SSR: Solar System Simulator

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1. Overview

Solar System Simulation SSR[1]. Android globus coelestis (celestial globe) and interactive calendar with Zodiac signs and timepiece covering the Solar System in the entire observable universe up to $r = 14.25\, Gpc$. In this context see the *Great Debate* [2] or the *Shapley–Curtis Debate*, held on 26 April 1920 at the Smithsonian Museum of Natural History, between astronomers Harlow Shapley and Heber Doust Curtis, concerning the nature of spiral nebulae and the *size of the galaxy or universe, res.* (see Shapley & Curtis, 1921).

SSR contains $n = 69$ stars, $n = 70$ nebulae and star clusters, most important Milky Way objects, $n = 48$ galaxies and galaxy clusters (c.f. Tab. 1, Tab. 2) as well as the most well-known quasars. Full implementation of all $n = 110$ Messier objects (Messier, 1784), Inner Cloud (Hills, 1981), Oort Cloud (Oort, 1950) and more.

Further astronomical objects can be implemented by means of external definition files (ssr_*.dat). All objects of the Caldwell catalogue (Moore & Pepin, 1995) as well as parts of the Herschel 400 catalogue (Mullaney, 1976) are included as *ssr_Caldwell.dat* and *ssr_Herschel400.dat*, see further *ssr_orion.dat*, *ssr_local.dat*, *ssr_IC342_Maffei.dat* and *ssr_gw__.dat*. For additional important astronomical catalogues see e.g. *CN* (Herschel, 1786), *NGC* (Deryer, 1888), *CGCG* (Zwicky et al., 1961) or *PGC* (Paturel et al., 1989).

Solar System parameters of the Sun, planets and Moon are based on the current NASA Planetary Fact Sheets (Williams, 2025). Positions, distances and sizes of further objects are from Wikipedia sources (Wikipedia contributors, 2025), which can be traced back primarily to the *SIMBAD* astronomical database (Strasbourg astronomical Data Center, 2023), the *VizieR* Catalogue Service (see Ochsenbein et al., 2000) or the NASA/IPAC Extragalactic Database *NED*.

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[1] https://doi.org/10.5281/zenodo.8240203

[2] Shapley (c.f. Bok, 1971; Smith & Trimble, 2007) argued that spiral nebulae were relatively *small* and located in the *outer regions* of the *Milky Way*, which until then had been thought to be the *entire universe.* Curtis (c.f. Marché & Lindner, 2007), on the other hand, believed that spiral nebulae were *themselves* independent *galaxies* and thus *extremely large* and far away.

The debate *resulted in favor of Curtis' theory* and led to the model *generally accepted* today

(c.f. Trimble, 1995; Bonnell et al., 1996; Gingerich, 1996; Peruzzi & Realdi, 2011; Sokol, 2017), for Edwin Powell Hubble established the *distance* to classical *Cepheid* variables in the Andromeda *nebula* and found that those variables were *not members* of the Milky Way itself and therefore Andromeda to be *external* to the galaxy (s. Hubble, 1925). Later, Hubble examined the relationship between *distances* of galaxies and their *radial velocities* as determined from *redshifts* (c.f. Zwicky, 1933) and found the linear relationship, now known as *Hubble's law* (s. Hubble, 1929).

group	designation					object	type
	M	NGC	CGCG	PGC	C		
local						Milky Way	SB(rs)bc
	31	224	535-17	2557		Andromeda	SA(s)b
	33	598	502-110	5818		Triangulum [3]	SA(s)cd
IC 342/Maffei [4]			305-002	13826	5	"Hidden Galaxy"	SAB(rs)cd
Sculptor		300		3238	70	Sculptor Pinwheel	SA(s)d
				1014	72	String of Pearls	SB(s)m
		253		2789	65	Sculptor	SAB(s)c
M81		2403	309-040	21396	7		SAB(s)cd
	82	3034		28655		Cigar	I0
		4236		39346	3		SB(s)dm
	81			28630		Bode's	SA(s)ab, AGN
Centaurus A/M83		5128		46957	77	Centaurus A	S0 pec, Ep, AGN
	83	5236		48082		Southern Pinwheel	SAB(s)c
Canes Venatici I	94	4736		43495			(R)SA(r)ab
	51a	5194		47404		Whirlpool	SA(s)bc pec, AGN
M101	101	5457	272-021	50063		Pinwheel	SAB(rs)cd
Canes Venatici II	106 [5]	4258		39600			SAB(s)bc, AGN
Virgo				62836	101	Pavo	SAB(r)bc, AGN
				65001	12	Fireworks	SAB(rs)cd
NGC5866		5907	274-038	54470		Splinter [6]	SA(s)c, ULX

group	object	angular diameter V		isophotal diameter	distance			
		°	′	kly	$10^{15}\,km$	Mly	$10^{18}\,km$
local	Milky Way			87.4	827		
	Andromeda	3.2	1.0	152.0	1438	2.5	24
	Triangulum		70.8 41.7	61.1	578	3.2	30
IC 342/Maffei	"Hidden Galaxy"		21.4 20.9	150.0	1419	10.7	101
Sculptor	Sculptor Pinwheel		21.9 15.5	55.2	522	6.1	57
	String of Pearls		32.4 5.6	68.5	648	6.5	61
	Sculptor		27.5 6.8	120.5	1140	11.4	108
M81	C7		21.9 12.3	90.3	854	9.7	91
	Cigar		11.2 4.3	40.8	386	11.4	108
	C3		21.9 7.2	74.0	700	11.7	111
	Bode's		26.9 14.1	96.0	908	11.8	112
Centaurus A/M83	Centaurus A		25.7 20.0	123.1	1165	12.0	114
	Southern Pinwheel		12.9 11.5	118.0	1116	14.7	139
Canes Venatici I	M94		11.2 9.1	45.0	426	16.0	151
	Whirlpool		11.2 6.9	76.9	728	23.5	222
M101	Pinwheel		28.8 26.9	252.0	2384	21.6	204
Canes Venatici II	M106		18.6 7.2	151.7	1435	23.7	224
Virgo	Pavo		20.0 12.9	171.8	1625	23.6	224
	Fireworks		16.0 11.2	87.3	826	25.2	238
NGC5866	Splinter		12.7 1.4	173.4	1640	46.6	440


[3] c.f. Brunthaler et al. (2005).
[4] c.f. Karachentsev et al. (2020).
[5] For its active *Type 2 Seyfert* nucleus and central supermassive *black hole* c.f. Miyoshi et al. (1995), Jang et al. (2021) or Baan et al. (2022).
[6] For its *stellar stream* and *X-ray source* c.f. Israel et al. (2017).

2. Screenshots

Screenshots from SSR Application (Fig. 1 to Fig. 6).
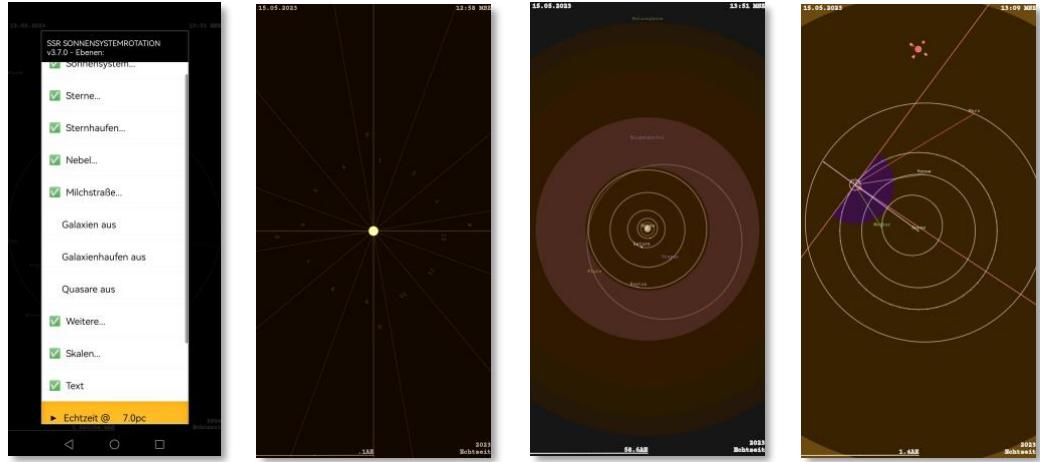
Figure 1. The Sun at $r = 0.1\ au$ astronomical units; Solar System with Asteroid and Kuiper Belts as well as Heliosphere at $r = 58.6\ au$; Inner Solar System with orbits, current rotation position of the Earth with time and position representation, as well as projection lines to the neighboring planets at $r = 1.4\ au$.
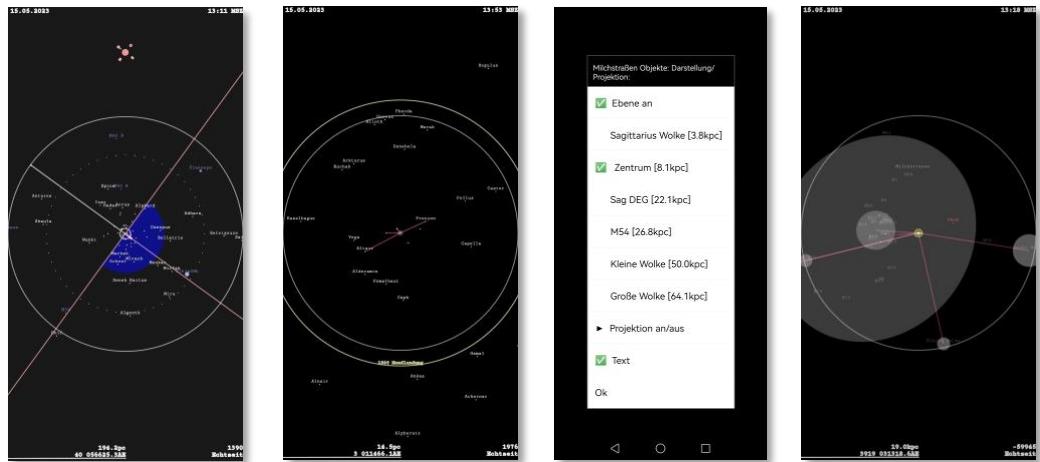
**Figure 2.** Surrounding stars at $r = 194.2\ pc$ and their relative positions to Earth, artificial horizon facing south; closer stars with their relative historical position and representation, from $r = 14.5\ pc$ before the year 1976; the Milky Way at $r = 19\ kpc$ with Magellanic Clouds, Sagittarius Dwarf Elliptical Galaxy Sag DEG (Ibata et al., 1994) and V838 Monocerotis (Brown et al., 2002).
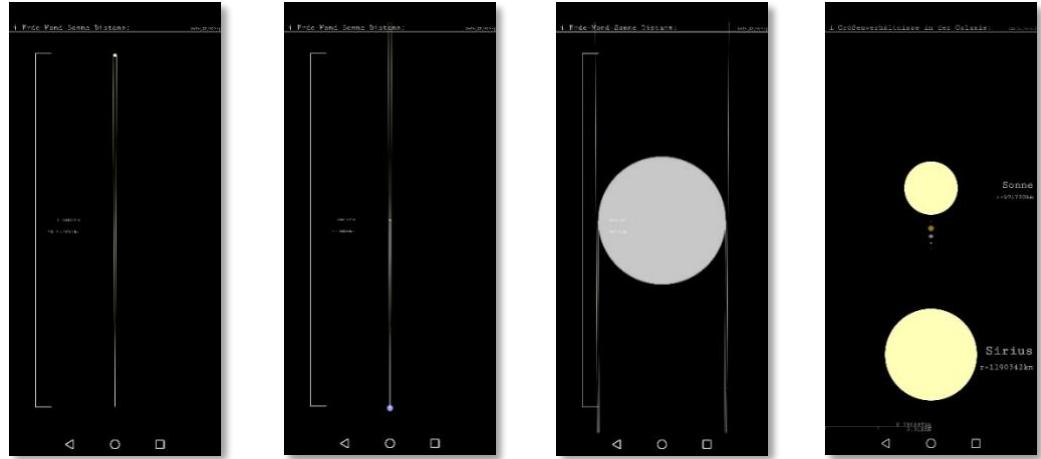
Figure 3. Interactive simulation to display distances between Earth, Moon and Sun with corresponding perspective projection lines; interactive simulation to compare sizes of stars.
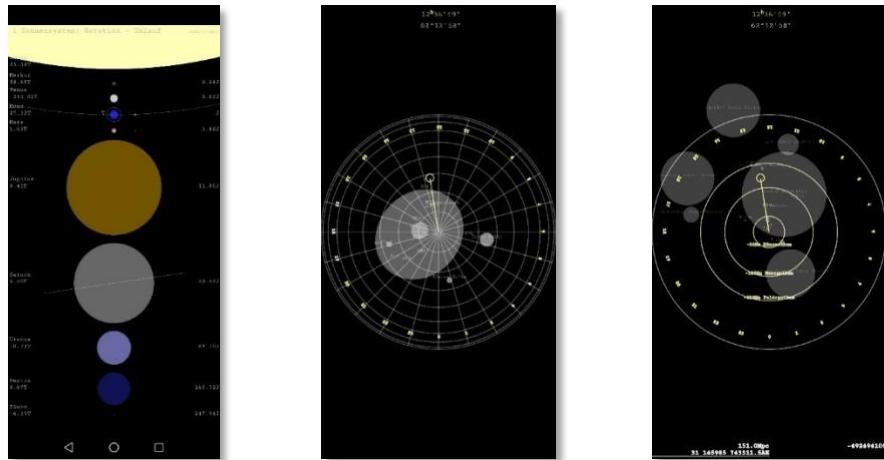
Figure 4. Parameters of the Solar System; Hubble deep field (HDF) located at a right ascension of $12^h36^m49^s$ and a declination of $+62°12'58''$ (see Ferguson, 1996); towards the HDF from a distance of $r = 151\ Mpc$ within the surrounding galaxy clusters and Laniakea supercluster (Tully et al., 2014) with relative historical positions.
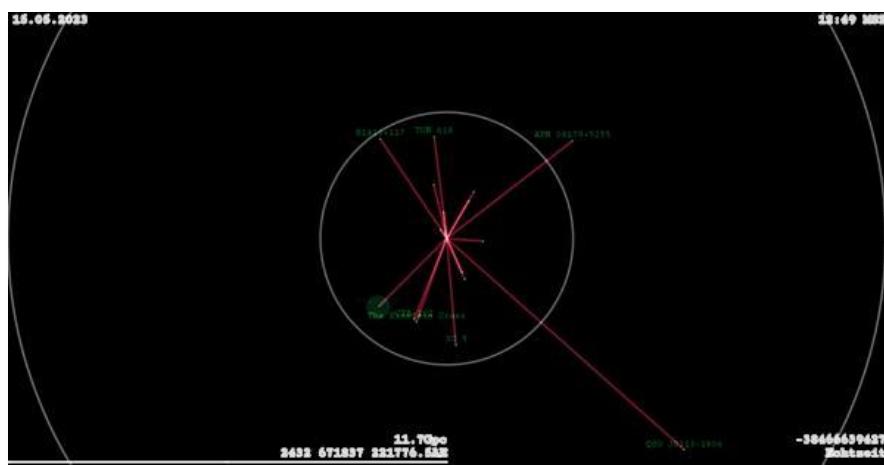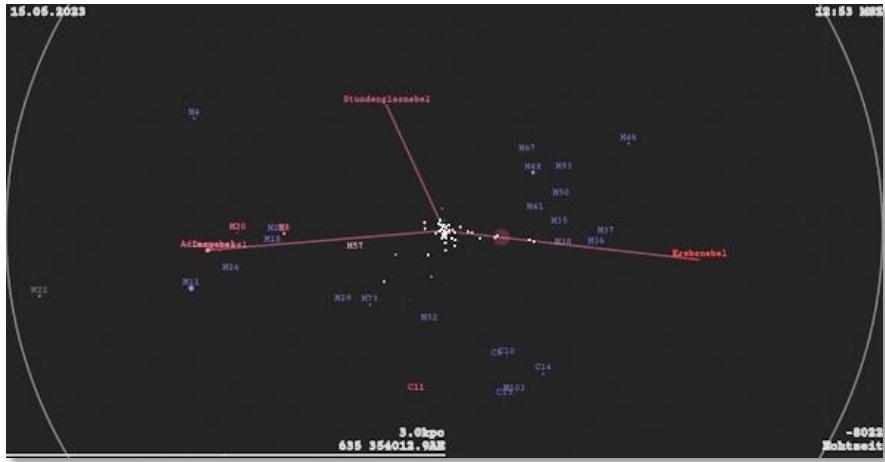
Figure 5. Most distant quasars on the edge of the observable universe at $r > 9\ Gpc$ (see e.g. Wang et al., 2021).

Figure 6. Local star *cluster* within Orion-Cygnus Arm containing the signs of the Zodiac and surrounding nebulae seen from a distance of $r = 3\,kpc$.

3. Calculations

Object distances r in parsec pc are calculated from object parallax π_O, given in milliarcseconds *mas*, with

$$r = \left(\frac{\pi_O}{1000}\right)^{-1}, \pi_O = 1000 \cdot r^{-1}. \tag{1}$$

The *luminosity* distance $r = d_l$ in parsec pc is given by

$$r = 10^{\frac{\mu}{5}+1}, \mu = \frac{5 \cdot \log(r) - 5 \cdot \log(10)}{\log(10)} \tag{2}$$

with distance modulus μ, defined by the difference between apparent magnitude m and absolute magnitude M as

$$\mu = m - M. \tag{3}$$

Object radii r_O at a given distance r are calculated via angular diameter $V°$, where

$$r_O = r \cdot \tan\frac{V}{2}, r = r_O \cdot \left(\tan\frac{V}{2}\right)^{-1}, V = 2 \cdot \tan^{-1}\frac{r_O}{r} \tag{4}$$

with

$$V = \frac{V°}{180} \cdot \pi, V° = \frac{180 \cdot V}{\pi}. \tag{5}$$

In addition, SSR can perform the following *calculations*: Given value x to (a) speed of light c in $\frac{m}{s}$ and to (b) astronomical unit AU in km. Furthermore, parallax π_O in mas (1) to parsecs pc, Modulus μ (3) in mag to parsecs pc and parsecs pc to light-years ly. Conversions can be performed for (a) hexagesimal degrees ° or hour h, min, sec to decimal degrees °, (b) angular degrees ° to radians rad and (c) angular diameter V (4) in degrees ° for a given distance d to radius r.

For more on photometry see e.g. Miles (2006) or Milone (2011), s. also Schrausser (2025); c.f. Tab. 3, Tab. 4., respectively.

Table 3. *Wavelength* λ in meters m and *frequency* bands f in hertz Hz (cycle per second s), where $f = \frac{v}{\lambda}$ of (1) *electromagnetic radiation* EMR[7], with $v_e = c = 299792458 \frac{m}{s}$ of the *electromagnetic field* EMF[8] and (2) *sound* [9], with $v_s = 340.3 \frac{m}{s}$ in comparison.

	f		λ		(1)	abr	λ		(2)
	from	to	from	to			from	to	
Sound,		3 Hz					3	km	*Infrasound*
Long waves	3	30 Hz	100	10 Mm	*Extremely low frequency*	ELF			
	30	300 Hz	10	1 Mm	*Super low frequency*	SLF	21	m	*Sound*
	300	3000 Hz	1000	100 km	*Ultra low frequency*	ULF			
	3	30 kHz	100	10 km	*Very low frequency*	VLF	17	mm	*Ultrasound*
	30	300 kHz	10	1 km	*Low frequency*	LF			
	300	3000 kHz	1000	100 m	*Medium frequency*	MF			
Radar, Radio, TV	3	30 MHz	100	10 m	*High frequency*	HF			
	30	300 MHz	10	1 m	*Very high frequency*	VHF			
Microwave	300	3000 MHz	1000	100 mm	*Ultra high frequency*	UHF	213	nm	*Hypersound*
	3	30 GHz	100	10 mm	*Super high frequency*	SHF			
	30	300 GHz	10	1 mm	*Extremely high frequency*	EHF			
Thermal Infrared	300	3000 GHz	1000	100 mm	*Tremendously high frequency*	THF			
	0,3	20 THz	1000	15 mm	*Far-infrared*	FIR			
Infrared	20	37 THz	15	8 mm	*Long-wavelength infrared*	MIR			
	37	100 THz	8	3 mm	*Mid-wavelength infrared*				
	100	214 THz	3	1,4 mm	*Short-wavelength infrared*				
	214	400 THz	1400	750 nm	*Near-infrared*	NIR			
Visible light	400	480 THz	750	625 nm	*Red*				
	480	510 THz	625	590 nm	*Orange*				
	510	530 THz	590	565 nm	*Yellow*				
	530	600 THz	565	500 nm	*Green*	*Light*			
	600	620 THz	500	485 nm	*Cyan*				
	620	670 THz	485	450 nm	*Blue*				
	670	790 THz	450	380 nm	*Violet*				
Ultraviolet	790	952 THz	400	315 nm	*Ultraviolet A*	UV-A			
	952	1000 THz	315	280 nm	*Ultraviolet B*	UV-B			
	1	3 PHz	280	100 nm	*Ultraviolet C*	UV-C			
Ionizing radiation	3	30 PHz	121	10 nm	*Extreme ultraviolet*	E-UV			
	30	3000 PHz	10	0,1 nm	*Soft X-rays*	SX			
	3	30 EHz	100	10 pm	*Hard X-rays*	HX			
	30	EHz	10	pm	*Gamma rays*	Y			

Table 4. Metric Prefixes (CGPM, 2022; NIST, 2024).

factor					
10	1E-01 d	deci	1E+01 da	deca	
100	1E-02 c	centi	1E+02 h	hecto	
1 000	1E-03 m	milli	1E+03 k	kilo	
1 000 000	1E-06 µ	micro	1E+06 M	Mega	
1 000 000 000	1E-09 n	nano	1E+09 G	Giga	
1 000 000 000 000	1E-12 p	pico	1E+12 T	Tera	
1 000 000 000 000 000	1E-15 f	femto	1E+15 P	Peta	
1 000 000 000 000 000 000	1E-18 a	atto	1E+18 E	Exa	
1 000 000 000 000 000 000 000	1E-21 z	zepto	1E+21 Z	Zetta	
1 000 000 000 000 000 000 000 000	1E-24 y	yocto	1E+24 Y	Yotta	
1 000 000 000 000 000 000 000 000 000	1E-27 r	ronto	1E+27 R	Ronna	
1 000 000 000 000 000 000 000 000 000 000	1E-30 q	quecto	1E+30 Q	Quetta	

[7] A *self-propagating wave* of the electromagnetic field itself, requiring *no medium* for propagation.
[8] A physical field that represents the influences generated by or acting on *electrical charges*, a *combination* of an *electric* and a *magnetic* field.
[9] A *vibration* that propagates in a *medium* (gas, liquid or solid).

