

# RTKLIBの紹介



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2016-02-01 トラ技2016年2月号オフ会

# 自己紹介

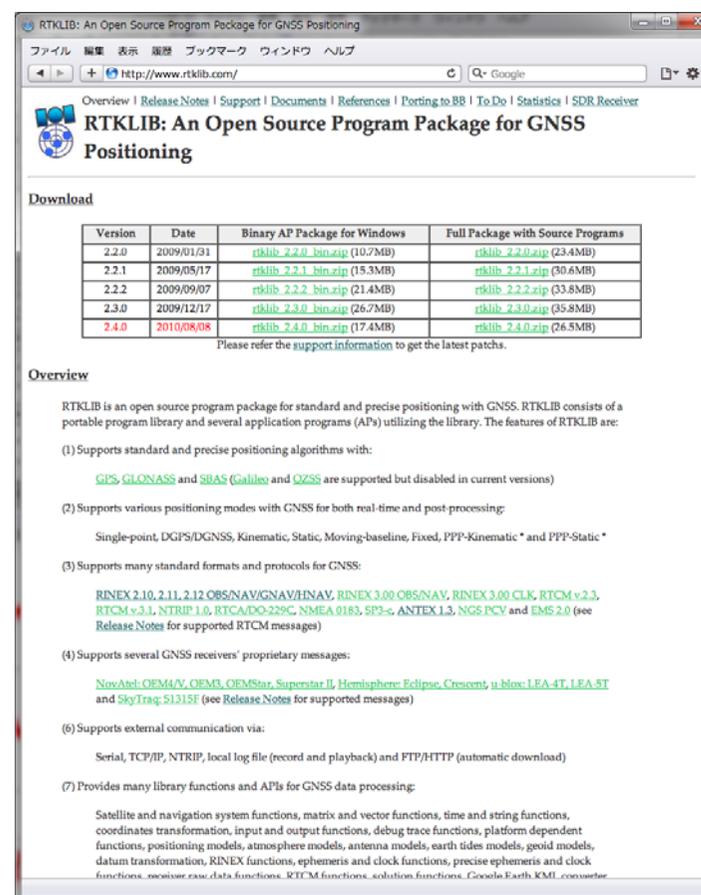
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- ソフトウェア・エンジニア
  - 宇宙開発分野: 人工衛星、地上系 等
  - 得意分野: 解析系 ...
  - コードは20年以上書いている ...
- 現在の所属と仕事
  - 東京海洋大学 客員研究員 (9年)   
GPS/GNSS精密測位技術  
衛星軌道の精密決定
  - ライトハウステクノロジー・アンド・コンサルティング (3年)  
実用準天頂衛星 (QZSS) システム開発



# RTKLIB (1)

- GPS/GNSS測位解析ツール
  - 開発開始 : 2006年
  - OSS公開 : 2009年
  - 最新ver. : ver. 2.4.2 p11
  - ライセンス : BSD 2-clause
- API + AP
  - オールインワンパッケージ
  - Windows GUI AP + CLI AP



The screenshot shows the RTKLIB website interface. At the top, there is a navigation menu with links for Overview, Release Notes, Support, Documents, References, Porting to BB, To Do, Statistics, and SDR Receiver. Below the navigation is the title "RTKLIB: An Open Source Program Package for GNSS Positioning". A "Download" section contains a table with columns for Version, Date, Binary AP Package for Windows, and Full Package with Source Programs. The table lists versions from 2.2.0 to 2.4.0, with the latest version 2.4.0 highlighted in red. Below the table, there is an "Overview" section that describes the project and lists its features, including support for various positioning algorithms, modes, and protocols.

Version	Date	Binary AP Package for Windows	Full Package with Source Programs
2.2.0	2009/01/31	<a href="#">rtklib_2.2.0_bin.zip</a> (10.7MB)	<a href="#">rtklib_2.2.0.zip</a> (23.4MB)
2.2.1	2009/05/17	<a href="#">rtklib_2.2.1_bin.zip</a> (15.3MB)	<a href="#">rtklib_2.2.1.zip</a> (30.6MB)
2.2.2	2009/09/07	<a href="#">rtklib_2.2.2_bin.zip</a> (21.4MB)	<a href="#">rtklib_2.2.2.zip</a> (33.8MB)
2.3.0	2009/12/17	<a href="#">rtklib_2.3.0_bin.zip</a> (26.7MB)	<a href="#">rtklib_2.3.0.zip</a> (35.8MB)
2.4.0	2010/08/08	<a href="#">rtklib_2.4.0_bin.zip</a> (17.4MB)	<a href="#">rtklib_2.4.0.zip</a> (26.5MB)

Please refer the support information to get the latest patches.

