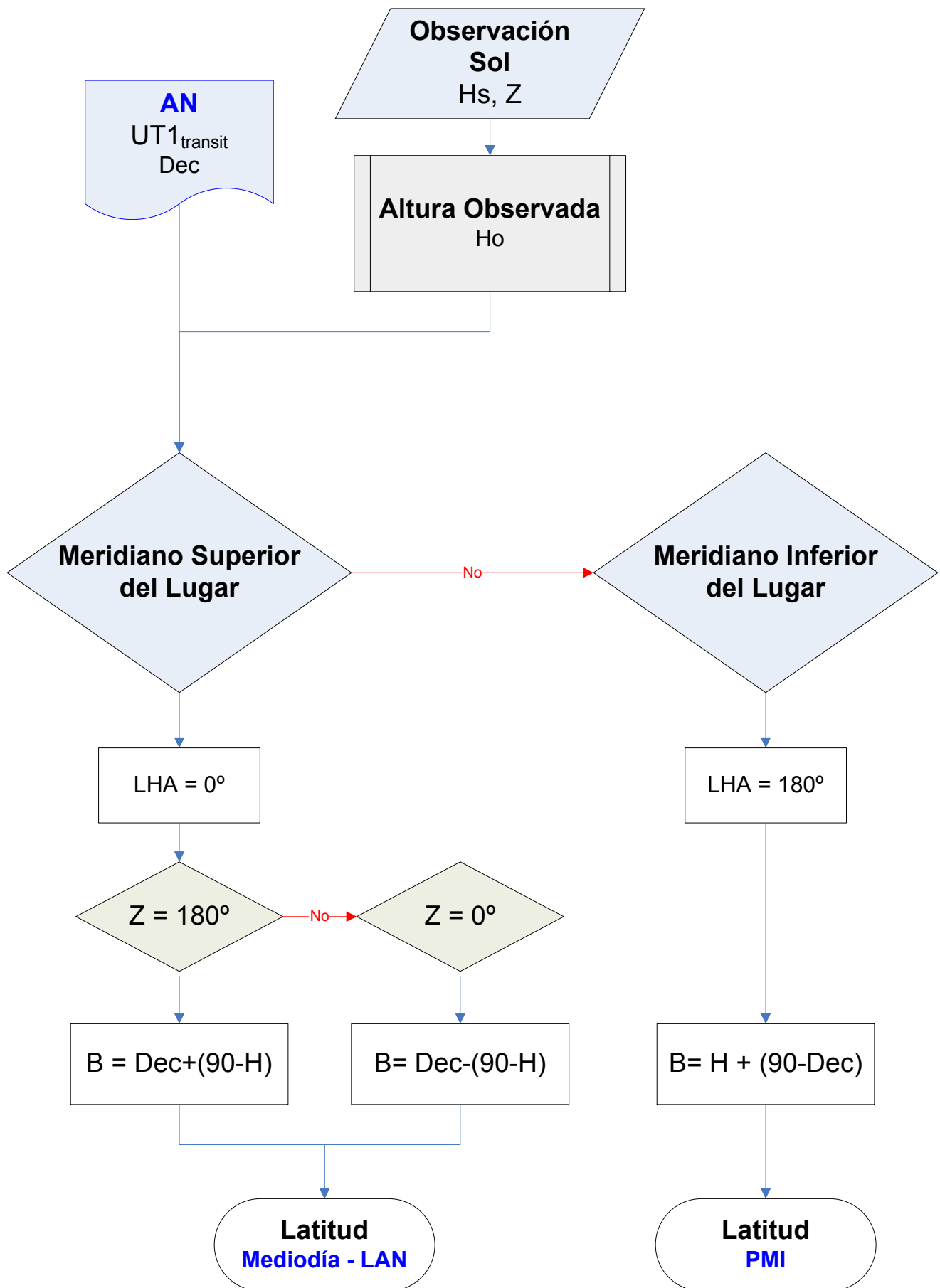


```
/*  
FILE: circunmeridiana.cpp  
  
Altitude Factors and Change of Altitude in Given Time From Meridian Transit  
  
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Andrés Ruiz. San Sebastian - Donostia. Gipuzkoa  
Copyright (c) 2001  
*/  
  
#include "stdafx.h"  
#include <math.h>  
#include "../Nav/angulos.hpp"  
#include "astronomica.h"  
#include "LAN.hpp"  
  
double AltitudeFactors( double lat, double dec, enum Transit transit = UpperTransit )  
{  
    /*  
    Bowditch Table 24 Ex-meridian sight  
    Change in the altitude of a celestial body in one minute of time from meridian transit  
    The values are accurate if:  
    the altitude is between 6° and 86°,  
    the latitude is not more than 60°,  
    and the declination is not more than 63°  
    */  
  
    if( transit == LowerTransit ) dec = -dec;  
  
    return( fabs( 1.9635*COS( lat )*COS( dec )*( 1.0/SIN( lat-dec )) ) ); // seconds of arc  
}  
  
double ChangeOfAltitudeInGivenTimeFromMeridianTransit( double a, double meridian )  
{  
    // Bowditch Table 25 Ex-meridian sight  
  
    // [a] seconds of arc  
    // [meridian] minutes of time  
    return( a*SQ( meridian )/60.0 ); // minutes of arc  
}  
  
double AlturaMeridiana( double lat, double dec, double LHA, double Hcm, enum Transit transit = UpperTransit )  
{  
    double a = AltitudeFactors( lat, dec, UpperTransit );  
    double ma = MeridianAngle( LHA );  
    double t = ma/15.0*60.0;  
    double C = ChangeOfAltitudeInGivenTimeFromMeridianTransit( a, t );  
  
    double Hlan = 0.0;  
    if( transit == UpperTransit ) Hlan = Hcm + C/60.0;  
    else if( transit == LowerTransit ) Hlan = Hcm - C/60.0;  
    else Hlan = 0;  
  
    return( Hlan );  
}  
  
double LatitudPorCircunmeridiana( double Be, double Le, double dec, double gha, double Hcm, enum Culminacion  
culminacion = SUR, enum Transit transit = UpperTransit )  
{  
    double lha = LHA( Le, gha );  
    double hm = AlturaMeridiana( Be, dec, lha, Hcm, transit );  
  
    return( Lat_LAN( dec, hm, culminacion ) );  
}
```