4. Source of main function

```
!!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

                         SONNENSYSTEMROTATION
                        + semper ubique sum +

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

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!!
_name$="SSR"
_ver$="v3.7.28"            %
INCLUDE strg_.inc
INCLUDE ssr.inc
SENSORS.OPEN 3:0           %
SENSORS.OPEN 8:0           % SCRS
GR.OPEN 255,0,0,0,0,-1     %
GR.SCREEN sx,sy
GOSUB global               % Globale Variablen
c_m=299792458              % c in m/s (exakt, SI)
au_=149597870700           % AE in m (exakt, quasi SI)
pc_=648000/PI()            % pc aus AE (IAU, 2016)
a_=365.25                  % Tage pro Jahr
ca_=360/a_                 % Korrekturfaktor bei Simulation
GOSUB astroparameter       %
!
INCLUDE ssr_globals1.bas   % Globale Parameter (NASA)
INCLUDE ssr_globals2.bas   % Globale Parameter (CDS SIMBAD)
!
GR.BITMAP.CREATE scrs,sx,sy
pat$="../../SSR/"
!
INCLUDE ssr_ini.bas        % ini
GOSUB weitere_ini          %
GOSUB zeit:jx=yr           % Jahr für Simulation
GOSUB tagnr                % Tagnr für Simulation
GOSUB mnt                  % Monatslängen
GOSUB dialog               % Hauptmenü
!
st0: %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

DO
 GR.SET.STROKE skl          % 1-5
 IF s07=1                   % bei Echtzeit
  GOSUB zeit                % Aktuelle Zeit
   !
   ! % Schaltjahr %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
  sj=0
  IF Yr/4=INT(Yr/4) THEN sj=1
  sj=1
  GOSUB tagnr
  ! % Sommerzeit %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
  sz$="":sz=0
  IF nt>=mz+29 & nt<or+24
   sz$="MSZ":sz=1
  ENDIF
  !
  tg=nt+1                   % Tagnummer
  tg=tg+10                  %
  i=((tg/a_)*360)-135       % Tagposition
  j=0                       % Tagzaehler
  jx=yr                     % Jahr
  !
 ENDIF
 GR.SCREEN sx,sy            % Bildschirmformat
 mx=sx/2:my=sy/2
 IF sx>sy
  swbs=0                    % Schalter Breitformat
 ELSE
  swbs=1                    % Schalter Hochformat
 ENDIF
 !
 mnc=min/60                 % Minutentakt
```

```
ae=(sx/2.9)/ed        %%%% % Faktor ed zu AE
aed=ae
IF s07=1 THEN v=0          % bei Echtzeit
i=i+v                       % Tagposition bei Simulation
nt=nt+v/ca_                 % Tagnummer bei Simulation
!
GR.CLS
GR.TEXT.SETFONT "courier","",1
GR.TEXT.SIZE txz1
IF u00=1
 ! % Oortsche Wolke %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 d=100000               % AE
 gr1=ed*d
 IF u10=1 & ed<50000 & AE<10000000 %
  GR.COLOR 45,60,60,60,1
  GR.CIRCLE sn,mx,my,ed*d
  IF AE<=45000
   GR.COLOR cc,0,0,0,1
   GR.CIRCLE sn,mx,my,ed*d/2
  ENDIF
  IF AE>30&AE<45000
   GR.COLOR 20,60,60,60,1
   GR.CIRCLE sn,mx,my,ed*d/2
  ENDIF
  IF AE>50&AE<45000
   GR.COLOR 15,60,60,60,1
   GR.CIRCLE sn,mx,my,ed*d/2
  ENDIF
  IF u11=1&ae>30000&ae<3000000
   GR.TEXT.ALIGN 2
   GR.COLOR cc,60,60,60,1
   GR.TEXT.DRAW txt,mx,my-gr1-c10,"Oortsche Wolke"
  ENDIF
 ENDIF
 ! % Hills-Wolke, Innere Kometenwolke %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 d=1500                 % AE
 gr1=ed*d
 IF u15=1 & ed<5000 & AE<1000000 %
  IF u10=1:GR.COLOR 35,20,30,30,1
ELSE:GR.COLOR 75,20,30,30,1:ENDIF
  GR.CIRCLE sn,mx,my,ed*d*c145
  IF u10=1:GR.COLOR cc,10,10,10,1
ELSE:GR.COLOR cc,0,0,0,1:ENDIF
  GR.CIRCLE sn,mx,my,ed*d/4
  IF u11=1&ae>300&ae<30000
   GR.TEXT.ALIGN 2
   GR.COLOR cc,60,60,60,1
   GR.TEXT.DRAW txt,mx,my-gr1-c10,"Hills-Wolke, Innere Kometenwolke"
  ENDIF
 ENDIF
 ! % Heliosphäre %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 d=150
 gr1=ed*d
 IF u14=1 & ed<500 & AE<100000 %
  GR.COLOR 178,20,10,0,1
  GR.CIRCLE sn,mx,my,ed*(d/1.3)
  GR.COLOR 130,20,10,0,1
  GR.CIRCLE sn,mx,my,ed*(d/1.1)
  GR.COLOR 115,20,10,0,1
  GR.CIRCLE sn,mx,my,ed*d
  IF u11=1&ae>40&ae<2700
   GR.TEXT.ALIGN 2
   GR.COLOR 230,70,60,0,1
   GR.TEXT.DRAW txt,mx,my-gr1-c10,"Heliosphäre"
  ENDIF
 ENDIF
 ! % Kuipergürtel %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 d=45
 gr1=ed*d*c142
 IF u13=1 & ed<500 & AE<100000 %
  GR.COLOR 30,60,60,100,1
  GR.CIRCLE sn,mx,my,ed*d*1.8
  IF u14=1
   GR.COLOR 200,20,10,0,1
  ELSE
   GR.COLOR cc,0,0,0,1
  ENDIF
```

```
    GR.CIRCLE sn,mx,my,ed*d
    IF u11=1&ae>20&ae<700
     GR.TEXT.ALIGN 2
     GR.COLOR 200,60,60,100,1
     GR.TEXT.DRAW txt,mx,my-gr1-c10,"Kuipergürtel"
    ENDIF
   ENDIF
   ! % Asteroidengürtel %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
   d=3
   gr1=ed*4.8
   IF u04=1 & ed>5 & AE<10000 %
    GR.COLOR 30,100,100,60,1
    GR.CIRCLE sn,mx,my,ed*d*1.8
    IF u14=1
     GR.COLOR cc,20,10,0,1
    ELSE
     GR.COLOR cc,0,0,0,1
    ENDIF
    GR.CIRCLE sn,mx,my,ed*d*c142
    IF u11=1&ae>1.5&ae<45
     GR.TEXT.ALIGN 2
     GR.COLOR 150,100,100,60,1
     GR.TEXT.DRAW txt,mx,my-gr1-c10,"Asteroidengürtel"
    ENDIF
   ENDIF
  ENDIF
  ! % Jahreszeiten %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
  IF s01=1
   GR.COLOR 35,cc,cc,0,1
   GR.LINE ln,0,my,sx,my
   GR.LINE ln,mx,0,mx,sy
   ! % Namen
   stl=431
   ac=360/24
   lt=sy/4.8125           % Distanz
   GR.TEXT.ALIGN 2
   GR.TEXT.SIZE txz4      % 12
   GR.COLOR 40,cc,cc,0,1
   GR.ROTATE.START stl+ac,mx,my
   GR.TEXT.DRAW tx,mx+c02,my-lt,"W"
   GR.ROTATE.END
   GR.ROTATE.START stl+7*ac,mx,my
   GR.TEXT.DRAW tx,mx+c02,my-lt,"H"
   GR.ROTATE.END
   GR.ROTATE.START stl+13*ac,mx,my
   GR.TEXT.DRAW tx,mx+c02,my-lt,"S"
   GR.ROTATE.END
   GR.ROTATE.START stl+19*ac,mx,my
   GR.TEXT.DRAW tx,mx+c02,my-lt,"F"
   GR.ROTATE.END
  ENDIF
  ! % Himmelsgewölbe %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
  IF t34=1 & ae>=Lj_
   GR.COLOR 35,cc/2,cc/2,cc/2,0
   FOR hg=0 TO 90 STEP 10
    GR.CIRCLE cl,mx,my,mx*SIN(TORADIANS(hg))
   NEXT
   FOR w=1 TO 24
    GR.ROTATE.START w/24*360,mx,my
    GR.LINE ln,0,my,mx-sx/108,my
    GR.ROTATE.END
   NEXT
  ENDIF
  ! % Rektaszension %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
  IF swbs % nur im Hochformat
   IF t31=1 & ae>=Lj_
    GR.TEXT.ALIGN 3
    GR.TEXT.SIZE txz1 % 9
    GR.COLOR 80,cc,cc,0,0
    IF s08=1:cor=0:ELSE:cor=1.1:ENDIF
    FOR hr=0 TO 24
     GR.ROTATE.START ((hr/24)*360)-cor,mx,my
     IF hr>0
      GR.TEXT.DRAW tx,mx,sx*c142,INT$(24-hr)
     ENDIF
     GR.ROTATE.END
    NEXT
```

```
      dsn=1
      IF t39=1 % Deklination %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
       dg_x=dg_:dm_x=dm_:ds_x=ds_
       GOSUB dekl
       GR.COLOR 80,cc,cc,0,1
       GR.TEXT.SIZE txz5
       GR.TEXT.ALIGN 2
       GR.TEXT.DRAW tx,mx,sy/4.5,_gd$+dkl$
       GR.COLOR 80,cc,cc,0,0
      ENDIF
      ! % Positionszeiger %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
      m_1=m_/60
      s_2=s_/6000
      pos=h_+m_1+s_1
      pos1=-(pos/24)*360
      GR.ROTATE.START pos1,mx,my
      GR.LINE ln,mx,my,mx,my+(my/1.96)*dsn
      GR.CIRCLE cl,mx,my+(my/1.93)*dsn,sy/115.5
      GR.ROTATE.END
      GR.COLOR 80,cc,cc,0,1
      GR.TEXT.SIZE txz5
      GR.TEXT.ALIGN 2
      GR.TEXT.DRAW tx,mx,sy/5,_ga$+rk$
     ENDIF
   ENDIF
 ! % Monate %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 IF s02=1
  FOR s=1 TO 12
   GR.ROTATE.START 180-((s/12)*360)-((10/a_)*360),mx,my
   GR.COLOR 8,cc,cc,cc,1
   GR.LINE ln,-sx,my,sx*2,my
   GR.ROTATE.END
  NEXT
  ! % Monatsnummern %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
  stl=410
  ac=360/24
  lt=sy/6.6          % Distanz
  GR.TEXT.ALIGN 2
  GR.TEXT.SIZE txz4
  GR.COLOR 40,cc,cc,cc,1
  GR.ROTATE.START stl+ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"1"
  GR.ROTATE.END
  GR.ROTATE.START stl+3*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"12"
  GR.ROTATE.END
  GR.ROTATE.START stl+5*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"11"
  GR.ROTATE.END
  GR.ROTATE.START stl+7*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"10"
  GR.ROTATE.END
  GR.ROTATE.START stl+9*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"9"
  GR.ROTATE.END
  GR.ROTATE.START stl+11*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"8"
  GR.ROTATE.END
  GR.ROTATE.START stl+13*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"7"
  GR.ROTATE.END
  GR.ROTATE.START stl+15*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"6"
  GR.ROTATE.END
  GR.ROTATE.START stl+17*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"5"
  GR.ROTATE.END
  GR.ROTATE.START stl+19*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"4"
  GR.ROTATE.END
  GR.ROTATE.START stl+21*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"3"
  GR.ROTATE.END
  GR.ROTATE.START stl+23*ac,mx,my
  GR.TEXT.DRAW tx,mx,my-lt,"2"
  GR.ROTATE.END
 ENDIF
```

```
! % Sternbilder/Tierkreis %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
IF swbs % nur im Hochformat
 IF t99=1 % & ae>=Lj_
  GR.COLOR 10,cc,cc,0, 0
  IF ae/Lj_<=800
   FOR s=1 TO 12
    GR.ROTATE.START 180-((s/12)*360),mx,my
    GR.LINE ln,-sx,my,sx*2,my
    GR.ROTATE.END
   NEXT
  ENDIF
  IF ae/Lj_<=2000
   % Tierkreissymbole %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
   GR.COLOR 100,cc,cc,0,1
   GR.TEXT.ALIGN 2
   GR.TEXT.SIZE txz1*1.5 % 15
   GR.ROTATE.START 16,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz01$
   GR.ROTATE.END
   GR.ROTATE.START 46,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz02$
   GR.ROTATE.END
   GR.ROTATE.START 75,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz03$
   GR.ROTATE.END
   GR.ROTATE.START 105,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz04$
   GR.ROTATE.END
   GR.ROTATE.START 135,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz05$
   GR.ROTATE.END
   GR.ROTATE.START 165,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz06$
   GR.ROTATE.END
   GR.ROTATE.START 196,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz07$
   GR.ROTATE.END
   GR.ROTATE.START 226,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz08$
   GR.ROTATE.END
   GR.ROTATE.START 256,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz09$
   GR.ROTATE.END
   GR.ROTATE.START 286,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz10$
   GR.ROTATE.END
   GR.ROTATE.START 316,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz11$
   GR.ROTATE.END
   GR.ROTATE.START 345,mx,my
   GR.TEXT.DRAW tx,mx,my-dis,_tz12$
   GR.ROTATE.END
  ENDIF
  IF ae/Lj_>=800 & ae/Lj_<=90000
   GR.COLOR 20,cc,cc,0,0
   FOR s=1 TO 12
    GR.ROTATE.START 180-((s/12)*360),mx,my
    GR.LINE ln,mx,my,mx+ed*(2000*lj_)*c145,my
    GR.ROTATE.END
   NEXT
   GR.COLOR 45,cc,cc,0,0
   GR.CIRCLE cl,mx,my,ed*(2000*lj_)*c145
  ENDIF
 ENDIF
ENDIF
! % Historie %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
IF t98=1
 GR.COLOR 50,cc,cc,cc/2,0
 GR.TEXT.ALIGN 2
 GR.TEXT.SIZE txz1
 grh=ed*((jx-1969)*Lj_)*c145
 IF grh>40
  GR.CIRCLE cl,mx,my,grh
  GR.TEXT.DRAW txt,mx,my+grh-c10,"1969 Mondlandung"
 ENDIF
 grh=ed*((jx-1914)*Lj_)*c145
 IF grh>40
```

```
  GR.CIRCLE cl,mx,my,grh
  GR.TEXT.DRAW txt,mx,my+grh-c10,"1914 Erster Weltkrieg"
ENDIF
grh=ed*((jx-1848)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"1848 Gründerzeit"
ENDIF
grh=ed*((jx-1789)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"1789 Französische Revolution"
ENDIF
grh=ed*((jx-1618)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"1618 30-jähriger Krieg"
ENDIF
grh=ed*((jx-1492)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"1492 Columbus"
ENDIF
grh=ed*((jx-800)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"800 Karl der Große"
ENDIF
grh=ed*((jx-476)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"476 Goten"
ENDIF
grh=ed*((jx-170)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"170 Ptolemaeus" % [1]
ENDIF
grh=ed*((jx-0)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"0 AD"
ENDIF
grh=ed*((jx+1200)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-1200 Troja" %[2]
ENDIF
grh=ed*((jx+3500)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-3500 Noah" %[3]
ENDIF
grh=ed*((jx+5500)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-5500 Jahr der Welt" %[3]
ENDIF
grh=ed*((jx+10000)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-10000 Jungsteinzeit"
ENDIF
grh=ed*((jx+48000)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-48000 Jungpaläolithikum"
ENDIF
grh=ed*((jx+2600000)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-2.6Ma Altsteinzeit"
ENDIF
grh=ed*((jx+66*10^6)*Lj_)*c145
IF grh>40
 GR.CIRCLE cl,mx,my,grh
 GR.TEXT.DRAW txt,mx,my+grh-c10,"-66Ma Känozoikum"
```

```
    ENDIF
   grh=ed*((jx+186.2*10^6)*Lj_)*c145
   IF grh>40
    GR.CIRCLE cl,mx,my,grh
    GR.TEXT.DRAW txt,mx,my+grh-c10,"-186Ma Mesozoikum"
   ENDIF
   grh=ed*((jx+288.8*10^6)*Lj_)*c145
   IF grh>40
    GR.CIRCLE cl,mx,my,grh
    GR.TEXT.DRAW txt,mx,my+grh-c10,"-288Ma Paläozoikum"
   ENDIF
   grh=ed*((jx+2.5*10^9)*Lj_)*c145
   IF grh>40
    GR.CIRCLE cl,mx,my,grh
    GR.TEXT.DRAW txt,mx,my+grh-c10,"-2.5Ga Proterozoikum"
   ENDIF
   grh=ed*((jx+4*10^9)*Lj_)*c145
   IF grh>40
    GR.CIRCLE cl,mx,my,grh
    GR.TEXT.DRAW txt,mx,my+grh-c10,"-4.0Ga Archaikum"
   ENDIF
   grh=ed*((jx+4.6*10^9)*Lj_)*c145
   IF grh>40
    GR.CIRCLE cl,mx,my,grh
    GR.TEXT.DRAW txt,mx,my+grh-c10,"-4.6Ga Hadaikum"
   ENDIF
  ENDIF
!!
References:
[1]Halma, N. (1813). Composition Mathematique de Claude Ptolemee. Vorwort. Paris.
[2]Eratosthenes. (-220). Chronographai. Verloren, nach Kokkinos, 2009.
[3]Petavius, D. (1630). Uranologion sive systema variorum authorum. S. 351. Lutetiae
Parisiorum.
!!
 ! % Grössenvergleich %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 IF swvgl=1
  dst=500
  SW.BEGIN vglst
   SW.CASE 4 %%%%%%%%%%%%%%%%%%%%%%%%
    gr1=(ed*r_btg_ae)*c142
    GR.COLOR (cc-155),cc,0,0,1
    vglst$="'Beteigeuze'"
    SW.BREAK
   SW.CASE 6 %%%%%%%%%%%%%%%%%%%%%%%%
    dst=Lj_*1400
    gr1=(ed*r_orn_ae)*c142
    GR.COLOR cc/3,cc,cc/3,cc/2,1
    vglst$="'Orionnebel'"
    SW.BREAK
   SW.CASE 2 %%%%%%%%%%%%%%%%%%%%%%%%
    gr1=(ed*r_srs_ae)*c142
    GR.COLOR (cc-55),cc,cc,0,1
    vglst$="'Sirius'"
    SW.BREAK
   SW.CASE 1 %%%%%%%%%%%%%%%%%%%%%%%%
    gr1=(ed*r_acn_ae)*c142
    GR.COLOR cc-20,cc,cc,cc,1
    vglst$="'"+_ga$+" Centauri A'"
    SW.BREAK
   SW.CASE 3 %%%%%%%%%%%%%%%%%%%%%%%%
    gr1=(ed*r_adb_ae)*c142
    GR.COLOR (cc-40),cc,0,0,1
    vglst$="'Aldebaran'"
    SW.BREAK
   SW.CASE 5 %%%%%%%%%%%%%%%%%%%%%%%%
    gr1=(ed*r_rsg_ae)*c142
    GR.COLOR (cc-155),cc,0,0,1
    vglst$="'RSGC2-01'"