**Overview**

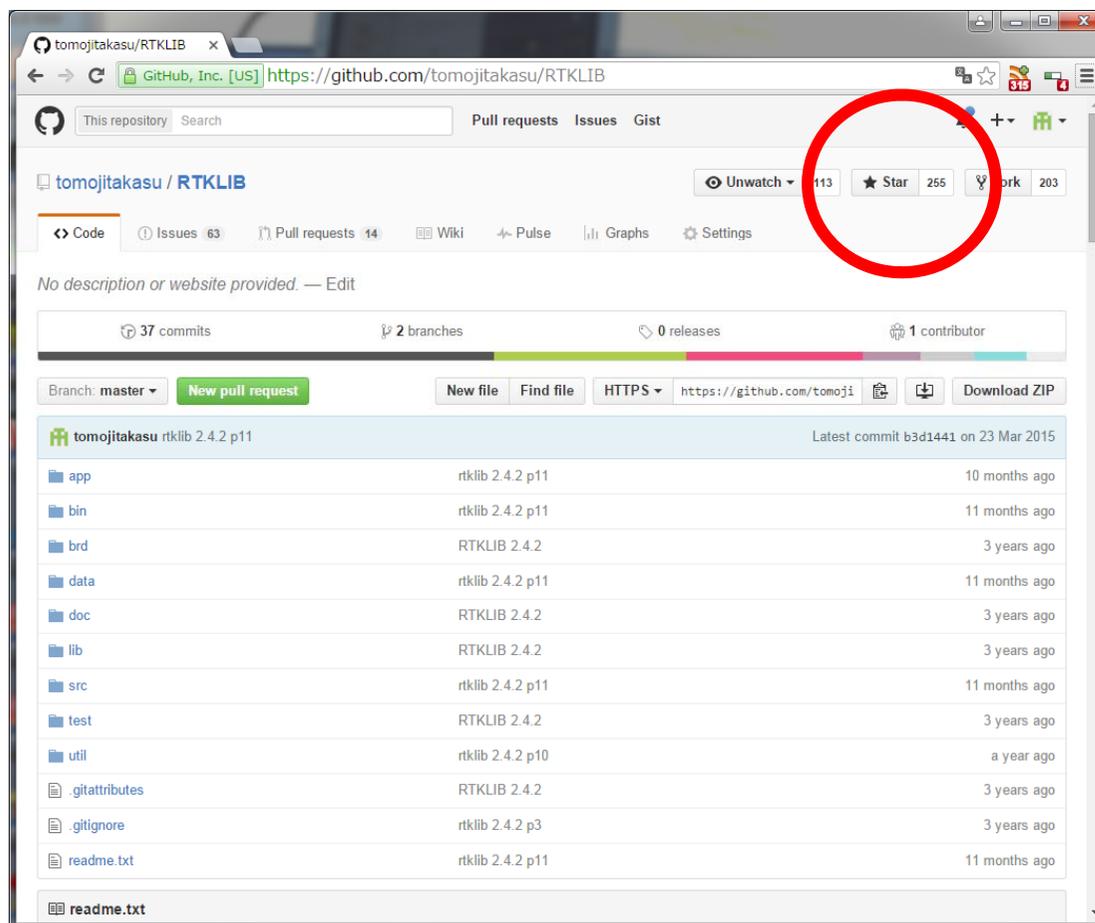
RTKLIB is an open source program package for standard and precise positioning with GNSS. RTKLIB consists of a portable program library and several application programs (APs) utilizing the library. The features of RTKLIB are:

