INAC

Astnav89 is an implementation of navigational algorithms in the TI89 calculator.

Author: Brian Dreyer.

E-mail: brian072@hotmail.com

Program: Implementation of Navigational Algorithms on Computers (INAC)

Have any questions or comments? Please email.

You may use this program how you wish but I am not reliable for any incidents resulting from its use. You are allowed to modify the code as long as you do not spread the code to others without my explicit permission. Usage of this program constitutes an agreement with the disclaimer in this document.

This program is a scientific program for use around the world, all units are METRIC.

Thank you for downloading this program and reading the directions.

# Installation:

1. Put the INAC.89g on your calculator.
2. Press <diamond><5> to launch the setup program.
3. The following screen will appear.



1. When this screen appears, press <enter>. After pressing enter a series of screens will appear, while INAC is installed.



1. When the above screen appears, press <enter> to start the main program.

# Quick Start Guide

1. Use a method under F1 to put in your initial position.
2. Put in two or more LOPs from the F2 menu
   1. Can be from same object, but must be at different times and/or dates.
3. Do a fix with the F3 button.
4. New location is found.

Contents

[Installation: 1](#_Toc378795150)

[Quick Start Guide 1](#_Toc378795151)

[The main screen 3](#_Toc378795152)

[(F1) Initial Pos 3](#_Toc378795153)

[1) Known LAT & LNG 3](#_Toc378795154)

[2) Noonshot 3](#_Toc378795155)

[3) Known Alt & Azi 3](#_Toc378795156)

[4) BVTD (Dead Reckng) 3](#_Toc378795157)

[(F2) Add LOP 4](#_Toc378795158)

[1) Sun 4](#_Toc378795159)

[2) Moon 4](#_Toc378795160)

[3) Stars 4](#_Toc378795161)

[4) Mars 4](#_Toc378795162)

[5) Jupiter 4](#_Toc378795163)

[6) Saturn 4](#_Toc378795164)

[7) Venus 4](#_Toc378795165)

[8) DEC & GHA 4](#_Toc378795166)

[9) Azimuth and Altitude 4](#_Toc378795167)

[(F3) Fix 4](#_Toc378795168)

[(F4) Settings 5](#_Toc378795169)

[1) Show LOPS 5](#_Toc378795170)

[2) Set HT. of eye 5](#_Toc378795171)

[3) Set PERM date 5](#_Toc378795172)

[4) Use AMS time 5](#_Toc378795173)

[5) Use AMS date 5](#_Toc378795174)

[6) Manual time 5](#_Toc378795175)

[7) Manual date 5](#_Toc378795176)

[8) Delete last LOP 5](#_Toc378795177)

[9) Restore last 5](#_Toc378795178)

[(F5) Tools 6](#_Toc378795179)

[1) Great Circle 6](#_Toc378795180)

[2) Astronomy 6](#_Toc378795181)

[3) Tall object 6](#_Toc378795182)

[4) Clock 6](#_Toc378795183)

[(F6) Other 6](#_Toc378795184)

[1) Delete ALL DATA 6](#_Toc378795185)

[2) EXIT 6](#_Toc378795186)

[3) About 6](#_Toc378795187)

[4) Clear screen 6](#_Toc378795188)

[DISCLAIMER 7](#_Toc378795189)

**Notes**:

* Upper and lower limb of the celestial object should use either ‘u’ or ‘l’ to indicate which side of the object is used.
* Near and far IC adjustments should use either ‘n’ or ‘-‘ OR ‘f’ or ‘+‘. This indicates whether the IC (also known as Index error) should be added or negated from the sextant reading.
* Pressing ESC at any time in the menu will exit the program and return to the previous program or exit to the main screen.
* When asked ‘lat name’ it is referring to north, south, east, west, use them respectively i.e. Latitude is north, south and longitude is east, west.(use ‘n’ for north, ‘e’ for east ‘w’ for west and ‘s’ for south).
* The ‘fix’ command will not work if you only have one LOP.
* All settings for the AMS are saved and recovered after use.

Detailed Instructions:

# The main screen



## (F1) Initial Pos

****

Sets the initial position for celestial navigation calculations. There are 4 possible sources of an IP:

### Known LAT & LNG

From a given latitude and longitude.

### Noonshot

From a Local Meridian passage (Noon shot).

### Known Alt & Azi

From a roughly measured altitude and azimuth

1. BVTD (Dead Reckng)

From Bearing, Velocity, Time and Distance (BVTD) (i.e. Dead Reckoning).

## (F2) Add LOP



Calculates a line of position (LOP) from the selected source. The following are the currently implemented sources.

### Sun

### Moon

### Stars

**Only 2 currently implemented**

### Mars

### Jupiter

### Saturn

### Venus

### DEC & GHA

From manually entered declination and Greenwich Hour angle (GHA).

### Azimuth and Altitude

From a measured altitude and azimuth.

## (F3) Fix

Accurately calculates current position.

## (F4) Settings



Configures the operation of the INAC program:

### Show LOPS

Show LOPS will show all current lines of positions

### Set HT. of eye

Set the height of the eye.

### Set PERM date

Set a GMT permanent date not prompt for a new date on every LOP.

### Use AMS time

Uses the AMS’s time setting for all calculations, will not ask for time afterwards.

### Use AMS date

Uses the AMS’s date setting for all calculations, will not ask for date afterwards.

### Manual time

Requires manual input of time for every calculation.

### Manual date

Requires manual input of date for every calculation.

### Delete last LOP

Deletes the last LOP calculated.

### Restore last

Restores last deleted LOP.

## (F5) Tools



Contains all the programs not really needed for Celestial Navigation, but are useful.

### Great Circle

Will input two locations by LAT and LON and will output the circular distance and heading to the second location. The formula takes in to count the curvature of the Earth so it is reasonably accurate.

### Astronomy

Is a planetarium program that takes in location and date/time to calculate the positions of the planets and is capable of outputting a skymap.

### Tall object

This is a derivative of coastal navigation it uses a tall object to determine distance away or the height of an object at known distance.

### Clock

For AMS’s that support clocks, it will display the current time and date on your calculator.

## (F6) Other



Miscellaneous features including:

### Delete ALL DATA

### EXIT

### About

### Clear screen

# ****DISCLAIMER****

THE AUTHOR CANNOT AND DOES NOT WARRANT THAT ANY FUNCTIONS CONTAINED IN THE SOFTWARE WILL MEET YOUR REQUIREMENTS, OR THAT ITS OPERATIONS WILL BE ERROR FREE. THE ENTIRE RISK AS TO THE SOFTWARE PERFORMANCE OR QUALITY, OR BOTH, IS SOLELY WITH THE USER AND NOT THE AUTHOR.

THE AUTHOR MAKES NO WARRANTY; NEITHER IMPLIED NOR EXPRESSED WITH RESPECT TO THIS SOFTWARE, DOCUMENTATION, QUALITY, PERFORMANCE, OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL THE AUTHOR BE LIABLE TO YOU FOR DAMAGES, WHETHER DIRECT OR INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL ARISING OUT THE USE OF OR ANY DEFECT IN THE SOFTWARE, EVEN IF THE AUTHOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY.

ALL OTHER WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY EXCLUDED.