    SW.BREAK
  SW.END
  GR.TEXT.SIZE txz1
  GR.TEXT.ALIGN 2
  IF t06=1&ae<dst THEN GR.TEXT.DRAW txt,mx,my-gr1-c10,vglst$
  IF ae<dst
   GR.CIRCLE sn,mx,my,gr1
  ENDIF
 ENDIF
```

```
!
IF u00=1                    THEN GOSUB sonnensystem
IF t00=1  & ae>=Lj_         THEN GOSUB sterne
IF st00=1 & ae*pc_>92       THEN GOSUB sternhaufen
IF nb00=1 & ae*pc_>315      THEN GOSUB nebel
IF gm00=1 & ae*pc_>85       THEN GOSUB milchstrasse
IF gx00=1 & ae*pc_>cc*10^3  THEN GOSUB galaxien
IF gh00=1 & ae*pc_>1.3*10^6 THEN GOSUB haufen
IF gq00=1 & ae*pc_>2*10^8   THEN GOSUB quasare
IF gw00=1                   THEN GOSUB weitere
!
! % Simulation %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
jc=i-(j*360)
IF jc>=360-135+10           % Vor
 j=j+1:jx=jx+1:nt=1.25      %%%%%
 !TONE 11500,55
ENDIF
IF nt<1                     % Zurück
 j=j-1:jx=jx-1:nt=a_-0.25   %%%%%%%%
 !TONE 11500,55
ENDIF
! % Textoutput %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
GR.COLOR 80,cc,cc,cc,0
GR.TEXT.ALIGN 3
GR.TEXT.SIZE txz3           %
IF s10=1                    % Skala
 GR.LINE ln,0, sy-sy/177.69,   mx,sy-sy/165
 GR.LINE ln,0, sy-sy/144.375,  0, sy-sy/210
 GR.LINE ln,mx,sy-sy/144.375,  mx,sy-sy/210
 GR.LINE ln,mx/2,sy-sy/144.375,mx/2,sy-sy/210
 IF AE<Lj_*0.1
  GR.TEXT.DRAW txt,mx,sy-dtx3,FORMAT$("#####.##",AE)+" AE"
 ENDIF
 IF AE>=Lj_*0.1             % 1 Lichtjahr
  GR.COLOR 30,cc,cc,cc,0
  GR.CIRCLE cl,mx,my,mx      % Skala
  GR.COLOR 80,cc,cc,cc,0
  IF AE<Lj_*pcl_
   GR.TEXT.DRAW txt,mx,sy-dtx3,FORMAT$("# ######.##",ae)+" AE"
   GR.TEXT.DRAW txt,mx,sy-dtx2,FORMAT$("#.##",ae/Lj_)+" Lj"
  ENDIF
 ENDIF
 IF AE>=Lj_*pcl_            % 1 Parsec
  CLIPBOARD.PUT STR$(ae/pc_)
  GR.TEXT.DRAW txt,mx,sy-dtx3,FORMAT$("###### ###### ######.##",AE)+" AE"
  IF ae<Lj_*(pcl_*10^3)     %
   GR.TEXT.DRAW txt,mx,sy-dtx2,FORMAT$("###.##",ae/pc_)+"pc"
  ENDIF
  IF ae>=Lj_*(pcl_*10^3)    %
   IF ae<Lj_*(pcl_*10^6)    %
    GR.TEXT.DRAW txt,mx,sy-dtx2,FORMAT$("###.##",(ae/pc_)/10^3)+" kpc"
   ENDIF
   IF ae>=Lj_*(pcl_*10^6) & ae<Lj_*(pcl_*10^9)
    GR.TEXT.DRAW txt,mx,sy-dtx2,FORMAT$("# ###### ######.##",(ae/pc_)/10^6)+" Mpc"
   ENDIF
   IF ae>=Lj_*(pcl_*10^9)
    mxd=ae/pc_:IF mxd>=14.25*10^9 THEN mxd=14.25*10^9
    CLIPBOARD.PUT STR$(mxd)
    GR.TEXT.DRAW txt,mx,sy-dtx2,FORMAT$("# ###### ######.##",mxd/10^9)+" Gpc"
   ENDIF
  ENDIF
 ENDIF
 GR.TEXT.ALIGN 3
 IF s07=0                   % bei Vollsimulation
  GR.TEXT.DRAW txt,sx,sy-dtx3,FORMAT$("# ###### ###### ###### ######",v_)+" AE/h"
  GR.TEXT.DRAW txt,sx,sy-dtx2,FORMAT$("# ###### ###### ######",v_c)+"c"
 ENDIF
 IF s07=1                   % bei Echtzeit
  GR.TEXT.DRAW txt,sx,sy-dtx2,FORMAT$("## ###### ######",VAL(y$)-AE/Lj_+1)
 ENDIF
 IF s07=-1                  % bei Simulation
  GR.TEXT.DRAW txt,sx,sy-dtx2,FORMAT$("## ###### ######",jx-AE/Lj_+1)
 ENDIF
ENDIF
IF s09=1 % Text %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 IF s07=0                   % bei Vollsimulation
  GR.TEXT.ALIGN 1
```

```
    GR.TEXT.DRAW txt,dtx4,dtx1,"SSR SONNENSYSTEMROTATION "+_ver$+" Vollsimulation"
    GR.TEXT.DRAW txt,dtx4,dtx1+dtx1,"Copyright "+_cr$+" 2023 by Dietmar Gerald
Schrausser"
  ENDIF
  IF s07=-1                   % bei Simulation
   GR.TEXT.ALIGN 1
   GR.TEXT.DRAW txt,dtx4,dtx1,INT$(jx)
   GR.TEXT.ALIGN 3
   GR.TEXT.DRAW txt,sx,dtx1,INT$(nt+1)+"T"
   GR.TEXT.DRAW txt,sx,sy-dtx3,"Simulation: "+STR$(ROUND(v/0.1,3))+"×"
  ENDIF
  IF s07=1                    % bei Echtzeit
   GR.TEXT.ALIGN 1
   GR.TEXT.DRAW txt,dtx4,dtx1,d$+"."+m$+"."+y$
   GR.TEXT.ALIGN 3
   GR.TEXT.DRAW txt,sx,dtx1,h$+":"+min$+" "+sz$
   GR.TEXT.DRAW txt,sx,sy-dtx3,"Echtzeit"
  ENDIF
 ENDIF
! % Kompass %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
IF swbs % nur im Hochformat
 IF s08=1
  lg=35:p=10
  SENSORS.READ 3,cp,cpi,crl
  IF swk=1|swk=0
   GR.COLOR cc/3,cc,50,50,1
   GR.CIRCLE cl,mx,my/(p/2),sx/83
   GR.COLOR cc/1.5,cc,50,50,0
   GR.CIRCLE cl,mx+sx/83*crl/90,my/(p/2)+sx/83*cpi/90,sx/83
   GR.CIRCLE cl,mx,my/(p/2),sx/540
   GR.ROTATE.START 360-cp,mx,sy/p
   GR.CIRCLE cl,mx,sy/p-lg+sx/135,sx/1080
   GR.TEXT.ALIGN 2
   GR.TEXT.SIZE txz2 %10
   GR.TEXT.DRAW tx,mx,sy/p-lg,"N"
   GR.ROTATE.END
   GR.ROTATE.START 180-cp,mx,sy/p
   GR.TEXT.DRAW tx,mx,sy/p-lg,"S"
   GR.CIRCLE cl,mx,sy/p-lg-sx/108,sx/1080
   GR.ROTATE.END
   GR.ROTATE.START 90-cp,mx,sy/p
   GR.TEXT.DRAW tx,mx,sy/p-lg,"O"
   GR.ROTATE.END
   GR.ROTATE.START 270-cp,mx,sy/p
   GR.TEXT.DRAW tx,mx,sy/p-lg,"W"
   GR.ROTATE.END
  ENDIF
 ENDIF
ENDIF
! % Touch Ereignisse %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
GR.TOUCH2 t2,tx,ty
IF t2
 GOSUB dialog
ENDIF
GR.TOUCH tc,tx,ty
IF tc
 IF ae/pc_<14.25*10^9        % max Entfernung
  IF ty<sy/3 THEN ed=ed/vse    %%%%%%%%%%%%%%%%
 ENDIF
 IF ae>=0.002                % min Entfernung
  IF ty>sy*2/3 THEN ed=ed*vse  %%%%%%%%%%%%%%%%
 ENDIF
 IF s07=-1                   % bei Simulation
  IF ty<=sy*2/3 & ty>=sy/3
   IF tx<mx THEN v=v+vsmn
   IF tx>mx THEN v=v-vsmn
   IF v>10  THEN v=10          % Grenzwert 100x
   IF v<-10 THEN v=-10         %
  ENDIF
 ENDIF
ENDIF
! % Vollsimulation %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
IF s07=0
 IF sw=1
  ed=ed/vsm %%%%%%%
  IF ae/pc_>=vsm_mx:sw=-1:PAUSE 2000:ENDIF
 ENDIF
```

```
  IF sw=-1
   ed=ed*vsm %%%%%%%
   IF ae<=vsm_mn:sw=1:PAUSE 2000:ENDIF
  ENDIF
  GOSUB zeit
  IF sec<>sec1                  % Geschwindigkeit
   sec1=sec                     %
   v_=ABS(ae-ae1)*3600          % AE/h
   v_c=v_*(au_/1000)            %
   v_c=v_c/c_                   % c
   ae1=ae
  ENDIF
 ENDIF
 !
 GR.RENDER
 ! % SCRS %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 IF s11=1
  SENSORS.READ 8,dmy,dmy,bwg
  IF bwg=0 THEN sw0=1
  IF bwg=1&sw0=1
   scrs$=pat$+_name$+Y$+M$+D$+h$+min$+sec$
   GR.SCREEN.TO_BITMAP scrs
   GR.BITMAP.SAVE scrs,scrs$
   TONE 11500,55
   sw0=0
  ENDIF
  !
 ENDIF
 IF s07=1                       % bei Echtzeit
  v=0.1                         % Umlaufgeschwindigkeit bei Simulation
  sw=1                          % Vollsimulation Schalter
  sec1=-1                       %
 ENDIF
UNTIL 0
!
ONERROR:
GOSUB fin
END
ONMENUKEY:
GOSUB dialog
MENUKEY.RESUME
ONBACKKEY:
GOSUB fin
END
!
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Subroutinen
zeit:
TIME Y$,M$,D$,h$,min$,sec$
yr= VAL(Y$)
sec=VAL(sec$)
nt= VAL(D$)
nm= VAL(M$)
st= VAL(h$)
min=VAL(min$)
RETURN
! % Globale Variablen %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
global:
clz1=sx/28                     % Textgröße 8
clz2=sx/52                     % Textgröße 4
clz3=sx/47                     % Textgröße 5
clz4=sx/41                     % Textgröße 6
clz5=sx/100                    % Textgröße 1
clz6=sx/80                     % Textgröße 2
txz1=sx/50                     % Textgröße 12
txz2=sx/60                     % Textgröße 10
txz3=sx/35                     %
txz4=sx/36                     %
txz5=sx/31                     %
txzi=clz1                      % Textgröße info
txzi2=sx/30                    % Textgröße info2
dtx1=sy/80                     % Text Abstand 1
dtx2=sy/40                     % Text Abstand 2
dtx3=sy/100                    % Text Abstand 3
dtx4=sx/100                    % Text Abstand 4
c145=1.45                      % sx/760 %1.45 corr
c142=1.42                      % 1.42 corr
```

```
c10=sy/231                      % 10 corr
c01=sx/1080                     % 1 corr
c02=c01*2                       % 2 corr
cc=255                          % Farbe
dis=sy/5.372                    % Tierkreis Distanz
gr_0=sx/400                     % allg. Objekt Größe
swvgl=-1                        % sw Grössenvergleich
!ed=ed/aed                      % Anfangsentfernung
vgr=1                           % Vergrößerungsfaktor
vgrp0=100                       % Vergrößerungsfaktor 0 Planeten
vgrs0=200000                    % Vergrößerungsfaktor 0 Sterne
CLIPBOARD.PUT "0"               % Berechnungen
RETURN
! Bei Start %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
astroparameter:
pcm_=pc_*au_                    % pc in m
c_=c_m*3.6                      % c in km/h
Lj_m=c_m*31557600               % Lj in m
Lj_=Lj_m/au_                    % Lj in AE
pcl_=pcm_/Lj_m                  % pc in Lj
GOSUB sterne                    %
GOSUB sternhaufen               %
GOSUB nebel                     %
GOSUB milchstrasse              %
GOSUB galaxien                  %
GOSUB haufen                    %
GOSUB quasare                   %
GOSUB weitere_in                %
RETURN
! % Tagesanzahl %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
tagnr:
nt=nt-1
IF nm>1  THEN nt=nt+31
IF nm>2  THEN nt=nt+28+sj
IF nm>3  THEN nt=nt+31
IF nm>4  THEN nt=nt+30
IF nm>5  THEN nt=nt+31
IF nm>6  THEN nt=nt+30
IF nm>7  THEN nt=nt+31
IF nm>8  THEN nt=nt+31
IF nm>9  THEN nt=nt+30
IF nm>10 THEN nt=nt+31
IF nm>11 THEN nt=nt+30
RETURN
! % Monatslängen %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
mnt:
Fr=31
Mz=Fr+28+sj
Al=Mz+31
Mi=Al+30
Ji=Mi+31
Jl=Ji+30
At=Jl+31
Sr=At+31
Or=Sr+30
Nr=Or+31
Dr=Nr+30
RETURN
! % Position Rekta in Grad %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
r_pos:
m_x=m_x/60
s_x=s_x/6000
pos1=h_x+m_x+s_x
pos=pos1*-(360/24)-135
RETURN
! % Deklination %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dekl:
dm_x=dm_x/60
ds_x=ds_x/6000
dkl=dg_x+dm_x+ds_x
d=d*COS(TORADIANS(dkl))
d=d*Lj_
dsn=(COS(TORADIANS(dkl)))
RETURN
! % Sonnensystem %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
sonnensystem::INCLUDE ssr_sonnensystem.bas:RETURN
! % Sterne, Sternhaufen und Nebel %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```basic
sterne::      INCLUDE ssr_sterne.bas:      RETURN
sternhaufen:: INCLUDE ssr_sternhaufen.bas: RETURN
nebel::       INCLUDE ssr_nebel.bas:       RETURN
! % Milchstraßensystem %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
milchstrasse::INCLUDE ssr_milchstrasse.bas:RETURN
! % Galaxien, Galaxienhaufen weitere Objekte %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
galaxien::    INCLUDE ssr_galaxien.bas:    RETURN
haufen::      INCLUDE ssr_haufen.bas:      RETURN
quasare::     INCLUDE ssr_quasare.bas:     RETURN
weitere::     INCLUDE ssr_weitere.bas:     RETURN
! % Beobachtbares Universum r=14.25 Gpc %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Objektdarstellung
objdarst:
GR.ROTATE.START pos,mx,my
IF ae<200*d                  % Darstellung
 IF symsw=-1 THEN symb=gr_0     % Symbol
 IF symsw=1  THEN symb=rds      % Maßstab
 !IF otype=-1 | symsw=-1
 IF symsw=-1
  GR.CIRCLE cl,mx-ed*d,my-ed*d,symb*vgr
 ENDIF
 !
 !IF otype=0 & symsw=1
 IF symsw=1
  GR.CIRCLE cl,mx-ed*d,my-ed*d,(ed*symb*Lj_)*vgr
 ENDIF
ENDIF
IF t06=1&ae<5*d              % Text
 GR.ROTATE.START -pos,mx-ed*d,my-ed*d
 GR.TEXT.ALIGN 2
 GR.TEXT.SIZE txz1            % 11
 GR.TEXT.DRAW txt,mx-ed*d,my-ed*d-c10,objname$
 GR.ROTATE.END
ENDIF
IF pro_=1                    % Projektion
 erd=TORADIANS(-i-45-pos)
 ex1= mx-(ed*c145)*SIN(-erd)
 ey1= my-(ed*c145)*COS(erd)
 GR.COLOR 30,cc,cc/3,cc/2,0   %%% gosub color
 GR.LINE ln,mx-ed*d,my-ed*d,ex1,ey1
ENDIF
GR.ROTATE.END
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Haupt-Dialog Parameter
dialogprm:
u00=-1
t00=-1
s07=1
s09=1
s11=1
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog:
GOSUB anfangsentfernung        % aed$
GOSUB menu
std:
ARRAY.LOAD
sel$[],o05$,o06$,o12$,o13$,o14$,o15$,o17$,o16$,o18$,o10$,o09$,o07$,o11$,"Ok",_ex$+"
Exit"
DIALOG.SELECT sel,sel$[],_name$+" SONNENSYSTEMROTATION "+_ver$+" - Ebenen:"
IF sel=1: GOSUB dialog1: ENDIF
IF sel=2: GOSUB dialog2: ENDIF
IF sel=3: GOSUB dialog4: ENDIF
IF sel=4: GOSUB dialog5: ENDIF
IF sel=5: GOSUB dialog6: ENDIF
IF sel=6: GOSUB dialog7: ENDIF
IF sel=7: GOSUB dialog8: ENDIF
IF sel=8: GOSUB dialog9: ENDIF
IF sel=9: GOSUB dialog11:ENDIF
IF sel=10:GOSUB dialog10:ENDIF
IF sel=11:s09=s09*-1:    ENDIF
IF sel=12:GOSUB dialog3: ENDIF
IF sel=13:s11=s11*-1:    ENDIF
IF sel=14:RETURN:        ENDIF
```

```
IF sel=15:GOSUB fin:END: ENDIF
GOSUB menu
GOTO std
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu:
IF u00=1:  o05$=smb$+"  Sonnensystem...":   ENDIF
IF u00=-1: o05$=   "    Sonnensystem aus":  ENDIF
IF t00=1:  o06$=smb$+"  Sterne...":         ENDIF
IF t00=-1: o06$=   "    Sterne aus":        ENDIF
IF st00=1: o12$=smb$+"  Sternhaufen...":    ENDIF
IF st00=-1:o12$=   "    Sternhaufen aus":   ENDIF
IF nb00=1: o13$=smb$+"  Nebel...":          ENDIF
IF nb00=-1:o13$=   "    Nebel aus":         ENDIF
IF gm00=1: o14$=smb$+"  Milchstraße...":    ENDIF
IF gm00=-1:o14$=   "    Milchstraße aus":   ENDIF
IF gx00=1: o15$=smb$+"  Galaxien...":       ENDIF
IF gx00=-1:o15$=   "    Galaxien aus":      ENDIF
IF gh00=1: o17$=smb$+"  Galaxienhaufen...": ENDIF
IF gh00=-1:o17$=   "    Galaxienhaufen aus":ENDIF
IF gq00=1: o16$=smb$+"  Quasare...":        ENDIF
IF gq00=-1:o16$=   "    Quasare aus":       ENDIF
IF gw00=1: o18$=smb$+"  Weitere...":        ENDIF
IF gw00=-1:o18$=   "    Weitere aus":       ENDIF
IF s07=1:  o07$=smq$+"  Echtzeit @ "+aed$:  ENDIF
IF s07=-1: o07$=smq$+"  Simulation @ "+aed$:ENDIF
IF s07=0:  o07$= oo$+"  Vollsimulation":    ENDIF
!IF s07=2:o07$="i  Information":ENDIF
IF s09=1:  o09$=smb$+"  Text":              ENDIF
IF s09=-1: o09$=   "    Text aus":          ENDIF
IF s10=1:  o10$=smb$+"  Skalen...":         ENDIF
IF s10=-1: o10$=   "    Skalen aus":        ENDIF
IF s11=1:  o11$=smb$+"  SCRS":              ENDIF
IF s11=-1: o11$=   "    SCRS aus":          ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Sonnensystem
dialog1prm:
s00=1
u00=1
u01=-1
u02=-1
u03=-1
u04=1
u05=-1
u06=-1
u07=-1
u08=-1
u09=-1
u10=1
u11=1
u13=1
u14=1
u15=1
u16=1
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog1:
GOSUB menu1
std1:
ARRAY.LOAD
sel1$[],q00$,q20$,q01$,q02$,q03$,q04$,q05$,q06$,q07$,q08$,q09$,q13$,q14$,q15$,q10$,q1
2$,q16$,q11$,"Ok"
DIALOG.SELECT sel1,sel1$[],"Sonnensystem: Darstellung/Projektion:"
IF sel1=1:u00=u00*-1: ENDIF
IF sel1=2:s00=s00*-1: ENDIF
IF sel1=3:u01=u01*-1: ENDIF
IF sel1=4:u02=u02*-1: ENDIF
IF sel1=5:u03=u03*-1: ENDIF
IF sel1=6:u04=u04*-1: ENDIF
IF sel1=7:u05=u05*-1: ENDIF
IF sel1=8:u06=u06*-1: ENDIF
IF sel1=9:u07=u07*-1: ENDIF
IF sel1=10:u08=u08*-1:ENDIF
```

```
IF sel1=11:u09=u09*-1:                ENDIF
IF sel1=12:u13=u13*-1:                ENDIF
IF sel1=13:u14=u14*-1:                ENDIF
IF sel1=14:u15=u15*-1:                ENDIF
