

Precise Orbit Determination by using MADOCA on JSS2

Report Number: R18ER0800

Subject Category: Space Technology

URL: <https://www.jss.jaxa.jp/en/ar/e2018/9156/>

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● Abstract

Satellite Navigation Unit has been generating the precise orbit and clock products of GNSS satellites by using MADOCA (Multi-GNSS Advanced Demonstration tool for Orbit and Clock Analysis), and been distributing to user via network routinely. On the JSS2, we aim to realize fast computation for the long-term data analysis and simulation.

Ref. URL: https://ssl.tksc.jaxa.jp/madoca/public/public_index_en.html

● Reasons for using JSS2

To improve the MADOCA products accuracy, we need to do long-term data analysis. By using JSS2, we have been expecting the reduction of the data analysis time.

● Achievements of the Year

We validated the orbit and clock determination products which generated by using MADOCA on the general-purpose PC routinely. By using the computing ability of JSS2, we could performed multiple processing with different settings and/or the analysis of long-term data in a short time. Especially, we confirmed that we could generate the Ultra-Rapid product in the permissible accuracy every single hour which usually generated every six hours on the general-purpose PC (Figure 1).

We also adjusted the data communication environment between JSS2 and our general-purpose PC, together with Supercomputer Division. That communication environment is necessary to perform the improvement of MADOCA on JSS2 and we confirmed it. By this adjustment, we obtained the ability of gathering the real-time data from the global GNSS stations and generating the real-time products on JSS2.

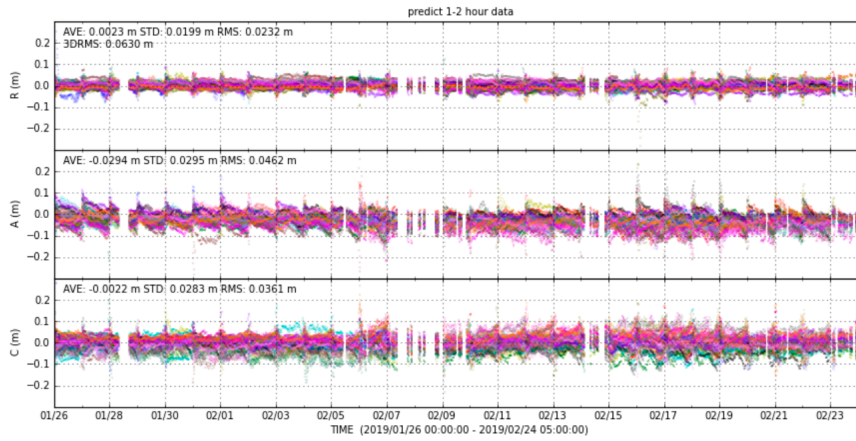


Fig. 1: The evaluation results of the predicted part in the Ultra-Rapid products which generated every single hour with reference to the IGS Rapid products. From the top, Radial, Along and Cross components.

● **Publications**

N/A

● **Usage of JSS2**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	OpenMP
Number of Processes	1
Elapsed Time per Case	30 Minute (s)

● **Resources Used**

Fraction of Usage in Total Resources*1 (%): 0.06

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	0.00	0.00
SORA-PP	0.00	0.00
SORA-LM	0.00	0.00
SORA-TPP	62,876.56	4.60

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	100.14	0.10
/data	2,584.46	0.05
/ltmp	1,953.13	0.17

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	0.00	0.00

*1: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*2: Fraction of Usage: Percentage of usage relative to each resource used in one year.