- (1) Supports standard and precise positioning algorithms with:  
[GPS](#), [GLONASS](#) and [SBAS \(Galileo and QZSS\)](#) are supported but disabled in current versions
- (2) Supports various positioning modes with GNSS for both real-time and post-processing:  
Single-point, DGPS/DGNSS, Kinematic, Static, Moving-baseline, Fixed, PPP-Kinematic \* and PPP-Static \*
- (3) Supports many standard formats and protocols for GNSS:  
[RINEX 2.10, 2.11, 2.12 OBS/NAV/GNAV/INAV](#), [RINEX 3.00 OBS/NAV](#), [RINEX 3.00 CLK](#), [RTCM v2.3](#), [RTCM v3.1](#), [NTRIP 1.0](#), [RTCA/DO-229C](#), [NMEA 0183](#), [SP3-c](#), [ANTEX 1.3](#), [NGS PCV](#) and [EMS 2.0](#) (see [Release Notes](#) for supported RTCM messages)
- (4) Supports several GNSS receivers' proprietary messages:  
[NovAtel: OEM4/V, OEM3, OEMStar, Superstar II](#), [Hemisphere: Eclipse, Crescent, u-blox: LEA-4T, LEA-5T](#) and [SkyTrac: 51315F](#) (see [Release Notes](#) for supported messages)
- (6) Supports external communication via:  
Serial, TCP/IP, NTRIP, local log file (record and playback) and FTP/HTTP (automatic download)
- (7) Provides many library functions and APIs for GNSS data processing:  
Satellite and navigation system functions, matrix and vector functions, time and string functions, coordinate transformation, input and output functions, debug trace functions, platform dependent functions, positioning models, atmosphere models, earth tides models, geoid models, datum transformation, RINEX functions, ephemeris and clock functions, precise ephemeris and clock functions, receiver raw data functions, RTCM functions, solution functions, Google Earth KML converter