IF sel1=15:u10=u10*-1:                ENDIF
IF sel1=16:GOSUB dlgvgr:vgr_p=_vgr:ENDIF
IF sel1=17:u16=u16*-1:                ENDIF
IF sel1=18:u11=u11*-1:                ENDIF
IF sel1=19:RETURN:                ENDIF
GOSUB menu1
GOTO std1
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu1:
IF u00=1: q00$=smb$+"  Ebene an":                       ENDIF
IF u00=-1:q00$=  "    Ebene aus":                       ENDIF
IF s00=1: q20$=smb$+"  Umlaufbahnen":                   ENDIF
IF s00=-1:q20$=  "    Umlaufbahnen aus":                ENDIF
IF u01=1: q01$=smb$+"  Merkur ["+STR$(ROUND(d_mkr_ae,1))+"AE]": ENDIF
IF u01=-1:q01$=  "    Merkur ["+STR$(ROUND(d_mkr_ae,1))+"AE]": ENDIF
IF u02=1: q02$=smb$+"  Venus ["+STR$(ROUND(d_vns_ae,1))+"AE]":  ENDIF
IF u02=-1:q02$=  "    Venus ["+STR$(ROUND(d_vns_ae,1))+"AE]":   ENDIF
IF u03=1: q03$=smb$+"  Mars ["+STR$(ROUND(d_mrs_ae,1))+"AE]":   ENDIF
IF u03=-1:q03$=  "    Mars ["+STR$(ROUND(d_mrs_ae,1))+"AE]":    ENDIF
IF u04=1: q04$=smb$+"  Asteroidengürtel [~3.3AE]":      ENDIF
IF u04=-1:q04$=  "    Asteroidengürtel [~3.3AE]":       ENDIF
IF u05=1: q05$=smb$+"  Jupiter ["+STR$(ROUND(d_jpt_ae,1))+"AE]":ENDIF
IF u05=-1:q05$=  "    Jupiter ["+STR$(ROUND(d_jpt_ae,1))+"AE]":ENDIF
IF u06=1: q06$=smb$+"  Saturn ["+STR$(ROUND(d_stn_ae,1))+"AE]": ENDIF
IF u06=-1:q06$=  "    Saturn ["+STR$(ROUND(d_stn_ae,1))+"AE]":  ENDIF
IF u07=1: q07$=smb$+"  Uranus ["+STR$(ROUND(d_urs_ae,1))+"AE]": ENDIF
IF u07=-1:q07$=  "    Uranus ["+STR$(ROUND(d_urs_ae,1))+"AE]":  ENDIF
IF u08=1: q08$=smb$+"  Neptun ["+STR$(ROUND(d_npt_ae,1))+"AE]": ENDIF
IF u08=-1:q08$=  "    Neptun ["+STR$(ROUND(d_npt_ae,1))+"AE]":  ENDIF
IF u13=1: q13$=smb$+"  Kuipergürtel [~40AE]":           ENDIF
IF u13=-1:q13$=  "    Kuipergürtel [~40AE]":            ENDIF
IF u14=1: q14$=smb$+"  Heliosphäre [~100AE]":           ENDIF
IF u14=-1:q14$=  "    Heliosphäre [~100AE]":            ENDIF
IF u09=1: q09$=smb$+"  Pluto [39.5AE]":                 ENDIF
IF u09=-1:q09$=  "    Pluto [39.5AE]":                  ENDIF
IF u15=1: q15$=smb$+"  Hills-Wolke [~875AE]":           ENDIF
IF u15=-1:q15$=  "    Hills-Wolke [~875AE]":            ENDIF
IF u10=1: q10$=smb$+"  Oortsche Wolke [~0.8Lj]":        ENDIF
IF u10=-1:q10$=  "    Oortsche Wolke [50000AE]":        ENDIF
q12$=smq$+"  Vergrößerung: "+INT$(vgr_p)+" ×"
IF u16=-1:q16$=_smbl$+"    Symbol":                     ENDIF
IF u16=1: q16$=_mst$+"    Maßstab × "+INT$(vgrp0):      ENDIF
IF u11=1: q11$=smb$+"  Text":                           ENDIF
IF u11=-1:q11$=  "    Text aus":                        ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Sterne
dialog2prm:
t00=1
t01=-1
t02=-1
t03=-1
t05=-1
t06=1
t07=-1
t08=-1
t09=-1
t10=-1
t11=-1
t12=-1
t13=-1
t14=-1
t15=-1
t17=-1
t18=-1
t19=-1
t20=-1
t32=-1
t33=-1
t35=-1
t36=-1
```

```
t38=-1
t73=-1
t74=-1
t75=-1
t76=-1
t77=-1
t78=-1
t79=-1
t80=-1
t81=-1
t82=-1
t83=-1
t84=-1
t85=-1
t86=-1
t87=-1
t88=-1
t89=-1
t90=-1
t91=-1
t92=-1
t93=-1
t94=-1
t95=-1
t96=-1
t97=-1
t100=-1
t101=-1
t102=-1
t103=-1
t104=-1
t105=-1
t106=-1
t107=-1
t108=-1
t109=-1
t110=-1
t111=-1
t112=-1
t113=-1
t114=-1
t115=-1
t116=-1
t117=-1
t118=-1
t119=-1
t120=-1
t121=-1
t122=-1
t123=-1
t124=-1
t125=-1
t126=-1
t127=-1
t128=-1
t129=-1
t130=-1
s99=-1
s101=-1
t06s=1
!!
 t__=-1
!!
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog2:
GOSUB menu2
std2:
ARRAY.LOAD
sel2$[],p00$,p01$,p82$,p05$,p35$,p08$,p07$,p36$,p09$,p38$,p03$,p11$,p12$,p33$,p10$,p8
3$,p02$,p84$,p85$,p86$,p13$,p87$,p88$,p89$,p90$,p91$,p14$,p92$,p93$,p94$,p95$,p96$,p9
7$,p100$,p101$,p102$,p103$,p104$,p105$,p106$,p107$,p108$,p109$,p110$,p111$,p112$,p113
$,p32$,p114$,p115$,p116$,p117$,p118$,p15$,p119$,p120$,p121$,p17$,p122$,p18$,p123$,p12
4$,p19$,p125$,p126$,p127$,p128$,p20$,p129$,p130$,s99$,s100$,s101$,p06$,"Ok"
DIALOG.SELECT sel2,sel2$[],"Sterne: Darstellung/Projektion:"
IF sel2=1:t00=t00*-1:IF t00=-1 THEN RETURN:ENDIF
IF sel2=2:t01=t01*-1:                   ENDIF
```

```
IF sel2=3: t82= t82*-1: ENDIF
IF sel2=4: t05= t05*-1: ENDIF
IF sel2=5: t35= t35*-1: ENDIF
IF sel2=6: t08= t08*-1: ENDIF
IF sel2=7: t07= t07*-1: ENDIF
IF sel2=8: t36= t36*-1: ENDIF
IF sel2=9: t09= t09*-1: ENDIF
IF sel2=10:t38= t38*-1: ENDIF
IF sel2=11:t03= t03*-1: ENDIF
IF sel2=12:t11= t11*-1: ENDIF
IF sel2=13:t12= t12*-1: ENDIF
IF sel2=14:t33= t33*-1: ENDIF
IF sel2=15:t10= t10*-1: ENDIF
IF sel2=16:t83= t83*-1: ENDIF
IF sel2=17:t02= t02*-1: ENDIF
IF sel2=18:t84= t84*-1: ENDIF
IF sel2=19:t85= t85*-1: ENDIF
IF sel2=20:t86= t86*-1: ENDIF
IF sel2=21:t13= t13*-1: ENDIF
IF sel2=22:t87= t87*-1: ENDIF
IF sel2=23:t88= t88*-1: ENDIF
IF sel2=24:t89= t89*-1: ENDIF
IF sel2=25:t90= t90*-1: ENDIF
IF sel2=26:t91= t91*-1: ENDIF
IF sel2=27:t14= t14*-1: ENDIF
IF sel2=28:t92= t92*-1: ENDIF
IF sel2=29:t93= t93*-1: ENDIF
IF sel2=30:t94= t94*-1: ENDIF
IF sel2=31:t95= t95*-1: ENDIF
IF sel2=32:t96= t96*-1: ENDIF
IF sel2=33:t97= t97*-1: ENDIF
IF sel2=34:t100=t100*-1:ENDIF
IF sel2=35:t101=t101*-1:ENDIF
IF sel2=36:t102=t102*-1:ENDIF
IF sel2=37:t103=t103*-1:ENDIF
IF sel2=38:t104=t104*-1:ENDIF
IF sel2=39:t105=t105*-1:ENDIF
IF sel2=40:t106=t106*-1:ENDIF
IF sel2=41:t107=t107*-1:ENDIF
IF sel2=42:t108=t108*-1:ENDIF
IF sel2=43:t109=t109*-1:ENDIF
IF sel2=44:t110=t110*-1:ENDIF
IF sel2=45:t111=t111*-1:ENDIF
IF sel2=46:t112=t112*-1:ENDIF
IF sel2=47:t113=t113*-1:ENDIF
IF sel2=48:t32= t32*-1: ENDIF
IF sel2=49:t114=t114*-1:ENDIF
IF sel2=50:t115=t115*-1:ENDIF
IF sel2=51:t116=t116*-1:ENDIF
IF sel2=52:t117=t117*-1:ENDIF
IF sel2=53:t118=t118*-1:ENDIF
IF sel2=54:t15= t15*-1: ENDIF
IF sel2=55:t119=t119*-1:ENDIF
IF sel2=56:t120=t120*-1:ENDIF
IF sel2=57:t121=t121*-1:ENDIF
IF sel2=58:t17= t17*-1: ENDIF
IF sel2=59:t122=t122*-1:ENDIF
IF sel2=60:t18= t18*-1: ENDIF
IF sel2=61:t123=t123*-1:ENDIF
IF sel2=62:t124=t124*-1:ENDIF
IF sel2=63:t19= t19*-1: ENDIF
IF sel2=64:t125=t125*-1:ENDIF
IF sel2=65:t126=t126*-1:ENDIF
IF sel2=66:t127=t127*-1:ENDIF
IF sel2=67:t128=t128*-1:ENDIF
IF sel2=68:t20= t20*-1: ENDIF
IF sel2=69:t129=t129*-1:ENDIF
IF sel2=70:t130=t130*-1:ENDIF
!!
 IF sel2=_:t__=t__*-1:ENDIF
!!
IF sel2=71:GOSUB sreset: s99=s99*-1:ENDIF
IF sel2=72
 GOSUB dlgvgr
 vgr_s=_vgr:IF s101=1 THEN vgr_s=vgr_s
 vgr=vgr_s
ENDIF
```

```
IF sel2=73:s101=s101*-1:ENDIF
IF sel2=74:t06s=t06s*-1:ENDIF
IF sel2=75:RETURN:       ENDIF
GOSUB menu2
GOTO std2
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu2:
IF t00=1:  p00$= smb$+"  Ebene an":                                         ENDIF
IF t00=-1: p00$=   "    Ebene aus":                                         ENDIF
IF t01=1:  p01$= smb$+"  "+_ga$+" Centauri ["+STR$(ROUND(s_d01,1))+"pc]":ENDIF
IF t01=-1: p01$=   "    "+_ga$+" Centauri ["+STR$(ROUND(s_d01,1))+"pc]":ENDIF
IF t82=1:  p82$= smb$+"  Barnards Stern ["+STR$(ROUND(s_d02,1))+"pc]":    ENDIF
IF t82=-1: p82$=   "    Barnards Stern ["+STR$(ROUND(s_d02,1))+"pc]":    ENDIF
IF t05=1:  p05$= smb$+"  Sirius ["+STR$(ROUND(s_d03,1))+"pc]":           ENDIF
IF t05=-1: p05$=   "    Sirius ["+STR$(ROUND(s_d03,1))+"pc]":           ENDIF
IF t35=1:  p35$= smb$+"  Procyon ["+STR$(ROUND(s_d04,1))+"pc]":          ENDIF
IF t35=-1: p35$=   "    Procyon ["+STR$(ROUND(s_d04,1))+"pc]":          ENDIF
IF t08=1:  p08$= smb$+"  Altair ["+STR$(ROUND(s_d05,1))+"pc]":           ENDIF
IF t08=-1: p08$=   "    Altair ["+STR$(ROUND(s_d05,1))+"pc]":           ENDIF
IF t07=1:  p07$= smb$+"  Vega ["+STR$(ROUND(s_d06,1))+"pc]":
IF t07=-1: p07$=   "    Vega ["+STR$(ROUND(s_d06,1))+"pc]":             ENDIF
IF t36=1:  p36$= smb$+"  Fomalhaut ["+STR$(ROUND(s_d07,1))+"pc]":        ENDIF
IF t36=-1: p36$=   "    Fomalhaut ["+STR$(ROUND(s_d07,1))+"pc]":        ENDIF
IF t09=1:  p09$= smb$+"  Pollux ["+STR$(ROUND(s_d08,1))+"pc]":           ENDIF
IF t09=-1: p09$=   "    Pollux ["+STR$(ROUND(s_d08,1))+"pc]":           ENDIF
IF t38=1:  p38$= smb$+"  Denebola ["+STR$(ROUND(s_d09,1))+"pc]":         ENDIF
IF t38=-1: p38$=   "    Denebola ["+STR$(ROUND(s_d09,1))+"pc]":         ENDIF
IF t03=1:  p03$= smb$+"  Arkturus ["+STR$(ROUND(s_d10,1))+"pc]":         ENDIF
IF t03=-1: p03$=   "    Arkturus ["+STR$(ROUND(s_d10,1))+"pc]":         ENDIF
IF t11=1:  p11$= smb$+"  Capella ["+STR$(ROUND(s_d11,1))+"pc]":          ENDIF
IF t11=-1: p11$=   "    Capella ["+STR$(ROUND(s_d11,1))+"pc]":          ENDIF
IF t12=1:  p12$= smb$+"  Rasalhague ["+STR$(ROUND(s_d12,1))+"pc]":       ENDIF
IF t12=-1: p12$=   "    Rasalhague ["+STR$(ROUND(s_d12,1))+"pc]":       ENDIF
IF t33=1:  p33$= smb$+"  Alderamin ["+STR$(ROUND(s_d13,1))+"pc]":        ENDIF
IF t33=-1: p33$=   "    Alderamin ["+STR$(ROUND(s_d13,1))+"pc]":        ENDIF
IF t10=1:  p10$= smb$+"  Castor ["+STR$(ROUND(s_d14,1))+"pc]":           ENDIF
IF t10=-1: p10$=   "    Castor ["+STR$(ROUND(s_d14,1))+"pc]":           ENDIF
IF t83=1:  p83$= smb$+"  Caph ["+STR$(ROUND(s_d15,1))+"pc]":             ENDIF
IF t83=-1: p83$=   "    Caph ["+STR$(ROUND(s_d15,1))+"pc]":             ENDIF
IF t02=1:  p02$= smb$+"  Aldebaran ["+STR$(ROUND(s_d16,1))+"pc]":        ENDIF
IF t02=-1: p02$=   "    Aldebaran ["+STR$(ROUND(s_d16,1))+"pc]":        ENDIF
IF t84=1:  p84$= smb$+"  Hamal ["+STR$(ROUND(s_d17,1))+"pc]":            ENDIF
IF t84=-1: p84$=   "    Hamal ["+STR$(ROUND(s_d17,1))+"pc]":            ENDIF
IF t85=1:  p85$= smb$+"  Unuk ["+STR$(ROUND(s_d18,1))+"pc]":             ENDIF
IF t85=-1: p85$=   "    Unuk ["+STR$(ROUND(s_d18,1))+"pc]":             ENDIF
IF t86=1:  p86$= smb$+"  Alphecca ["+STR$(ROUND(s_d19,1))+"pc]":         ENDIF
IF t86=-1: p86$=   "    Alphecca ["+STR$(ROUND(s_d19,1))+"pc]":         ENDIF
IF t13=1:  p13$= smb$+"  Regulus ["+STR$(ROUND(s_d20,1))+"pc]":          ENDIF
IF t13=-1: p13$=   "    Regulus ["+STR$(ROUND(s_d20,1))+"pc]":          ENDIF
IF t87=1:  p87$= smb$+"  Merak ["+STR$(ROUND(s_d21,1))+"pc]":            ENDIF
IF t87=-1: p87$=   "    Merak ["+STR$(ROUND(s_d21,1))+"pc]":            ENDIF
IF t88=1:  p88$= smb$+"  Ankaa ["+STR$(ROUND(s_d22,1))+"pc]":            ENDIF
IF t88=-1: p88$=   "    Ankaa ["+STR$(ROUND(s_d22,1))+"pc]":            ENDIF
IF t89=1:  p89$= smb$+"  Alioth ["+STR$(ROUND(s_d23,1))+"pc]":           ENDIF
IF t89=-1: p89$=   "    Alioth ["+STR$(ROUND(s_d23,1))+"pc]":           ENDIF
IF t90=1:  p90$= smb$+"  Phecda ["+STR$(ROUND(s_d24,1))+"pc]":           ENDIF
IF t90=-1: p90$=   "    Phecda ["+STR$(ROUND(s_d24,1))+"pc]":           ENDIF
IF t91=1:  p91$= smb$+"  Gacrux ["+STR$(ROUND(s_d25,1))+"pc]":           ENDIF
IF t91=-1: p91$=   "    Gacrux ["+STR$(ROUND(s_d25,1))+"pc]":           ENDIF
IF t14=1:  p14$= smb$+"  Algol ["+STR$(ROUND(s_d26,1))+"pc]":            ENDIF
IF t14=-1: p14$=   "    Algol ["+STR$(ROUND(s_d26,1))+"pc]":            ENDIF
IF t92=1:  p92$= smb$+"  Alpheratz ["+STR$(ROUND(s_d27,1))+"pc]":        ENDIF
IF t92=-1: p92$=   "    Alpheratz ["+STR$(ROUND(s_d27,1))+"pc]":        ENDIF
IF t93=1:  p93$= smb$+"  Alnair ["+STR$(ROUND(s_d28,1))+"pc]":           ENDIF
IF t93=-1: p93$=   "    Alnair ["+STR$(ROUND(s_d28,1))+"pc]":           ENDIF
IF t94=1:  p94$= smb$+"  Alhena ["+STR$(ROUND(s_d29,1))+"pc]":           ENDIF
IF t94=-1: p94$=   "    Alhena ["+STR$(ROUND(s_d29,1))+"pc]":           ENDIF
IF t95=1:  p95$= smb$+"  Vindemiatrix ["+STR$(ROUND(s_d30,1))+"pc]":     ENDIF
IF t95=-1: p95$=   "    Vindemiatrix ["+STR$(ROUND(s_d30,1))+"pc]":     ENDIF
IF t96=1:  p96$= smb$+"  Dubhe ["+STR$(ROUND(s_d31,1))+"pc]":            ENDIF
IF t96=-1: p96$=   "    Dubhe ["+STR$(ROUND(s_d31,1))+"pc]":            ENDIF
IF t97=1:  p97$= smb$+"  Algieba ["+STR$(ROUND(s_d32,1))+"pc]":          ENDIF
IF t97=-1: p97$=   "    Algieba ["+STR$(ROUND(s_d32,1))+"pc]":          ENDIF
IF t100=1: p100$=smb$+"  Kochab ["+STR$(ROUND(s_d33,1))+"pc]":           ENDIF
IF t100=-1:p100$=  "    Kochab ["+STR$(ROUND(s_d33,1))+"pc]":           ENDIF
IF t101=1: p101$=smb$+"  Markab ["+STR$(ROUND(s_d34,1))+"pc]":           ENDIF
```

```
IF t101=-1:p101$=   "    Markab ["+STR$(ROUND(s_d34,1))+"pc]":        ENDIF
IF t102=1: p102$=smb$+" Elnath ["+STR$(ROUND(s_d35,1))+"pc]":         ENDIF
IF t102=-1:p102$=   "    Elnath ["+STR$(ROUND(s_d35,1))+"pc]":        ENDIF
IF t103=1: p103$=smb$+" Achernar ["+STR$(ROUND(s_d36,1))+"pc]":       ENDIF
IF t103=-1:p103$=   "    Achernar ["+STR$(ROUND(s_d36,1))+"pc]":      ENDIF
IF t104=1: p104$=smb$+" Kaus Australis ["+STR$(ROUND(s_d37,1))+"pc]":ENDIF
IF t104=-1:p104$=   "    Kaus Australis ["+STR$(ROUND(s_d37,1))+"pc]":ENDIF
IF t105=1: p105$=smb$+" Eltanin ["+STR$(ROUND(s_d38,1))+"pc]":        ENDIF
IF t105=-1:p105$=   "    Eltanin ["+STR$(ROUND(s_d38,1))+"pc]":       ENDIF
IF t106=1: p106$=smb$+" Alphard ["+STR$(ROUND(s_d39,1))+"pc]":        ENDIF
IF t106=-1:p106$=   "    Alphard ["+STR$(ROUND(s_d39,1))+"pc]":       ENDIF
IF t107=1: p107$=smb$+" Scheat ["+STR$(ROUND(s_d40,1))+"pc]":         ENDIF
IF t107=-1:p107$=   "    Scheat ["+STR$(ROUND(s_d40,1))+"pc]":        ENDIF
IF t108=1: p108$=smb$+" Mirach ["+STR$(ROUND(s_d41,1))+"pc]":         ENDIF
IF t108=-1:p108$=   "    Mirach ["+STR$(ROUND(s_d41,1))+"pc]":        ENDIF
IF t109=1: p109$=smb$+" Nunki ["+STR$(ROUND(s_d42,1))+"pc]":          ENDIF
IF t109=-1:p109$=   "    Nunki ["+STR$(ROUND(s_d42,1))+"pc]":         ENDIF
IF t110=1: p110$=smb$+" Schedar ["+STR$(ROUND(s_d43,1))+"pc]":        ENDIF
IF t110=-1:p110$=   "    Schedar ["+STR$(ROUND(s_d43,1))+"pc]":       ENDIF
IF t111=1: p111$=smb$+" Izar ["+STR$(ROUND(s_d44,1))+"pc]":           ENDIF
IF t111=-1:p111$=   "    Izar ["+STR$(ROUND(s_d44,1))+"pc]":          ENDIF
IF t112=1: p112$=smb$+" Menkar ["+STR$(ROUND(s_d45,1))+"pc]":         ENDIF
IF t112=-1:p112$=   "    Menkar ["+STR$(ROUND(s_d45,1))+"pc]":        ENDIF
IF t113=1: p113$=smb$+" Bellatrix ["+STR$(ROUND(s_d46,1))+"pc]":      ENDIF
IF t113=-1:p113$=   "    Bellatrix ["+STR$(ROUND(s_d46,1))+"pc]":     ENDIF
IF t32=1:  p32$= smb$+" Spica ["+STR$(ROUND(s_d47,1))+"pc]":          ENDIF
IF t32=-1: p32$=   "    Spica ["+STR$(ROUND(s_d47,1))+"pc]":          ENDIF
IF t114=1: p114$=smb$+" Deneb Kaitos ["+STR$(ROUND(s_d48,1))+"pc]":   ENDIF
IF t114=-1:p114$=   "    Deneb Kaitos ["+STR$(ROUND(s_d48,1))+"pc]":  ENDIF
IF t115=1: p115$=smb$+" Canopus ["+STR$(ROUND(s_d49,1))+"pc]":        ENDIF
IF t115=-1:p115$=   "    Canopus ["+STR$(ROUND(s_d49,1))+"pc]":       ENDIF
IF t116=1: p116$=smb$+" Acrux ["+STR$(ROUND(s_d50,1))+"pc]":          ENDIF
IF t116=-1:p116$=   "    Acrux ["+STR$(ROUND(s_d50,1))+"pc]":         ENDIF