# Latitud al paso por el meridiano del lugar



# Almanaque Nautico

Efemerides El Sol La Luna Navegacion Astronomica Rumbos Ayuda

Fecha: 27/01/2007  UT1 = 7:55:22  Ahora

Cuerpo Celeste  
 Sol  Planeta  
 Luna  Estrella  
 Aries

### Latitud por altura Circunmeridiana

Astro:  Calcular

Circunmeridiana:  
 15/01/2007 12:00:00  
 Sol

LHA =

Culminacion:

Alturas Circunmeridiana y Meridiana

Hs cm =

Ho cm =

Hm =

Latitud

	Date	UT1	Body	Altura
1	27/01/2007	07:55:22	Sol	65.38' (+)
2	27/01/2007	07:55:22	Luna	93.05'
3	27/01/2007	07:55:22	Aries	97.28'
4	27/01/2007	07:55:22	Venus	99.45'
5	27/01/2007	07:55:22	Mars	99.98'
6	27/01/2007	07:55:22	Jupiter	
7	27/01/2007	07:55:22	Saturn	
8	27/01/2007	07:55:22	Acamar	
9	27/01/2007	07:55:22	Aldebaran	
10	27/01/2007	07:55:22	Alioth	
11	27/01/2007	07:55:22	Alkaid	
12	27/01/2007	07:55:22	Alnilam	
13	27/01/2007	07:55:22	Alphecca	
14	27/01/2007	07:55:22	Alpheratz	
15	27/01/2007	07:55:22	Altair	
16	27/01/2007	07:55:22	Arcturus	
17	27/01/2007	07:55:22	Polaris	
18	27/01/2007	07:55:22	Pollux	
19	27/01/2007	07:55:22	Sirius	
20	27/01/2007	07:55:22	Spica	
21	27/01/2007	07:55:22	Vega	325° 46.5' 38° 47.1' 18:37:09
22	27/01/2007	07:55:22	Zubenelgen	22° 14.7' -16° 4.4' 14:51:16

Calcular

Efemerides t = UT1

Situacion

Observacion  
 Hs =  °  
 Parametros

Reconocimiento

Navegacion