<http://www.rtklib.com>

# RTKLIB (2)

- 累計ダウンロード  
20万件位。  
(7年間)
- Github★255  
(2016/1現在)
- この分野では世  
界的に有名かも

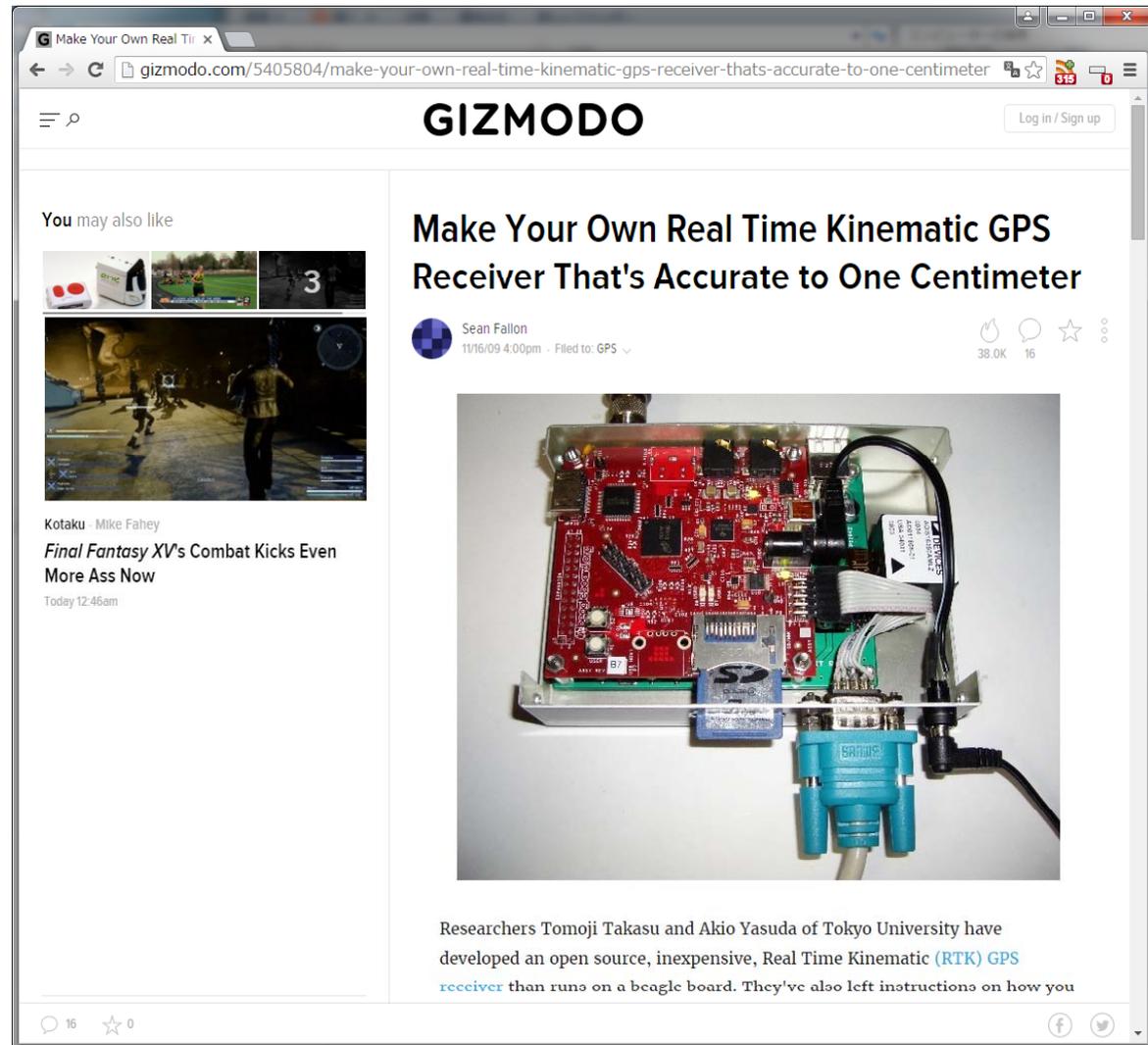


<https://github.com/tomojitakasu/RTKLIB>

# RTKLIB応用例 (1)

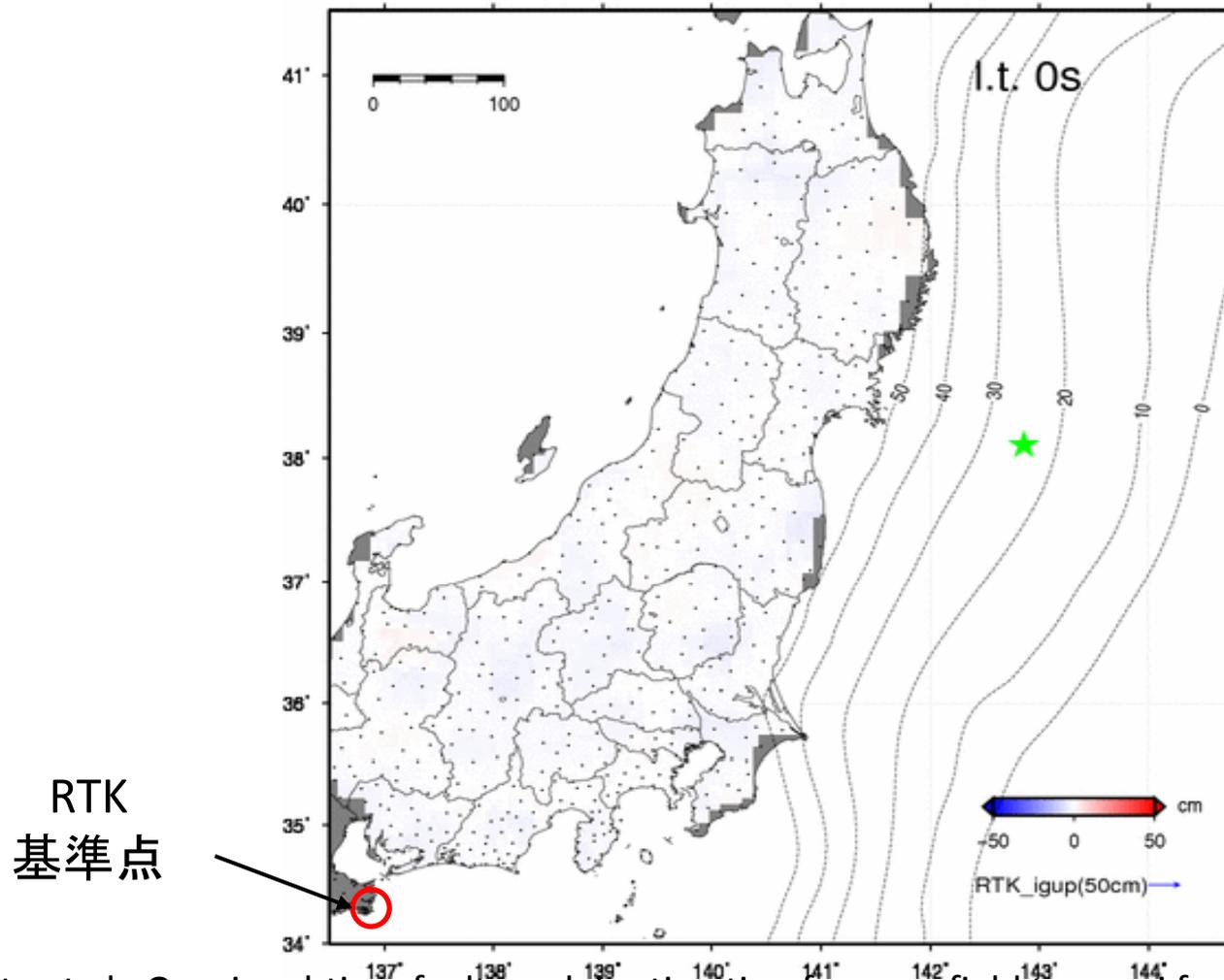
**GIZMODO**  
2009/11/16

(Beagle Board  
+ u-blox LEA-4T  
+ ADI MEMS-IMU)