IF t117=1: p117$=smb$+" Hadar ["+STR$(ROUND(s_d51,1))+"pc]":          ENDIF
IF t117=-1:p117$=   "    Hadar ["+STR$(ROUND(s_d51,1))+"pc]":         ENDIF
IF t118=1: p118$=smb$+" Polaris ["+STR$(ROUND(s_d52,1))+"pc]":        ENDIF
IF t118=-1:p118$=   "    Polaris ["+STR$(ROUND(s_d52,1))+"pc]":       ENDIF
IF t15=1:  p15$= smb$+" Mira ["+STR$(ROUND(s_d53,1))+"pc]":           ENDIF
IF t15=-1: p15$=   "    Mira ["+STR$(ROUND(s_d53,1))+"pc]":           ENDIF
IF t119=1: p119$=smb$+" Adhara ["+STR$(ROUND(s_d54,1))+"pc]":         ENDIF
IF t119=-1:p119$=   "    Adhara ["+STR$(ROUND(s_d54,1))+"pc]":        ENDIF
IF t120=1: p120$=smb$+" Algenib ["+STR$(ROUND(s_d55,1))+"pc]":        ENDIF
IF t120=-1:p120$=   "    Algenib ["+STR$(ROUND(s_d55,1))+"pc]":       ENDIF
IF t121=1: p121$=smb$+" Mirfak ["+STR$(ROUND(s_d56,1))+"pc]":         ENDIF
IF t121=-1:p121$=   "    Mirfak ["+STR$(ROUND(s_d56,1))+"pc]":        ENDIF
IF t17=1:  p17$= smb$+" Antares ["+STR$(ROUND(s_d57,1))+"pc]":        ENDIF
IF t17=-1: p17$=   "    Antares ["+STR$(ROUND(s_d57,1))+"pc]":        ENDIF
IF t122=1: p122$=smb$+" Shaula ["+STR$(ROUND(s_d58,1))+"pc]":         ENDIF
IF t122=-1:p122$=   "    Shaula ["+STR$(ROUND(s_d58,1))+"pc]":        ENDIF
IF t18=1:  p18$= smb$+" Beteigeuze ["+STR$(ROUND(s_d59,1))+"pc]":     ENDIF
IF t18=-1: p18$=   "    Beteigeuze ["+STR$(ROUND(s_d59,1))+"pc]":     ENDIF
IF t123=1: p123$=smb$+" Saiph ["+STR$(ROUND(s_d60,1))+"pc]":          ENDIF
IF t123=-1:p123$=   "    Saiph ["+STR$(ROUND(s_d60,1))+"pc]":         ENDIF
IF t124=1: p124$=smb$+" Enif ["+STR$(ROUND(s_d61,1))+"pc]":           ENDIF
IF t124=-1:p124$=   "    Enif ["+STR$(ROUND(s_d61,1))+"pc]":          ENDIF
IF t19=1:  p19$= smb$+" Rigel ["+STR$(ROUND(s_d62,1))+"pc]":          ENDIF
IF t19=-1: p19$=   "    Rigel ["+STR$(ROUND(s_d62,1))+"pc]":          ENDIF
IF t125=1: p125$=smb$+" Mintaka ["+STR$(ROUND(s_d63,1))+"pc]":        ENDIF
IF t125=-1:p125$=   "    Mintaka ["+STR$(ROUND(s_d63,1))+"pc]":       ENDIF
IF t126=1: p126$=smb$+" Alnitak ["+STR$(ROUND(s_d64,1))+"pc]":        ENDIF
IF t126=-1:p126$=   "    Alnitak ["+STR$(ROUND(s_d64,1))+"pc]":       ENDIF
IF t127=1: p127$=smb$+" Alnilam ["+STR$(ROUND(s_d65,1))+"pc]":        ENDIF
IF t127=-1:p127$=   "    Alnilam ["+STR$(ROUND(s_d65,1))+"pc]":       ENDIF
IF t128=1: p128$=smb$+" Arneb ["+STR$(ROUND(s_d66,1))+"pc]":          ENDIF
IF t128=-1:p128$=   "    Arneb ["+STR$(ROUND(s_d66,1))+"pc]":         ENDIF
IF t20=1:  p20$= smb$+" Deneb ["+STR$(ROUND(s_d67/1000,1))+"kpc]":    ENDIF
IF t20=-1: p20$=   "    Deneb ["+STR$(ROUND(s_d67,1))+"pc]":          ENDIF
IF t129=1: p129$=smb$+" RSGC2-01 ["+STR$(ROUND(s_d68/1000,1))+"kpc]":ENDIF
IF t129=-1:p129$=   "    RSGC2-01 ["+STR$(ROUND(s_d68/1000,1))+"kpc]":ENDIF
IF t130=1: p130$=smb$+" RSGC-F01 ["+STR$(ROUND(s_d69/1000,1))+"kpc]":ENDIF
IF t130=-1:p130$=   "    RSGC-F01 ["+STR$(ROUND(s_d69/1000,1))+"kpc]":ENDIF
!!
 IF t__=1:p__$=smb$+"  __ [__pc]":ENDIF
 IF t__=-1: p__$="      __ [__pc]":ENDIF
!!
s99$=smq$+"  Projektion an/aus"
s100$=smq$+"  Vergrößerung: "+INT$(vgr_s)+" ×"
```

```
IF s101=-1:s101$=_smbl$+"     Symbol":                    ENDIF
IF s101=1: s101$=_mst$+ "     Maßstab × "+INT$(vgrs0):ENDIF
IF t06s=1: p06$= smb$+     "  Text":                      ENDIF
IF t06s=-1:p06$=           "  Text aus":                  ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
sreset:
IF s99=1
 t01=-1
 t02=-1
 t03=-1
 t05=-1
 t07=-1
 t08=-1
 t09=-1
 t10=-1
 t11=-1
 t12=-1
 t13=-1
 t14=-1
 t15=-1
 t17=-1
 t18=-1
 t19=-1
 t20=-1
 t32=-1
 t33=-1
 t35=-1
 t36=-1
 t38=-1
 t59=-1
 t73=-1
 t74=-1
 t75=-1
 t76=-1
 t77=-1
 t78=-1
 t79=-1
 t80=-1
 t81=-1
 t82=-1
 t83=-1
 t84=-1
 t85=-1
 t86=-1
 t87=-1
 t88=-1
 t89=-1
 t90=-1
 t91=-1
 t92=-1
 t93=-1
 t94=-1
 t95=-1
 t96=-1
 t97=-1
 t100=-1
 t101=-1
 t102=-1
 t103=-1
 t104=-1
 t105=-1
 t106=-1
 t107=-1
 t108=-1
 t109=-1
 t110=-1
 t111=-1
 t112=-1
 t113=-1
 t114=-1
 t115=-1
 t116=-1
 t117=-1
 t118=-1
 t119=-1
```

```
t120=-1
t121=-1
t122=-1
t123=-1
t124=-1
t125=-1
t126=-1
t127=-1
t128=-1
t129=-1
t130=-1
ELSE
t01=1
t02=1
t03=1
t05=1
t07=1
t08=1
t09=1
t10=1
t11=1
t12=1
t13=1
t14=1
t15=1
t17=1
t18=1
t19=1
t20=1
t32=1
t33=1
t35=1
t36=1
t38=1
t73=1
t74=1
t75=1
t76=1
t77=1
t78=1
t79=1
t80=1
t81=1
t82=1
t83=1
t84=1
t85=1
t86=1
t87=1
t88=1
t89=1
t90=1
t91=1
t92=1
t93=1
t94=1
t95=1
t96=1
t97=1
t100=1
t101=1
t102=1
t103=1
t104=1
t105=1
t106=1
t107=1
t108=1
t109=1
t110=1
t111=1
t112=1
t113=1
t114=1
t115=1
t116=1
t117=1
```

```
    t118=1
    t119=1
    t120=1
    t121=1
    t122=1
    t123=1
    t124=1
    t125=1
    t126=1
    t127=1
    t128=1
    t129=1
    t130=1
ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Stern- und Kugelsternhaufen
dialog4prm:
st00=1
st01=-1
st02=-1
st03=-1
st04=-1
st05=-1
st06=-1
st07=-1
st08=-1
st09=-1
st10=-1
st11=-1
st12=-1
st13=-1
st14=-1
st15=-1
st16=-1
st17=-1
st18=-1
st19=-1
st20=-1
st21=-1
st22=-1
st23=-1
st24=-1
st25=-1
st26=-1
st27=-1
st28=-1
st29=-1
st30=-1
st31=-1
st32=-1
st33=-1
st34=-1
st35=-1
st36=-1
st37=-1
st38=-1
st39=-1
st40=-1
st41=-1
st42=-1
st43=-1
st44=-1
st45=-1
st46=-1
st47=-1
st48=-1
st49=-1
st50=-1
st51=-1
st52=-1
st53=-1
st54=-1
st55=-1
st56=-1
st57=-1
```

```
st99=-1
st101=1 %%%
t06st=1
!!
 st__=-1
!!
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog4:
GOSUB menu4
std4:
ARRAY.LOAD
sel4$[],st00$,st01$,st14$,st02$,st03$,st04$,st05$,st06$,st15$,st16$,st17$,st18$,st19$
,st07$,st08$,st20$,st21$,st22$,st23$,st24$,st25$,st26$,st27$,st28$,st29$,st30$,st31$,
st32$,st09$,st33$,st34$,st35$,st36$,st10$,st37$,st38$,st39$,st40$,st41$,st11$,st42$,s
t43$,st44$,st45$,st46$,st47$,st48$,st49$,st50$,st51$,st52$,st53$,st54$,st55$,st12$,st
56$,st13$,st57$,st99$,st100$,st101$,st60$,"Ok"
DIALOG.SELECT sel4,sel4$[],"Offene Sternhaufen und Kugelsternhaufen:
Darstellung/Projektion:"
IF sel4=1: st00=st00*-1:IF st00=-1 THEN RETURN:ENDIF
IF sel4=2: st01=st01*-1:ENDIF
IF sel4=3: st14=st14*-1:ENDIF
IF sel4=4: st02=st02*-1:ENDIF
IF sel4=5: st03=st03*-1:ENDIF
IF sel4=6: st04=st04*-1:ENDIF
IF sel4=7: st05=st05*-1:ENDIF
IF sel4=8: st06=st06*-1:ENDIF
IF sel4=9: st15=st15*-1:ENDIF
IF sel4=10:st16=st16*-1:ENDIF
IF sel4=11:st17=st17*-1:ENDIF
IF sel4=12:st18=st18*-1:ENDIF
IF sel4=13:st19=st19*-1:ENDIF
IF sel4=14:st07=st07*-1:ENDIF
IF sel4=15:st08=st08*-1:ENDIF
IF sel4=16:st20=st20*-1:ENDIF
IF sel4=17:st21=st21*-1:ENDIF
IF sel4=18:st22=st22*-1:ENDIF
IF sel4=19:st23=st23*-1:ENDIF
IF sel4=20:st24=st24*-1:ENDIF
IF sel4=21:st25=st25*-1:ENDIF
IF sel4=22:st26=st26*-1:ENDIF
IF sel4=23:st27=st27*-1:ENDIF
IF sel4=24:st28=st28*-1:ENDIF
IF sel4=25:st29=st29*-1:ENDIF
IF sel4=26:st30=st30*-1:ENDIF
IF sel4=27:st31=st31*-1:ENDIF
IF sel4=28:st32=st32*-1:ENDIF
IF sel4=29:st09=st09*-1:ENDIF
IF sel4=30:st33=st33*-1:ENDIF
IF sel4=31:st34=st34*-1:ENDIF
IF sel4=32:st35=st35*-1:ENDIF
IF sel4=33:st36=st36*-1:ENDIF
IF sel4=34:st10=st10*-1:ENDIF
IF sel4=35:st37=st37*-1:ENDIF
IF sel4=36:st38=st38*-1:ENDIF
IF sel4=37:st39=st39*-1:ENDIF
IF sel4=38:st40=st40*-1:ENDIF
IF sel4=39:st41=st41*-1:ENDIF
IF sel4=40:st11=st11*-1:ENDIF
IF sel4=41:st42=st42*-1:ENDIF
IF sel4=42:st43=st43*-1:ENDIF
IF sel4=43:st44=st44*-1:ENDIF
IF sel4=44:st45=st45*-1:ENDIF
IF sel4=45:st46=st46*-1:ENDIF
IF sel4=46:st47=st47*-1:ENDIF
IF sel4=47:st48=st48*-1:ENDIF
IF sel4=48:st49=st49*-1:ENDIF
IF sel4=49:st50=st50*-1:ENDIF
IF sel4=50:st51=st51*-1:ENDIF
IF sel4=51:st52=st52*-1:ENDIF
IF sel4=52:st53=st53*-1:ENDIF
IF sel4=53:st54=st54*-1:ENDIF
IF sel4=54:st55=st55*-1:ENDIF
IF sel4=55:st12=st12*-1:ENDIF
IF sel4=56:st56=st56*-1:ENDIF
IF sel4=57:st57=st57*-1:ENDIF
```

```
IF sel4=58:st13=st13*-1:ENDIF
!!
 IF sel4=_:st__=st__*-1:ENDIF
!!
IF sel4=59:GOSUB streset: st99=st99*-1:ENDIF
IF sel4=60
 GOSUB dlgvgr
 vgr_st=_vgr:vgr=vgr_st
ENDIF
IF sel4=61:st101=st101*-1:ENDIF
IF sel4=62:t06st=t06st*-1:ENDIF
IF sel4=63:RETURN:          ENDIF
GOSUB menu4
GOTO std4
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu4:
IF st00=1: st00$=smb$+"  Ebene an":                                        ENDIF
IF st00=-1:st00$=   "     Ebene aus":                                      ENDIF
IF st01=1: st01$=smb$+"  Plejaden ["+STR$(ROUND(st_d01,1))+"pc]":          ENDIF
IF st01=-1:st01$=   "   Plejaden ["+STR$(ROUND(st_d01,1))+"pc]":          ENDIF
IF st14=1: st14$=smb$+"  Winnecke 4 ["+STR$(ROUND(st_d02,1))+"pc]":        ENDIF
IF st14=-1:st14$=   "   Winnecke 4 ["+STR$(ROUND(st_d02,1))+"pc]":        ENDIF
IF st02=1: st02$=smb$+"  Praesepe ["+STR$(ROUND(st_d03,1))+"pc]":          ENDIF
IF st02=-1:st02$=   "   Praesepe ["+STR$(ROUND(st_d03,1))+"pc]":          ENDIF
IF st03=1: st03$=smb$+"  Ptolemaeus ["+STR$(ROUND(st_d04,1))+"pc]":        ENDIF
IF st03=-1:st03$=   "   Ptolemaeus ["+STR$(ROUND(st_d04,1))+"pc]":        ENDIF
IF st04=1: st04$=smb$+"  M39 ["+STR$(ROUND(st_d05,1))+"pc]":               ENDIF
IF st04=-1:st04$=   "   M39 ["+STR$(ROUND(st_d05,1))+"pc]":               ENDIF
IF st05=1: st05$=smb$+"  M34 ["+STR$(ROUND(st_d06,1))+"pc]":               ENDIF
IF st05=-1:st05$=   "   M34 ["+STR$(ROUND(st_d06,1))+"pc]":               ENDIF
IF st06=1: st06$=smb$+"  M6 ["+STR$(ROUND(st_d07,1))+"pc]":                ENDIF
IF st06=-1:st06$=   "   M6 ["+STR$(ROUND(st_d07,1))+"pc]":                ENDIF
IF st15=1: st15$=smb$+"  M47 ["+STR$(ROUND(st_d08,1))+"pc]":               ENDIF
IF st15=-1:st15$=   "   M47 ["+STR$(ROUND(st_d08,1))+"pc]":               ENDIF
IF st16=1: st16$=smb$+"  M23 ["+STR$(ROUND(st_d09,1))+"pc]":               ENDIF
IF st16=-1:st16$=   "   M23 ["+STR$(ROUND(st_d09,1))+"pc]":               ENDIF
IF st17=1: st17$=smb$+"  M25 ["+STR$(ROUND(st_d10,1))+"pc]":               ENDIF
IF st17=-1:st17$=   "   M25 ["+STR$(ROUND(st_d10,1))+"pc]":               ENDIF
IF st18=1: st18$=smb$+"  M41 ["+STR$(ROUND(st_d11,1))+"pc]":               ENDIF
IF st18=-1:st18$=   "   M41 ["+STR$(ROUND(st_d11,1))+"pc]":               ENDIF
IF st19=1: st19$=smb$+"  M73 ["+STR$(ROUND(st_d12,1))+"pc]":               ENDIF
IF st19=-1:st19$=   "   M73 ["+STR$(ROUND(st_d12,1))+"pc]":               ENDIF
IF st07=1: st07$=smb$+"  M48 ["+STR$(ROUND(st_d13,1))+"pc]":               ENDIF
IF st07=-1:st07$=   "   M48 ["+STR$(ROUND(st_d13,1))+"pc]":               ENDIF
IF st08=1: st08$=smb$+"  M67 ["+STR$(ROUND(st_d14,1))+"pc]":               ENDIF
IF st08=-1:st08$=   "   M67 ["+STR$(ROUND(st_d14,1))+"pc]":               ENDIF
IF st20=1: st20$=smb$+"  M50 ["+STR$(ROUND(st_d15,1))+"pc]":               ENDIF
IF st20=-1:st20$=   "   M50 ["+STR$(ROUND(st_d15,1))+"pc]":               ENDIF
IF st21=1: st21$=smb$+"  M35 ["+STR$(ROUND(st_d16,1))+"pc]":               ENDIF
IF st21=-1:st21$=   "   M35 ["+STR$(ROUND(st_d16,1))+"pc]":               ENDIF
IF st22=1: st22$=smb$+"  M93 ["+STR$(ROUND(st_d17/10^3,1))+"kpc]":         ENDIF
IF st22=-1:st22$=   "   M93 ["+STR$(ROUND(st_d17/10^3,1))+"kpc]":         ENDIF
IF st23=1: st23$=smb$+"  M38 ["+STR$(ROUND(st_d18/10^3,1))+"kpc]":         ENDIF
IF st23=-1:st23$=   "   M38 ["+STR$(ROUND(st_d18/10^3,1))+"kpc]":         ENDIF
IF st24=1: st24$=smb$+"  M29 ["+STR$(ROUND(st_d19/10^3,1))+"kpc]":         ENDIF
IF st24=-1:st24$=   "   M29 ["+STR$(ROUND(st_d19/10^3,1))+"kpc]":         ENDIF
IF st25=1: st25$=smb$+"  M36 ["+STR$(ROUND(st_d20/10^3,1))+"kpc]":         ENDIF
IF st25=-1:st25$=   "   M36 ["+STR$(ROUND(st_d20/10^3,1))+"kpc]":         ENDIF
IF st26=1: st26$=smb$+"  M18 ["+STR$(ROUND(st_d21/10^3,1))+"kpc]":         ENDIF
IF st26=-1:st26$=   "   M18 ["+STR$(ROUND(st_d21/10^3,1))+"kpc]":         ENDIF
IF st28=1: st28$=smb$+"  M21 ["+STR$(ROUND(st_d23/10^3,1))+"kpc]":         ENDIF
IF st28=-1:st28$=   "   M21 ["+STR$(ROUND(st_d23/10^3,1))+"kpc]":         ENDIF
IF st27=1: st27$=smb$+"  M37 ["+STR$(ROUND(st_d22/10^3,1))+"kpc]":         ENDIF
IF st27=-1:st27$=   "   M37 ["+STR$(ROUND(st_d22/10^3,1))+"kpc]":         ENDIF
IF st29=1: st29$=smb$+"  M52 ["+STR$(ROUND(st_d24/10^3,1))+"kpc]":         ENDIF
IF st29=-1:st29$=   "   M52 ["+STR$(ROUND(st_d24/10^3,1))+"kpc]":         ENDIF
IF st30=1: st30$=smb$+"  M46 ["+STR$(ROUND(st_d25/10^3,1))+"kpc]":         ENDIF
IF st30=-1:st30$=   "   M46 ["+STR$(ROUND(st_d25/10^3,1))+"kpc]":         ENDIF
IF st31=1: st31$=smb$+"  M26 ["+STR$(ROUND(st_d26/10^3,1))+"kpc]":         ENDIF
IF st31=-1:st31$=   "   M26 ["+STR$(ROUND(st_d26/10^3,1))+"kpc]":         ENDIF
IF st32=1: st32$=smb$+"  Wildenten ["+STR$(ROUND(st_d27/10^3,1))+"kpc]":   ENDIF
IF st32=-1:st32$=   "   Wildenten ["+STR$(ROUND(st_d27/10^3,1))+"kpc]":   ENDIF
IF st09=1: st09$=smb$+"  M4 ["+STR$(ROUND(st_d28/10^3,1))+"kpc]":          ENDIF
IF st09=-1:st09$=   "   M4 ["+STR$(ROUND(st_d28/10^3,1))+"kpc]":          ENDIF
IF st33=1: st33$=smb$+"  M103 ["+STR$(ROUND(st_d29/10^3,1))+"kpc]":        ENDIF
```

```
IF st33=-1:st33$=   "      M103 ["+STR$(ROUND(st_d29/10^3,1))+"kpc]":           ENDIF
IF st34=1: st34$=smb$+"  M22 ["+STR$(ROUND(st_d30/10^3,1))+"kpc]":           ENDIF
IF st34=-1:st34$=   "      M22 ["+STR$(ROUND(st_d30/10^3,1))+"kpc]":           ENDIF
IF st35=1: st35$=smb$+"  M71 ["+STR$(ROUND(st_d31/10^3,1))+"kpc]":           ENDIF
IF st35=-1:st35$=   "      M71 ["+STR$(ROUND(st_d31/10^3,1))+"kpc]":           ENDIF
IF st36=1: st36$=smb$+"  M10 ["+STR$(ROUND(st_d32/10^3,1))+"kpc]":           ENDIF
IF st36=-1:st36$=   "      M10 ["+STR$(ROUND(st_d32/10^3,1))+"kpc]":           ENDIF
IF st10=1: st10$=smb$+"  "+_go$+" Haufen ["+STR$(ROUND(st_d33/10^3,1))+"kpc]":  ENDIF
IF st10=-1:st10$=   "      "+_go$+" Haufen ["+STR$(ROUND(st_d33/10^3,1))+"kpc]":ENDIF
IF st37=1: st37$=smb$+"  M12 ["+STR$(ROUND(st_d34/10^3,1))+"kpc]":           ENDIF
IF st37=-1:st37$=   "      M12 ["+ STR$(ROUND(st_d34/10^3,1))+"kpc]":           ENDIF
IF st38=1: st38$=smb$+"  M55 ["+ STR$(ROUND(st_d35/10^3,1))+"kpc]":           ENDIF
IF st38=-1:st38$=   "      M55 ["+ STR$(ROUND(st_d35/10^3,1))+"kpc]":           ENDIF
IF st39=1: st39$=smb$+"  M28 ["+ STR$(ROUND(st_d36/10^3,1))+"kpc]":           ENDIF
IF st39=-1:st39$=   "      M28 ["+ STR$(ROUND(st_d36/10^3,1))+"kpc]":           ENDIF
IF st40=1: st40$=smb$+"  M107 ["+STR$(ROUND(st_d37/10^3,1))+"kpc]":           ENDIF
IF st40=-1:st40$=   "      M107 ["+STR$(ROUND(st_d37/10^3,1))+"kpc]":           ENDIF
IF st41=1: st41$=smb$+"  M62 ["+ STR$(ROUND(st_d38/10^3,1))+"kpc]":           ENDIF
IF st41=-1:st41$=   "      M62 ["+ STR$(ROUND(st_d38/10^3,1))+"kpc]":           ENDIF
