- **TUG(E)** TUG solution run consistent with ESOC.
Differences

• Start with differences that each group sees as the impact of
  • solid-earth tide (not minus not_nst solution)
  • Ocean tide (wot minus not solution).

• Look at total effect and then the differences when the mean effect removed.
Along track – trend removed
Cross-track Residual

**Figure 7** Solid-Earth Tide Effect ECI G01

- Days from 2007 Day 242
- $\Delta$Cross Track (m) - mean
- ESOC, JPL, MIT, TUG

**Figure 17** Solid-Earth Tide Effect ECI G02

- Days from 2007 Day 242
- $\Delta$Cross Track (m) - mean
- ESOC, JPL, MIT, TUG

**Figure 27** Ocean Tide Effect ECI G01

- Days from 2007 Day 242
- $\Delta$Cross Track (m) - mean
- ESOC, JPL, MIT, TUG

**Figure 37** Ocean Tide Effect ECI G02

- Days from 2007 Day 242
- $\Delta$Cross Track (m) - mean
- ESOC, JPL, MIT, TUG
Differences from JPL not tides: Radial

![Graph showing differences from JPL ECI G01](image)
Differences from JPL: Along track
Difference from JPL: Cross track
RMS differences to JPL for No-tides case (G01)

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