The screenshot shows a web browser window displaying a Gizmodo article. The browser's address bar shows the URL: [gizmodo.com/5405804/make-your-own-real-time-kinematic-gps-receiver-thats-accurate-to-one-centimeter](http://gizmodo.com/5405804/make-your-own-real-time-kinematic-gps-receiver-thats-accurate-to-one-centimeter). The article title is "Make Your Own Real Time Kinematic GPS Receiver That's Accurate to One Centimeter" by Sean Fallon, dated 11/16/09 4:00pm. The article features a photograph of a red Beagle Board with various components connected, including a blue u-blox LEA-4T GPS module and a blue ADI MEMS-IMU. The text below the image states: "Researchers Tomoji Takasu and Akio Yasuda of Tokyo University have developed an open source, inexpensive, Real Time Kinematic (RTK) GPS receiver than runs on a beagle board. They've also left instructions on how you".

# RTKLIB応用例 (2)



Y. Ohta et al., Quasi real-time fault model estimation for near-field tsunami forecasting base on RTK-GPS analysis: Application to the 2011 Tohoku-Oki earthquake (Mw 9.0), JGR-solid earth, 2012

# RTK (real-time kinematic) 応用



Geodetic Survey



Construction  
Machine Control



Precision Agriculture



ITS (Intelligent  
Transport System)



Mobile Mapping  
System



Sports

<http://www.trimble.com>, <http://www.leica-geosystems.com>, <http://www.gpsworld.com>

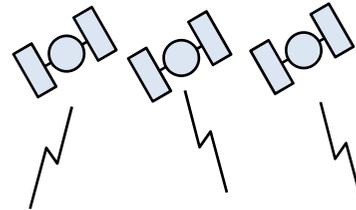
# RTK (従来)

Antenna: ~¥400K



Receiver: ~¥2,000K

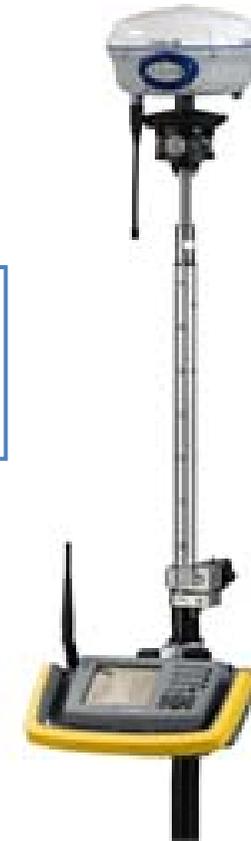
基準局



GPS

全部で  
1式¥500万位

Antenna-  
Receiver:  
~¥2,000K

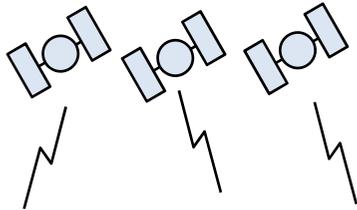


Controller:  
~¥500K

移動局

<http://www.trimble.com>

# RTK with RTKLIB



GPS, GLONASS,  
QZSS, Galileo,  
BeiDou

Antenna: \$75.45



Receiver:  
\$74.99



基準局

PC  
(流用)

全部で  
1式¥6万位

Antenna: \$75.45



Receiver:  
\$74.99



Windows  
Tablet  
\$179

移動局

# RTK with RTKLIB 例 (1)

RTKNAVI

RTKPLOT

RTKPLOT (GE View)

Receiver:  
CSG Shop  
u-blox NEO-  
M8T card



ONDA  
V919 Air CH  
9.7"  
(2048x1536)  
ATOM X5-8300,  
RAM 4GB,  
Flash 64GB

Com Link to base-station: Y-mobile WiFi Router

# RTK with RTKLIB 例 (2)



Receiver:  
CSG Shop  
u-blox NEO-  
M8T card

Tallysman  
TW2400

Antenna:

Tallysman  
TW4721



# RTK with RTKLIB 例 (3)