IF st11=1: st11$=smb$+"  M13 ["+ STR$(ROUND(st_d39/10^3,1))+"kpc]":           ENDIF
IF st11=-1:st11$=   "      M13 ["+ STR$(ROUND(st_d39/10^3,1))+"kpc]":           ENDIF
IF st42=1: st42$=smb$+"  M5 ["+  STR$(ROUND(st_d40/10^3,1))+"kpc]":           ENDIF
IF st42=-1:st42$=   "      M5 ["+  STR$(ROUND(st_d40/10^3,1))+"kpc]":           ENDIF
IF st43=1: st43$=smb$+"  M9 ["+  STR$(ROUND(st_d41/10^3,1))+"kpc]":           ENDIF
IF st43=-1:st43$=   "      M9 ["+  STR$(ROUND(st_d41/10^3,1))+"kpc]":           ENDIF
IF st44=1: st44$=smb$+"  M92 ["+ STR$(ROUND(st_d42/10^3,1))+"kpc]":           ENDIF
IF st44=-1:st44$=   "      M92 ["+ STR$(ROUND(st_d42/10^3,1))+"kpc]":           ENDIF
IF st45=1: st45$=smb$+"  M30 ["+ STR$(ROUND(st_d43/10^3,1))+"kpc]":           ENDIF
IF st45=-1:st45$=   "      M30 ["+ STR$(ROUND(st_d43/10^3,1))+"kpc]":           ENDIF
IF st46=1: st46$=smb$+"  M19 ["+ STR$(ROUND(st_d44/10^3,1))+"kpc]":           ENDIF
IF st46=-1:st46$=   "      M19 ["+ STR$(ROUND(st_d44/10^3,1))+"kpc]":           ENDIF
IF st47=1: st47$=smb$+"  M69 ["+ STR$(ROUND(st_d45/10^3,1))+"kpc]":           ENDIF
IF st47=-1:st47$=   "      M69 ["+ STR$(ROUND(st_d45/10^3,1))+"kpc]":           ENDIF
IF st48=1: st48$=smb$+"  M70 ["+ STR$(ROUND(st_d46/10^3,1))+"kpc]":           ENDIF
IF st48=-1:st48$=   "      M70 ["+ STR$(ROUND(st_d46/10^3,1))+"kpc]":           ENDIF
IF st49=1: st49$=smb$+"  M14 ["+ STR$(ROUND(st_d47/10^3,1))+"kpc]":           ENDIF
IF st49=-1:st49$=   "      M14 ["+ STR$(ROUND(st_d47/10^3,1))+"kpc]":           ENDIF
IF st50=1: st50$=smb$+"  M80 ["+ STR$(ROUND(st_d48/10^3,1))+"kpc]":           ENDIF
IF st50=-1:st50$=   "      M80 ["+ STR$(ROUND(st_d48/10^3,1))+"kpc]":           ENDIF
IF st51=1: st51$=smb$+"  M56 ["+ STR$(ROUND(st_d49/10^3,1))+"kpc]":           ENDIF
IF st51=-1:st51$=   "      M56 ["+ STR$(ROUND(st_d49/10^3,1))+"kpc]":           ENDIF
IF st52=1: st52$=smb$+"  M2 ["+  STR$(ROUND(st_d50/10^3,1))+"kpc]":           ENDIF
IF st52=-1:st52$=   "      M2 ["+  STR$(ROUND(st_d50/10^3,1))+"kpc]":           ENDIF
IF st53=1: st53$=smb$+"  M68 ["+ STR$(ROUND(st_d51/10^3,1))+"kpc]":           ENDIF
IF st53=-1:st53$=   "      M68 ["+ STR$(ROUND(st_d51/10^3,1))+"kpc]":           ENDIF
IF st54=1: st54$=smb$+"  M3 ["+  STR$(ROUND(st_d52/10^3,1))+"kpc]":           ENDIF
IF st54=-1:st54$=   "      M3 ["+  STR$(ROUND(st_d52/10^3,1))+"kpc]":           ENDIF
IF st55=1: st55$=smb$+"  M15 ["+ STR$(ROUND(st_d53/10^3,1))+"kpc]":           ENDIF
IF st55=-1:st55$=   "      M15 ["+ STR$(ROUND(st_d53/10^3,1))+"kpc]":           ENDIF
IF st12=1: st12$=smb$+"  M79 ["+ STR$(ROUND(st_d54/10^3,1))+"kpc]":           ENDIF
IF st12=-1:st12$=   "      M79 ["+ STR$(ROUND(st_d54/10^3,1))+"kpc]":           ENDIF
IF st56=1: st56$=smb$+"  M72 ["+ STR$(ROUND(st_d55/10^3,1))+"kpc]":           ENDIF
IF st56=-1:st56$=   "      M72 ["+ STR$(ROUND(st_d55/10^3,1))+"kpc]":           ENDIF
IF st57=1: st57$=smb$+"  M75 ["+ STR$(ROUND(st_d57/10^3,1))+"kpc]":           ENDIF
IF st57=-1:st57$=   "      M75 ["+ STR$(ROUND(st_d57/10^3,1))+"kpc]":           ENDIF
IF st13=1: st13$=smb$+"  M53 ["+ STR$(ROUND(st_d56/10^3,1))+"kpc]":           ENDIF
IF st13=-1:st13$=   "      M53 ["+ STR$(ROUND(st_d56/10^3,1))+"kpc]":           ENDIF
!!
 IF st__=1:st__$=smb$+"  __ [__pc]":ENDIF
 IF st__=-1: st__$="     __ [__pc]":ENDIF
!!
st99$=smq$+"  Projektion an/aus"
st100$=smq$+"  Vergrößerung: "+INT$(vgr_st)+" ×"
IF st101=-1:st101$=_smbl$+"    Symbol":  ENDIF
IF st101=1: st101$=_mst$+ "    Maßstab": ENDIF
IF t06st=1: st60$=  smb$+   " Text":     ENDIF
IF t06st=-1:st60$=         "    Text aus":ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
streset:
IF st99=1
 st01=-1
 st02=-1
 st03=-1
 st04=-1
 st05=-1
```

```
  st06=-1
  st07=-1
  st08=-1
  st09=-1
  st10=-1
  st11=-1
  st12=-1
  st13=-1
  st14=-1
  st15=-1
  st16=-1
  st17=-1
  st18=-1
  st19=-1
  st20=-1
  st21=-1
  st22=-1
  st23=-1
  st24=-1
  st25=-1
  st26=-1
  st27=-1
  st28=-1
  st29=-1
  st30=-1
  st31=-1
  st32=-1
  st33=-1
  st34=-1
  st35=-1
  st36=-1
  st37=-1
  st38=-1
  st39=-1
  st40=-1
  st41=-1
  st42=-1
  st43=-1
  st44=-1
  st45=-1
  st46=-1
  st47=-1
  st48=-1
  st49=-1
  st50=-1
  st51=-1
  st52=-1
  st53=-1
  st54=-1
  st55=-1
  st56=-1
  st57=-1
ELSE
  st01=1
  st02=1
  st03=1
  st04=1
  st05=1
  st06=1
  st07=1
  st08=1
  st09=1
  st10=1
  st11=1
  st12=1
  st13=1
  st14=1
  st15=1
  st16=1
  st17=1
  st18=1
  st19=1
  st20=1
  st21=1
  st22=1
  st23=1
  st24=1
```

```
    st25=1
    st26=1
    st27=1
    st28=1
    st29=1
    st30=1
    st31=1
    st32=1
    st33=1
    st34=1
    st35=1
    st36=1
    st37=1
    st38=1
    st39=1
    st40=1
    st41=1
    st42=1
    st43=1
    st44=1
    st45=1
    st46=1
    st47=1
    st48=1
    st49=1
    st50=1
    st51=1
    st52=1
    st53=1
    st54=1
    st55=1
    st56=1
    st57=1
ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Nebel
dialog5prm:
nb00=1
nb01=-1
nb02=-1
nb10=-1
nb11=-1
nb12=-1
nb14=-1
nb15=-1
nb16=-1
nb17=-1
nb18=-1
nb19=-1
nb20=-1
nb21=-1
nb22=-1
nb101=1 %%%%
nb99=-1
t06nb=1
!!
 nb__=-1
!!
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog5:
GOSUB menu5
std5:
ARRAY.LOAD sel5$[],nb00$,nb15$,nb01$,nb16$,nb17$,nb18$,
nb19$,nb20$,nb21$,nb22$,nb10$,nb11$,nb12$,nb14$,nb99$,nb100$,nb101$,nb23$,"Ok"
DIALOG.SELECT sel5,sel5$[],"Nebel, Planetare Nebel und Supernovae:
Darstellung/Projektion:"
IF sel5=1: nb00=nb00*-1:IF nb00=-1 THEN RETURN:ENDIF
IF sel5=2: nb15=nb15*-1:ENDIF
IF sel5=3: nb01=nb01*-1:ENDIF
IF sel5=4: nb16=nb16*-1:ENDIF
IF sel5=5: nb17=nb17*-1:ENDIF
IF sel5=6: nb18=nb18*-1:ENDIF
IF sel5=7: nb19=nb19*-1:ENDIF
IF sel5=8: nb20=nb20*-1:ENDIF
```

```
IF sel5=9: nb21=nb21*-1:ENDIF
IF sel5=10:nb22=nb22*-1:ENDIF
IF sel5=11:nb10=nb10*-1:ENDIF
IF sel5=12:nb11=nb11*-1:ENDIF
IF sel5=13:nb12=nb12*-1:ENDIF
IF sel5=14:nb14=nb14*-1:ENDIF
!!
 IF sel5=__:nb__=nb__*-1:ENDIF
!!
IF sel5=15:GOSUB nbreset: nb99=nb99*-1:ENDIF
IF sel5=16
 GOSUB dlgvgr
 vgr_nb=_vgr:vgr=vgr_nb
ENDIF
IF sel5=17:nb101=nb101*-1:ENDIF
IF sel5=18:t06nb=t06nb*-1:ENDIF
IF sel5=19:RETURN:        ENDIF
GOSUB menu5
GOTO std5
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu5:
IF nb00=1: nb00$=smb$+"  Ebene an":                              ENDIF
IF nb00=-1:nb00$=  "   Ebene aus":                              ENDIF
IF nb15=1: nb15$=smb$+"  Hantelnebel ["+STR$(ROUND(nb_d01,1))+"pc]":     ENDIF
IF nb15=-1:nb15$=  "   Hantelnebel ["+STR$(ROUND(nb_d01,1))+"pc]":     ENDIF
IF nb01=1: nb01$=smb$+"  Orionnebel ["+STR$(ROUND(nb_d02,1))+"pc]":      ENDIF
IF nb01=-1:nb01$=  "   Orionnebel ["+STR$(ROUND(nb_d02,1))+"pc]":      ENDIF
IF nb16=1: nb16$=smb$+"  M78 ["+STR$(ROUND(nb_d03,1))+"pc]":           ENDIF
IF nb16=-1:nb16$=  "   M78 ["+STR$(ROUND(nb_d03,1))+"pc]":           ENDIF
IF nb17=1: nb17$=smb$+"  Eulennebel ["+STR$(ROUND(nb_d04,1))+"pc]":      ENDIF
IF nb17=-1:nb17$=  "   Eulennebel ["+STR$(ROUND(nb_d04,1))+"pc]":      ENDIF
IF nb18=1: nb18$=smb$+"  M76 ["+STR$(ROUND(nb_d05,1))+"pc]":           ENDIF
IF nb18=-1:nb18$=  "   M76 ["+STR$(ROUND(nb_d05,1))+"pc]":           ENDIF
IF nb19=1: nb19$=smb$+"  Ringnebel ["+STR$(ROUND(nb_d06,1))+"pc]":       ENDIF
IF nb19=-1:nb19$=  "   Ringnebel ["+STR$(ROUND(nb_d06,1))+"pc]":       ENDIF
IF nb20=1: nb20$=smb$+"  Lagunennebel ["+STR$(ROUND(nb_d07/1000,1))+"kpc]":  ENDIF
IF nb20=-1:nb20$=  "   Lagunennebel ["+STR$(ROUND(nb_d07/1000,1))+"kpc]":  ENDIF
IF nb21=1: nb21$=smb$+"  Trifidnebel ["+STR$(ROUND(nb_d08/1000,1))+"kpc]":   ENDIF
IF nb21=-1:nb21$=  "   Trifidnebel ["+STR$(ROUND(nb_d08/1000,1))+"kpc]":   ENDIF
IF nb22=1: nb22$=smb$+"  Omeganebel ["+STR$(ROUND(nb_d09/1000,1))+"kpc]":    ENDIF
IF nb22=-1:nb22$=  "   Omeganebel ["+STR$(ROUND(nb_d09/1000,1))+"kpc]":    ENDIF
IF nb10=1: nb10$=smb$+"  Krebsnebel ["+STR$(ROUND(nb_d10/1000,1))+"kpc]":    ENDIF
IF nb10=-1:nb10$=  "   Krebsnebel ["+STR$(ROUND(nb_d10/1000,1))+"kpc]":    ENDIF
IF nb11=1: nb11$=smb$+"  Adlernebel ["+STR$(ROUND(nb_d11/1000,1))+"kpc]":    ENDIF
IF nb11=-1:nb11$=  "   Adlernebel ["+STR$(ROUND(nb_d11/1000,1))+"kpc]":    ENDIF
IF nb12=1: nb12$=smb$+"  Stundenglasnebel ["+STR$(ROUND(nb_d12/1000,1))+"kpc]":ENDIF
IF nb12=-1:nb12$=  "   Stundenglasnebel ["+STR$(ROUND(nb_d12/1000,1))+"kpc]":ENDIF
IF nb14=1: nb14$=smb$+"  V838 ["+STR$(ROUND(nb_d13/1000,1))+"kpc]":       ENDIF
IF nb14=-1:nb14$=  "   V838 ["+STR$(ROUND(nb_d13/1000,1))+"kpc]":       ENDIF
!!
 IF nb__=1:nb__$=smb$+"  __ [__pc]":ENDIF
 IF nb__=-1: nb__$="      __ [__pc]":ENDIF
!!
nb99$=smq$+"  Projektion an/aus"
nb100$=smq$+"  Vergrößerung: "+INT$(vgr_nb)+" ×"
IF nb101=-1:nb101$=_smbl$+"    Symbol":  ENDIF
IF nb101=1: nb101$=_mst$+ "   Maßstab": ENDIF
IF t06nb=1: nb23$= smb$+    "  Text":     ENDIF
IF t06nb=-1:nb23$=         "   Text aus":ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
nbreset:
IF nb99=1
 nb01=-1
 nb02=-1
 nb10=-1
 nb11=-1
 nb12=-1
 nb14=-1
 nb15=-1
 nb16=-1
 nb17=-1
 nb18=-1
 nb19=-1
```

```
   nb20=-1
   nb21=-1
   nb22=-1
ELSE
  nb01=1
  nb02=1
  nb10=1
  nb11=1
  nb12=1
  nb14=1
  nb15=1
  nb16=1
  nb17=1
  nb18=1
  nb19=1
  nb20=1
  nb21=1
  nb22=1
ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Milchstraße
dialog6prm:
gm00=1
gm01=-1
gm02=-1
gm03=-1
gm04=-1
gm05=-1
gm06=-1
gm99=-1
t06gm=1
!!
  gm__=-1
!!
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog6:
GOSUB menu6
std6:
ARRAY.LOAD sel6$[],gm00$,gm05$,gm06$,gm01$,gm02$,gm04$,gm03$,gm99$,gm30$,"Ok"
DIALOG.SELECT sel6,sel6$[],"Milchstraßen Objekte: Darstellung/Projektion:"
IF sel6=1:gm00=gm00*-1:IF gm00=-1 THEN RETURN:ENDIF
IF sel6=2:gm05=gm05*-1:ENDIF
IF sel6=3:gm06=gm06*-1:ENDIF
IF sel6=4:gm01=gm01*-1:ENDIF
IF sel6=5:gm02=gm02*-1:ENDIF
IF sel6=6:gm04=gm04*-1:ENDIF
IF sel6=7:gm03=gm03*-1:ENDIF
!!
  IF sel6=__:gm__=gm__*-1:ENDIF
!!
IF sel6=8:GOSUB gmreset: gm99=gm99*-1:ENDIF
!!
IF sel6=9
 GOSUB dlgvgr
 vgr_gm=_vgr:vgr=vgr_gm
ENDIF
!!
IF sel6=9:t06gm=t06gm*-1:ENDIF
IF sel6=10:RETURN:      ENDIF
GOSUB menu6
GOTO std6
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu6:
IF gm00=1:gm00$= smb$+"  Ebene an":                                        ENDIF
IF gm00=-1:gm00$=  "  Ebene aus":                                          ENDIF
IF gm05=1:gm05$=smb$+"   Sagittarius Wolke ["+STR$(ROUND(gm_d02/1000,1))+"kpc]":ENDIF
IF gm05=-1:gm05$= "   Sagittarius Wolke ["+STR$(ROUND(gm_d02/1000,1))+"kpc]":ENDIF
IF gm06=1:gm06$=smb$+"   Zentrum ["+STR$(ROUND(gm_d01/1000,1))+"kpc]":       ENDIF
IF gm06=-1:gm06$= "   Zentrum ["+STR$(ROUND(gm_d01/1000,1))+"kpc]":         ENDIF
IF gm01=1:gm01$=smb$+"   Sag DEG ["+STR$(ROUND(gm_d03/1000,1))+"kpc]":      ENDIF
IF gm01=-1:gm01$= "      Sag DEG ["+STR$(ROUND(gm_d03/1000,1))+"kpc]":      ENDIF
```

```
IF gm02=1:gm02$=smb$+"   M54 ["+STR$(ROUND(gm_d04/1000,1))+"kpc]":          ENDIF
IF gm02=-1:gm02$= "      M54 ["+STR$(ROUND(gm_d04/1000,1))+"kpc]":          ENDIF
IF gm03=1:gm03$=smb$+"   Große Wolke ["+STR$(ROUND(gm_d05/1000,1))+"kpc]":  ENDIF
IF gm03=-1:gm03$= "      Große Wolke ["+STR$(ROUND(gm_d05/1000,1))+"kpc]":  ENDIF
IF gm04=1:gm04$=smb$+"   Kleine Wolke ["+STR$(ROUND(gm_d06/1000,1))+"kpc]": ENDIF
IF gm04=-1:gm04$= "      Kleine Wolke ["+STR$(ROUND(gm_d06/1000,1))+"kpc]": ENDIF
!!
 IF gm__=1:gm__$=smb$+"    __ [__kpc]":ENDIF
 IF gm__=-1: gm__$="      __ [__kpc]":ENDIF
!!
gm99$=smq$+"  Projektion an/aus"
!gm100$=smq$+"  Vergrößerung: "+INT$(vgr_gm)+" ×"
IF t06gm=1: gm30$=smb$+"  Text":      ENDIF
IF t06gm=-1:gm30$=  "     Text aus":ENDIF
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
gmreset:
IF gm99=1
 gm01=-1
 gm02=-1
 gm03=-1
 gm04=-1
 gm05=-1
 gm06=-1
ELSE
 gm01=1
 gm02=1
 gm03=1
 gm04=1
 gm05=1
 gm06=1
ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Galaxien
dialog7prm:
gx00=1
gx01=-1
gx02=-1
gx03=-1
gx04=-1
gx05=-1
gx06=-1
gx07=-1
gx08=-1
gx09=-1
gx10=-1
gx11=-1
gx12=-1
gx13=-1
gx14=-1
gx15=-1
gx16=-1
gx17=-1
gx18=-1
gx19=-1
gx20=-1
gx21=-1
gx22=-1
gx23=-1
gx24=-1
gx25=-1
gx26=-1
gx27=-1
gx28=-1
gx29=-1
gx30=-1
gx31=-1
gx99=-1
gx101=1 %%%
t06gx=1
!!
 gx__=-1
!!
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```
dialog7:
GOSUB menu7
std7:
ARRAY.LOAD
sel7$[],gx00$,gx01$,gx05$,gx11$,gx12$,gx20$,gx13$,gx02$,gx27$,gx03$,gx21$,gx04$,gx10$
,gx29$,gx22$,gx28$,gx14$,gx23$,gx31$,gx15$,gx26$,gx30$,gx17$,gx19$,gx07$,gx06$,gx16$,
gx09$,gx08$,gx25$,gx18$,gx24$,gx99$,gx100$,gx101$,gx40$,"Ok"
DIALOG.SELECT sel7,sel7$[],"Galaxien: Darstellung/Projektion:"
IF sel7=1: gx00=gx00*-1:IF gx00=-1 THEN RETURN:ENDIF
IF sel7=2: gx01=gx01*-1:ENDIF
IF sel7=3: gx05=gx05*-1:ENDIF
IF sel7=4: gx11=gx11*-1:ENDIF
IF sel7=5: gx12=gx12*-1:ENDIF
IF sel7=6: gx20=gx20*-1:ENDIF
IF sel7=7: gx13=gx13*-1:ENDIF
IF sel7=8: gx02=gx02*-1:ENDIF
IF sel7=9: gx27=gx27*-1:ENDIF
IF sel7=10:gx03=gx03*-1:ENDIF
IF sel7=11:gx21=gx21*-1:ENDIF
IF sel7=12:gx04=gx04*-1:ENDIF
IF sel7=13:gx10=gx10*-1:ENDIF
IF sel7=14:gx29=gx29*-1:ENDIF
IF sel7=15:gx22=gx22*-1:ENDIF
IF sel7=16:gx28=gx28*-1:ENDIF
IF sel7=17:gx14=gx14*-1:ENDIF
IF sel7=18:gx23=gx23*-1:ENDIF
IF sel7=19:gx31=gx31*-1:ENDIF
IF sel7=20:gx15=gx15*-1:ENDIF
IF sel7=21:gx26=gx26*-1:ENDIF
IF sel7=22:gx30=gx30*-1:ENDIF
IF sel7=23:gx17=gx17*-1:ENDIF
IF sel7=24:gx19=gx19*-1:ENDIF
IF sel7=25:gx07=gx07*-1:ENDIF
IF sel7=26:gx06=gx06*-1:ENDIF
IF sel7=27:gx16=gx16*-1:ENDIF
IF sel7=28:gx09=gx09*-1:ENDIF
IF sel7=29:gx08=gx08*-1:ENDIF
IF sel7=30:gx25=gx25*-1:ENDIF
IF sel7=31:gx18=gx18*-1:ENDIF
IF sel7=32:gx24=gx24*-1:ENDIF
!!
  IF sel7=__:gx__=gx__*-1:ENDIF
!!
IF sel7=33:GOSUB gxreset: gx99=gx99*-1:ENDIF
IF sel7=34
 GOSUB dlgvgr
 vgr_gx=_vgr:vgr=vgr_gx
ENDIF
IF sel7=35:gx101=gx101*-1:ENDIF
IF sel7=36:t06gx=t06gx*-1:ENDIF
IF sel7=37:RETURN:ENDIF
GOSUB menu7
GOTO std7
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu7:
IF gx00=1: gx00$=smb$+"  Ebene an":                                      ENDIF
IF gx00=-1:gx00$=   "  Ebene aus":                                       ENDIF
IF gx01=1: gx01$=smb$+"  Andromeda ["+STR$(ROUND(gx_d01/10^6,1))+"Mpc]": ENDIF
IF gx01=-1:gx01$=   "  Andromeda ["+STR$(ROUND(gx_d01/10^3,1))+"kpc]": ENDIF
IF gx05=1: gx05$=smb$+"  Triangulum ["+STR$(ROUND(gx_d02/10^6,1))+"Mpc]":ENDIF
IF gx05=-1:gx05$=   "  Triangulum ["+STR$(ROUND(gx_d02/10^3,1))+"kpc]":ENDIF
IF gx11=1: gx11$=smb$+"  M81 ["+STR$(ROUND(gx_d03/10^6,1))+"Mpc]:      ENDIF
IF gx11=-1:gx11$=   "  M81 ["+STR$(ROUND(gx_d03/10^6,1))+"Mpc]:      ENDIF
IF gx12=1: gx12$=smb$+"  M82 ["+STR$(ROUND(gx_d04/10^6,1))+"Mpc]":     ENDIF
IF gx12=-1:gx12$=   "  M82 ["+STR$(ROUND(gx_d04/10^6,1))+"Mpc]":     ENDIF
IF gx20=1: gx20$=smb$+"  M94 ["+STR$(ROUND(gx_d05/10^6,1))+"Mpc]":     ENDIF
IF gx20=-1:gx20$=   "  M94 ["+STR$(ROUND(gx_d05/10^6,1))+"Mpc]":     ENDIF
IF gx13=1: gx13$=smb$+"  M83 ["+STR$(ROUND(gx_d06/10^6,1))+"Mpc]":     ENDIF
IF gx13=-1:gx13$=   "  M83 ["+STR$(ROUND(gx_d06/10^6,1))+"Mpc]":     ENDIF
IF gx02=1: gx02$=smb$+"  M101 ["+STR$(ROUND(gx_d07/10^6,1))+"Mpc]":    ENDIF
IF gx02=-1:gx02$=   "  M101 ["+STR$(ROUND(gx_d07/10^6,1))+"Mpc]":    ENDIF
IF gx27=1: gx27$=smb$+"  M106 ["+STR$(ROUND(gx_d08/10^6,1))+"Mpc]":    ENDIF
IF gx27=-1:gx27$=   "  M106 ["+STR$(ROUND(gx_d08/10^6,1))+"Mpc]":    ENDIF
IF gx21=1: gx21$=smb$+"  M95 ["+STR$(ROUND(gx_d09/10^6,1))+"Mpc]":     ENDIF
IF gx21=-1:gx21$=   "  M95 ["+STR$(ROUND(gx_d09/10^6,1))+"Mpc]":     ENDIF
```

```
IF gx03=1: gx03$=smb$+"   M51 ["+STR$(ROUND(gx_d10/10^6,1))+"Mpc]": ENDIF
IF gx03=-1:gx03$=   "     M51 ["+STR$(ROUND(gx_d10/10^6,1))+"Mpc]": ENDIF
IF gx04=1: gx04$=smb$+"   M104 ["+STR$(ROUND(gx_d11/10^6,1))+"Mpc]":ENDIF
IF gx04=-1:gx04$=   "     M104 ["+STR$(ROUND(gx_d11/10^6,1))+"Mpc]":ENDIF
IF gx10=1: gx10$=smb$+"   M74 ["+STR$(ROUND(gx_d13/10^6,1))+"Mpc]": ENDIF
IF gx10=-1:gx10$=   "     M74 ["+STR$(ROUND(gx_d13/10^6,1))+"Mpc]": ENDIF
IF gx29=1: gx29$=smb$+"   M108 ["+STR$(ROUND(gx_d16/10^6,1))+"Mpc]":ENDIF
IF gx29=-1:gx29$=   "     M108 ["+STR$(ROUND(gx_d16/10^6,1))+"Mpc]":ENDIF
IF gx22=1: gx22$=smb$+"   M96 ["+STR$(ROUND(gx_d14/10^6,1))+"Mpc]": ENDIF
IF gx22=-1:gx22$=   "     M96 ["+STR$(ROUND(gx_d14/10^6,1))+"Mpc]": ENDIF
IF gx28=1: gx28$=smb$+"   M105 ["+STR$(ROUND(gx_d17/10^6,1))+"Mpc]":ENDIF
IF gx28=-1:gx28$=   "     M105 ["+STR$(ROUND(gx_d17/10^6,1))+"Mpc]":ENDIF
IF gx14=1: gx14$=smb$+"   M84 ["+STR$(ROUND(gx_d18/10^6,1))+"Mpc]": ENDIF
IF gx14=-1:gx14$=   "     M84 ["+STR$(ROUND(gx_d18/10^6,1))+"Mpc]": ENDIF
IF gx23=1: gx23$=smb$+"   M98 ["+STR$(ROUND(gx_d19/10^6,1))+"Mpc]": ENDIF
IF gx23=-1:gx23$=   "     M98 ["+STR$(ROUND(gx_d19/10^6,1))+"Mpc]": ENDIF
IF gx31=1: gx31$=smb$+"   M77 ["+STR$(ROUND(gx_d20/10^6,1))+"Mpc]": ENDIF
IF gx31=-1:gx31$=   "     M77 ["+STR$(ROUND(gx_d20/10^6,1))+"Mpc]": ENDIF
IF gx15=1: gx15$=smb$+"   M85 ["+STR$(ROUND(gx_d21/10^6,1))+"Mpc]": ENDIF
IF gx15=-1:gx15$=   "     M85 ["+STR$(ROUND(gx_d21/10^6,1))+"Mpc]": ENDIF
IF gx26=1: gx26$=smb$+"   M102 ["+STR$(ROUND(gx_d22/10^6,1))+"Mpc]":ENDIF
IF gx26=-1:gx26$=   "     M102 ["+STR$(ROUND(gx_d22/10^6,1))+"Mpc]":ENDIF
IF gx30=1: gx30$=smb$+"   M109 ["+STR$(ROUND(gx_d23/10^6,1))+"Mpc]":ENDIF
IF gx30=-1:gx30$=   "     M109 ["+STR$(ROUND(gx_d23/10^6,1))+"Mpc]":ENDIF
IF gx17=1: gx17$=smb$+"   M87 ["+STR$(ROUND(gx_d33/10^6,1))+"Mpc]": ENDIF
IF gx17=-1:gx17$=   "     M87 ["+STR$(ROUND(gx_d33/10^6,1))+"Mpc]": ENDIF
IF gx19=1: gx19$=smb$+"   M89 ["+STR$(ROUND(gx_d24/10^6,1))+"Mpc]": ENDIF
IF gx19=-1:gx19$=   "     M89 ["+STR$(ROUND(gx_d24/10^6,1))+"Mpc]": ENDIF
IF gx07=1: gx07$=smb$+"   M49 ["+STR$(ROUND(gx_d25/10^6,1))+"Mpc]": ENDIF
IF gx07=-1:gx07$=   "     M49 ["+STR$(ROUND(gx_d25/10^6,1))+"Mpc]": ENDIF
IF gx06=1: gx06$=smb$+"   M90 ["+STR$(ROUND(gx_d26/10^6,1))+"Mpc]": ENDIF
IF gx06=-1:gx06$=   "     M90 ["+STR$(ROUND(gx_d26/10^6,1))+"Mpc]": ENDIF
IF gx16=1: gx16$=smb$+"   M86 ["+STR$(ROUND(gx_d27/10^6,1))+"Mpc]": ENDIF
IF gx16=-1:gx16$=   "     M86 ["+STR$(ROUND(gx_d27/10^6,1))+"Mpc]": ENDIF
IF gx09=1: gx09$=smb$+"   M91 ["+STR$(ROUND(gx_d28/10^6,1))+"Mpc]": ENDIF
IF gx09=-1:gx09$=   "     M91 ["+STR$(ROUND(gx_d28/10^6,1))+"Mpc]": ENDIF
IF gx08=1: gx08$=smb$+"   M58 ["+STR$(ROUND(gx_d29/10^6,1))+"Mpc]": ENDIF
IF gx08=-1:gx08$=   "     M58 ["+STR$(ROUND(gx_d29/10^6,1))+"Mpc]": ENDIF
IF gx25=1: gx25$=smb$+"   M100 ["+STR$(ROUND(gx_d30/10^6,1))+"Mpc]":ENDIF
IF gx25=-1:gx25$=   "     M100 ["+STR$(ROUND(gx_d30/10^6,1))+"Mpc]":ENDIF
IF gx18=1: gx18$=smb$+"   M88 ["+STR$(ROUND(gx_d31/10^6,1))+"Mpc]": ENDIF
IF gx18=-1:gx18$=   "     M88 ["+STR$(ROUND(gx_d31/10^6,1))+"Mpc]": ENDIF
IF gx24=1: gx24$=smb$+"   M99 ["+STR$(ROUND(gx_d32/10^6,1))+"Mpc]": ENDIF
IF gx24=-1:gx24$=   "     M99 ["+STR$(ROUND(gx_d32/10^6,1))+"Mpc]": ENDIF
!!
 IF gx__=1:gx__$=smb$+"  ___  [Mpc]":ENDIF
 IF gx__=-1: gx__$="     ___  [Mpc]":ENDIF
!!
gx99$=smq$+"  Projektion an/aus"
gx100$=smq$+"  Vergrößerung: "+INT$(vgr_gx)+" ×"
IF gx101=-1:gx101$=_smbl$+"    Symbol": ENDIF
IF gx101=1: gx101$=_mst$+ "    Maßstab": ENDIF
IF t06gx=1: gx40$= smb$+    " Text":    ENDIF
IF t06gx=-1:gx40$=         "    Text aus":ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
gxreset:
IF gx99=1
 gx01=-1
 gx02=-1
 gx03=-1
 gx04=-1
 gx05=-1
 gx06=-1
 gx07=-1
 gx08=-1
 gx09=-1
 gx10=-1
 gx11=-1
 gx12=-1
 gx13=-1
 gx14=-1
 gx15=-1
 gx16=-1
 gx17=-1
 gx18=-1
 gx19=-1
```

```
  gx20=-1
  gx21=-1
  gx22=-1
  gx23=-1
  gx24=-1
  gx25=-1
  gx26=-1
  gx27=-1
  gx28=-1
  gx29=-1
  gx30=-1
  gx31=-1
  gx32=-1
  gx33=-1
ELSE
  gx01=1
  gx02=1
  gx03=1
  gx04=1
  gx05=1
  gx06=1
  gx07=1
  gx08=1
  gx09=1
  gx10=1
  gx11=1
  gx12=1
  gx13=1
  gx14=1
  gx15=1
  gx16=1
  gx17=1
  gx18=1
  gx19=1
  gx20=1
  gx21=1
  gx22=1
  gx23=1
  gx24=1
  gx25=1
  gx26=1
  gx27=1
  gx28=1
  gx29=1
  gx30=1
  gx31=1
  gx32=1
  gx33=1
ENDIF
RETURN
! % Dialog Galaxienhaufen %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog8prm:
gh00=1
gh01=-1
gh02=-1
gh03=-1
gh04=-1
gh05=-1
gh06=-1
gh07=-1
gh08=-1
gh09=-1
gh10=-1
gh11=-1
gh12=-1
gh13=-1
gh14=-1
gh15=-1
gh99=-1
t06gh=1
!!
  gh__=-1
!!
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog8:
GOSUB menu8
```

```
std8:
ARRAY.LOAD
sel8$[],gh00$,gh01$,gh03$,gh04$,gh06$,gh09$,gh02$,gh07$,gh10$,gh11$,gh05$,gh12$,gh13$
,gh14$,gh15$,gh08$,gh99$,gh30$,"Ok"
DIALOG.SELECT sel8,sel8$[],"Galaxien Haufen und Superhaufen: Darstellung/Projektion:"
IF sel8=1: gh00=gh00*-1:IF gh00=-1 THEN RETURN:ENDIF
IF sel8=2: gh01=gh01*-1:ENDIF
IF sel8=3: gh03=gh03*-1:ENDIF
IF sel8=4: gh04=gh04*-1:ENDIF
IF sel8=5: gh06=gh06*-1:ENDIF
IF sel8=6: gh09=gh09*-1:ENDIF
IF sel8=7: gh02=gh02*-1:ENDIF
IF sel8=8: gh07=gh07*-1:ENDIF
IF sel8=9: gh10=gh10*-1:ENDIF
IF sel8=10:gh11=gh11*-1:ENDIF
IF sel8=11:gh05=gh05*-1:ENDIF
IF sel8=12:gh12=gh12*-1:ENDIF
IF sel8=13:gh13=gh13*-1:ENDIF
IF sel8=14:gh14=gh14*-1:ENDIF
IF sel8=15:gh15=gh15*-1:ENDIF
IF sel8=16:gh08=gh08*-1:ENDIF
!!
 IF sel8=__ :gh__=gh__*-1:ENDIF
!!
IF sel8=17:GOSUB ghreset: gh99=gh99*-1:ENDIF
!!
IF sel8=18
 GOSUB dlgvgr
 vgr_gh=_vgr:vgr=vgr_gh
ENDIF
!!
IF sel8=18:t06gh=t06gh*-1:ENDIF
IF sel8=19:RETURN:ENDIF
GOSUB menu8
GOTO std8
RETURN
!
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu8:
IF gh00=1: gh00$=smb$+"  Ebene an":                                      ENDIF
IF gh00=-1:gh00$=   "  Ebene aus":                                       ENDIF
IF gh01=1: gh01$=smb$+"  Virgo  ["+STR$(ROUND(gh_d01/10^6,1))+"Mpc]":     ENDIF
IF gh01=-1:gh01$=   "  Virgo  ["+STR$(ROUND(gh_d01/10^6,1))+"Mpc]":       ENDIF
IF gh03=1: gh03$=smb$+"  Fornax ["+STR$(ROUND(gh_d02/10^6,1))+"Mpc]":     ENDIF
IF gh03=-1:gh03$=   "  Fornax ["+STR$(ROUND(gh_d02/10^6,1))+"Mpc]":       ENDIF
IF gh04=1: gh04$=smb$+"  Fornax II ["+STR$(ROUND(gh_d03/10^6,1))+"Mpc]":  ENDIF
IF gh04=-1:gh04$=   "  Eridanus ["+STR$(ROUND(gh_d03/10^6,1))+"Mpc]":     ENDIF
IF gh06=1: gh06$=smb$+"  Antila ["+STR$(ROUND(gh_d04/10^6,1))+"Mpc]":     ENDIF
IF gh06=-1:gh06$=   "  Antila ["+STR$(ROUND(gh_d04/10^6,1))+"Mpc]":       ENDIF
IF gh09=1: gh09$=smb$+"  Hydra ["+STR$(ROUND(gh_d05/10^6,1))+"Mpc]":      ENDIF
IF gh09=-1:gh09$=   "  Hydra ["+STR$(ROUND(gh_d05/10^6,1))+"Mpc]":        ENDIF
IF gh02=1: gh02$=smb$+"  Norma ["+STR$(ROUND(gh_d06/10^6,1))+"Mpc]":      ENDIF
IF gh02=-1:gh02$=   "  Norma ["+STR$(ROUND(gh_d06/10^6,1))+"Mpc]":        ENDIF
IF gh07=1: gh07$=smb$+"  Laniakea S. ["+STR$(ROUND(gh_d07/10^6,1))+"Mpc]":    ENDIF
IF gh07=-1:gh07$=   "  Großer Attraktor ["+STR$(ROUND(gh_d07/10^6,1))+"Mpc]":ENDIF
IF gh10=1: gh10$=smb$+"  Perseus-Pi. S. ["+STR$(ROUND(gh_d08/10^6,1))+"Mpc]": ENDIF
IF gh10=-1:gh10$=   "  Perseus-Pi. S. ["+STR$(ROUND(gh_d08/10^6,1))+"Mpc]":   ENDIF
IF gh11=1: gh11$=smb$+"  Coma S. ["+STR$(ROUND(gh_d09/10^6,1))+"Mpc]":    ENDIF
IF gh11=-1:gh11$=   "  Coma S. ["+STR$(ROUND(gh_d09/10^6,1))+"Mpc]":      ENDIF
IF gh05=1: gh05$=smb$+"  Coma ["+STR$(ROUND(gh_d10/10^6,1))+"Mpc]":       ENDIF
IF gh05=-1:gh05$=   "  Große Wand ["+STR$(ROUND(gh_d10/10^6,1))+"Mpc]":   ENDIF
IF gh12=1: gh12$=smb$+"  Ophiuchus S. ["+STR$(ROUND(gh_d11/10^6,1))+"Mpc]":   ENDIF
IF gh12=-1:gh12$=   "  Ophiuchus S. ["+STR$(ROUND(gh_d11/10^6,1))+"Mpc]":     ENDIF
IF gh13=1: gh13$=smb$+"  Leo S. ["+STR$(ROUND(gh_d12/10^6,1))+"Mpc]":     ENDIF
IF gh13=-1:gh13$=   "  Leo S. ["+STR$(ROUND(gh_d12/10^6,1))+"Mpc]":       ENDIF
IF gh14=1: gh14$=smb$+"  Herkules S. ["+STR$(ROUND(gh_d13/10^6,1))+"Mpc]":    ENDIF
IF gh14=-1:gh14$=   "  Herkules S. ["+STR$(ROUND(gh_d13/10^6,1))+"Mpc]":      ENDIF
IF gh15=1: gh15$=smb$+"  Shapley S. ["+STR$(ROUND(gh_d14/10^6,1))+"Mpc]":     ENDIF
IF gh15=-1:gh15$=   "  Shapley S. ["+STR$(ROUND(gh_d14/10^6,1))+"Mpc]":       ENDIF
IF gh08=1: gh08$=smb$+"  Geschoß ["+STR$(ROUND(gh_d15/10^9,1))+"Gpc]":    ENDIF
IF gh08=-1:gh08$=   "  Geschoß ["+STR$(ROUND(gh_d15/10^6,1))+"Mpc]":      ENDIF
!!
 IF gh__=1:gh__$=smb$+"  ____ [Mpc]":ENDIF
 IF gh__=-1: gh__$="     ____ [Mpc]":ENDIF
!!
gh99$=smq$+"  Projektion an/aus"
!gh100$=smq$+"  Vergrößerung: "+INT$(vgr_gh)+" ×"
```

```
IF t06gh=1: gh30$=smb$+"  Text":    ENDIF
IF t06gh=-1:gh30$=  "      Text aus":ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
ghreset:
IF gh99=1
 gh01=-1
 gh02=-1
 gh03=-1
 gh04=-1
 gh05=-1
 gh06=-1
 gh07=-1
 gh08=-1
 gh09=-1
 gh10=-1
 gh11=-1
 gh12=-1
 gh13=-1
 gh14=-1
 gh15=-1
ELSE
 gh01=1
 gh02=1
 gh03=1
 gh04=1
 gh05=1
 gh06=1
 gh07=1
 gh08=1
 gh09=1
 gh10=1
 gh11=1
 gh12=1
 gh13=1
 gh14=1
 gh15=1
ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Quasare
dialog9prm:
gq00=1
gq01=-1
gq02=-1
gq03=-1
gq04=-1
gq05=-1
gq06=-1
gq07=-1
gq08=-1
gq09=-1
gq10=-1
gq11=-1
gq12=-1
gq13=-1
gq14=-1
gq15=-1
gq16=-1
gq17=-1
gq18=-1
gq19=-1
gq20=-1
gq99=-1
gq101=1 %%%
t06gq=1
!!
 gq__=-1
!!
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog9:
GOSUB menu9
std9:
ARRAY.LOAD
sel9$[],gq00$,gq01$,gq13$,gq03$,gq14$,gq04$,gq20$,gq15$,gq05$,gq06$,gq16$,gq07$,gq09$
,gq08$,gq17$,gq18$,gq19$,gq02$,gq99$,gq100$,gq101$,gq30$,"Ok"
```

```
DIALOG.SELECT sel9,sel9$[],"Quasare: Darstellung/Projektion:"
IF sel9=1: gq00=gq00*-1:IF gq00=-1 THEN RETURN:ENDIF
IF sel9=2: gq01=gq01*-1:ENDIF
IF sel9=3: gq13=gq13*-1:ENDIF
IF sel9=4: gq03=gq03*-1:ENDIF
IF sel9=5: gq14=gq14*-1:ENDIF
IF sel9=6: gq04=gq04*-1:ENDIF
IF sel9=7: gq20=gq20*-1:ENDIF
IF sel9=8: gq15=gq15*-1:ENDIF
IF sel9=9: gq05=gq05*-1:ENDIF
IF sel9=10:gq06=gq06*-1:ENDIF
IF sel9=11:gq16=gq16*-1:ENDIF
IF sel9=12:gq07=gq07*-1:ENDIF
IF sel9=13:gq09=gq09*-1:ENDIF
IF sel9=14:gq08=gq08*-1:ENDIF
IF sel9=15:gq17=gq17*-1:ENDIF
IF sel9=16:gq18=gq18*-1:ENDIF
IF sel9=17:gq19=gq19*-1:ENDIF
IF sel9=18:gq02=gq02*-1:ENDIF
!!
 IF sel9=_:gq__=gq__*-1:ENDIF
!!
IF sel9=19:GOSUB gqreset: gq99=gq99*-1:ENDIF
IF sel9=20
 GOSUB dlgvgr
 vgr_gq=_vgr:vgr=vgr_gq
ENDIF
IF sel9=21:gq101=gq101*-1:ENDIF
IF sel9=22:t06gq=t06gq*-1:ENDIF
IF sel9=23:RETURN:ENDIF
GOSUB menu9
GOTO std9
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu9:
IF gq00=1: gq00$=smb$+"  Ebene an":                                        ENDIF
IF gq00=-1:gq00$=  "  Ebene aus":                                          ENDIF
IF gq01=1: gq01$=smb$+"  UGC 8085 ["+STR$(ROUND(gq_d01/10^6,1))+"Mpc]:     ENDIF
IF gq01=-1:gq01$=  "  UGC 8085 ["+STR$(ROUND(gq_d01/10^6,1))+"Mpc]:        ENDIF
IF gq13=1: gq13$=smb$+"  J1430+1339 ["+STR$(ROUND(gq_d02/10^6,1))+"Mpc]:   ENDIF
IF gq13=-1:gq13$=  "  J1430+1339 ["+STR$(ROUND(gq_d02/10^6,1))+"Mpc]:      ENDIF
IF gq03=1: gq03$=smb$+"  3C 273 ["+STR$(ROUND(gq_d03/10^6,1))+"Mpc]:       ENDIF
IF gq03=-1:gq03$=  "  3C 273 ["+STR$(ROUND(gq_d03/10^6,1))+"Mpc]:          ENDIF
IF gq14=1: gq14$=smb$+"  CID-42 ["+STR$(ROUND(gq_d04/10^9,1))+"Gpc]:       ENDIF
IF gq14=-1:gq14$=  "  CID-42 ["+STR$(ROUND(gq_d04/10^9,1))+"Gpc]:          ENDIF
IF gq04=1: gq04$=smb$+"  3C 48 ["+STR$(ROUND(gq_d05/10^9,1))+"Gpc]:        ENDIF
IF gq04=-1:gq04$=  "  3C 48 ["+STR$(ROUND(gq_d05/10^9,1))+"Gpc]:           ENDIF
IF gq20=1: gq20$=smb$+"  3C 47 ["+STR$(ROUND(gq_d06/10^9,1))+"Gpc]:        ENDIF
IF gq20=-1:gq20$=  "  3C 47 ["+STR$(ROUND(gq_d06/10^9,1))+"Gpc]:           ENDIF
IF gq15=1: gq15$=smb$+"  3C 279 ["+STR$(ROUND(gq_d07/10^9,1))+"Gpc]:       ENDIF
IF gq15=-1:gq15$=  "  3C 279 ["+STR$(ROUND(gq_d07/10^9,1))+"Gpc]:          ENDIF
IF gq05=1: gq05$=smb$+"  3C 147 ["+STR$(ROUND(gq_d08/10^9,1))+"Gpc]:       ENDIF
IF gq05=-1:gq05$=  "  3C 147 ["+STR$(ROUND(gq_d08/10^9,1))+"Gpc]:          ENDIF
IF gq06=1: gq06$=smb$+"  CTA-102 ["+STR$(ROUND(gq_d09/10^9,1))+"Gpc]:      ENDIF
IF gq06=-1:gq06$=  "  CTA-102 ["+STR$(ROUND(gq_d09/10^9,1))+"Gpc]:         ENDIF
IF gq16=1: gq16$=smb$+"  Einstein Cross ["+STR$(ROUND(gq_d10/10^9,1))+"Gpc]:ENDIF
IF gq16=-1:gq16$=  "  Einstein Cross ["+STR$(ROUND(gq_d10/10^9,1))+"Gpc]:ENDIF
IF gq07=1: gq07$=smb$+"  QSO 0957+561 ["+STR$(ROUND(gq_d11/10^9,1))+"Gpc]:  ENDIF
IF gq07=-1:gq07$=  "  QSO 0957+561 ["+STR$(ROUND(gq_d11/10^9,1))+"Gpc]:     ENDIF
IF gq09=1: gq09$=smb$+"  Huge-LQG ["+STR$(ROUND(gq_d12/10^9,1))+"Gpc]:     ENDIF
IF gq09=-1:gq09$=  "  Huge-LQG ["+STR$(ROUND(gq_d12/10^9,1))+"Gpc]:        ENDIF
IF gq08=1: gq08$=smb$+"  3C 9 ["+STR$(ROUND(gq_d13/10^9,1))+"Gpc]:         ENDIF
IF gq08=-1:gq08$=  "  3C 9 ["+STR$(ROUND(gq_d13/10^9,1))+"Gpc]:            ENDIF
IF gq17=1: gq17$=smb$+"  TON 618 ["+STR$(ROUND(gq_d14/10^9,1))+"Gpc]:      ENDIF
IF gq17=-1:gq17$=  "  TON 618 ["+STR$(ROUND(gq_d14/10^9,1))+"Gpc]:         ENDIF
IF gq18=1: gq18$=smb$+"  H1413+117 ["+STR$(ROUND(gq_d15/10^9,1))+"Gpc]:    ENDIF
IF gq18=-1:gq18$=  "  H1413+117 ["+STR$(ROUND(gq_d15/10^9,1))+"Gpc]:       ENDIF
IF gq19=1: gq19$=smb$+"  APM 08279+5255 ["+STR$(ROUND(gq_d16/10^9,1))+"Gpc]:ENDIF
IF gq19=-1:gq19$=  "  APM 08279+5255 ["+STR$(ROUND(gq_d16/10^9,1))+"Gpc]:ENDIF
IF gq02=1: gq02$=smb$+"  QSO J0313-1806 ["+STR$(ROUND(gq_d17/10^9,1))+"Gpc]:ENDIF
IF gq02=-1:gq02$=  "  QSO J0313-1806 ["+STR$(ROUND(gq_d17/10^9,1))+"Gpc]:ENDIF
!!
 IF gq__=1:gq__$=smb$+"  __ [__pc]":ENDIF
 IF gq__=-1: gq__$="      __ [__pc]":ENDIF
!!
gq99$=smq$+"  Projektion an/aus"
gq100$=smq$+"  Vergrößerung: "+INT$(vgr_gq)+" ×"
```

Schrausser, D. G. (2025). SSR: Solar System Simulator. https://doi.org/10.5281/zenodo.10338851   41

```
IF gq101=-1:gq101$=_smbl$+"    Symbol":  ENDIF
IF gq101=1: gq101$=_mst$+ "    Maßstab": ENDIF
IF t06gq=1: gq30$= smb$+    " Text":     ENDIF
IF t06gq=-1:gq30$=         "    Text aus":ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
gqreset:
IF gq99=1
 gq01=-1
 gq02=-1
 gq03=-1
 gq04=-1
 gq05=-1
 gq06=-1
 gq07=-1
 gq08=-1
 gq09=-1
 gq10=-1
 gq11=-1
 gq12=-1
 gq13=-1
 gq14=-1
 gq15=-1
 gq16=-1
 gq17=-1
 gq18=-1
 gq19=-1
 gq20=-1
ELSE
 gq01=1
 gq02=1
 gq03=1
 gq04=1
 gq05=1
 gq06=1
 gq07=1
 gq08=1
 gq09=1
 gq10=1
 gq11=1
 gq12=1
 gq13=1
 gq14=1
 gq15=1
 gq16=1
 gq17=1
 gq18=1
 gq19=1
 gq20=1
ENDIF
RETURN
! % Eingabedatei für weitere Objekte %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
objdatei:
DIM inp$[100]
FILE.DIR pth$, inp$[]
SELECT ninp, inp$[],_name$+" Objekt Definitionsdatei... ", "Select File"
gwf$=inp$[ninp]
ARRAY.DELETE inp$[]
RETURN
! % Weitere Objekte ini %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
weitere_ini:                              % Objekte einlesen
DIM  gw$[1000]
DIM gw_p[1000]
DIM gw_r[1000]
DIM gw_d[1000]
DIM gwdg[1000]
DIM gwdm[1000]
DIM gwds[1000]
DIM gwh_[1000]
DIM gwm_[1000]
DIM gws_[1000]
DIM gw_t[1000]
DIM gw_cl[1000]
FOR i_gw=1 TO 1000
 gw_p[i_gw]=-1                            % Projektionsvariable ini
NEXT                                      % Objektdatei
GOSUB weitere_in
```

```
! % Weitere Objekte %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
RETURN
weitere_in:
n_gw=0
FILE.EXISTS fw, gwf$
IF fw
 TEXT.OPEN r, fw, gwf$
 DO
  TEXT.READLN fw, gwf_$:n_gw=n_gw+1               % Anzahl n_gw
 UNTIL gwf_$="EOF"
 TEXT.CLOSE fw
 n_gw=(n_gw-1)/12                                 % Anzahl der Optionen
 TEXT.OPEN r, fw, gwf$                            % Einlesen
 FOR i_gw=1 TO n_gw
  TEXT.READLN fw, gwf_$                           % Nr
  TEXT.READLN fw, gwf_$:gw$[i_gw]=      gwf_$     % Name
  TEXT.READLN fw, gwf_$:gw_r[i_gw]= VAL(gwf_$)    % r Lj
  IF gw_r[i_gw]=-1 THEN gw_r[i_gw]=     gr_0      % Obj. Gr.
  TEXT.READLN fw, gwf_$:gw_d[i_gw]= VAL(gwf_$)    % d Lj
  TEXT.READLN fw, gwf_$:gwdg[i_gw]= VAL(gwf_$)    % dek g
  TEXT.READLN fw, gwf_$:gwdm[i_gw]= VAL(gwf_$)    % dek m
  TEXT.READLN fw, gwf_$:gwds[i_gw]= VAL(gwf_$)    % dek s
  TEXT.READLN fw, gwf_$:gwh_[i_gw]= VAL(gwf_$)    % ra h
  TEXT.READLN fw, gwf_$:gwm_[i_gw]= VAL(gwf_$)    % ra m
  TEXT.READLN fw, gwf_$:gws_[i_gw]= VAL(gwf_$)    % ra s
  TEXT.READLN fw, gwf_$:gw_t[i_gw]= VAL(gwf_$)    % typ
  TEXT.READLN fw, gwf_$:gw_cl[i_gw]=VAL(gwf_$)    % typfarbe
 NEXT
 TEXT.CLOSE fw
ELSE
 INCLUDE ssr_weitere_ini.bas                      % wenn keine Objektdatei
ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
weitere_out:                                      % Objekte ausgeben
DIALOG.MESSAGE "Weitere Objekte:","Astronomische
Objekte...",selob,"Anlegen","Löschen","Abbrechen"
IF selob=1
 n_gw=n_gw+1
 INPUT "Objektname…",gw_name$,"Objekt"+INT$(n_gw)
 INPUT "Radius in Lj[-1:Stern]…",gw_r_,-1
 gw_ty_=gw_r_:IF gw_r_>-1 THEN gw_ty_=0
 INPUT "Distanz in Lj…", gw_d_,15000
 INPUT "Rek. Stunde…",    gw_rh_,0
 INPUT "Rek. Minute…",    gw_rm_,0
 INPUT "Rek. Sekunde …", gw_rs_,0
 INPUT "Dekl. Grad…",     gw_dg_,0
 INPUT "Dekl. Minute…",   gw_dm_,0
 INPUT "Dekl. Sekunde …",gw_ds_,0
 % Typus und Farbe %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 ARRAY.LOAD seltp_$[],"Stern Gr1","Stern Gr2","Stern Gr3","Roter Riese","Blauer
Riese","Nova/Supernova","Sternhaufen","Nebel","Planetarer
Nebel","Kugelsternhaufen","Milchstraßenwolke","Galaxie","Haufen","Superhaufen","Quasa
r"
 DIALOG.SELECT seltp,seltp_$[],"Weitere Objekte: Typ..."
 DIALOG.MESSAGE "Weitere Objekte:","Neues astronomisches Objekt
anlegen?",wrtout,"Speichern","Abbrechen"
 IF wrtout=1
  obnrdat$="&"+FORMAT$("0%%%%",n_gw)+"["+d$+"/"+m$+"/"+y$+"]"
  TEXT.OPEN a, fw, gwf$                %Ausgabe
  TEXT.WRITELN fw, obnrdat$            % Nummer, Datum
  TEXT.WRITELN fw, gw_name$            % Name
  TEXT.WRITELN fw, gw_r_               % r Lj
  TEXT.WRITELN fw, gw_d_               % d Lj
  TEXT.WRITELN fw, gw_dg_              % Dekl Grad
  TEXT.WRITELN fw, gw_dm_              % Dekl Minute
  TEXT.WRITELN fw, gw_ds_              % Dekl Sekunde
  TEXT.WRITELN fw, gw_rh_              % Rekt Stunde
  TEXT.WRITELN fw, gw_rm_              % Rekt Minute
  TEXT.WRITELN fw, gw_rs_              % Rekt Sekunde
  TEXT.WRITELN fw, gw_ty_              % Typ
  TEXT.WRITELN fw, seltp               % Typfarbe
  TEXT.CLOSE fw
 ENDIF
ENDIF
IF selob=2                            % Alle Löschen
```

```
 DIALOG.MESSAGE "Weitere Objekte:","Alle weiteren astronomischen Objekte
löschen?",selob0,"Löschen","Abbrechen"
 IF selob0=1
  TEXT.OPEN w,fw,gwf$
  TEXT.CLOSE fw
 ENDIF
ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! % Dialog Weitere Objekte
dialog11prm:
gw00=1
gw99=-1
gw101=1
t06gw=1
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog11:
GOSUB weitere_in
GOSUB menu11
std11:
DIM sel11$[n_gw+8]
!
sel11$[1]=gw00$
sel11$[2]=smq$+"  Datei: "+gwf$
FOR i_gw=1 TO n_gw
 sel11$[i_gw+2]=gwmn$[i_gw]
NEXT
sel11$[n_gw+3]=smq$+"  Objekt anlegen/löschen"
sel11$[n_gw+4]=gw99$
sel11$[n_gw+5]=gw100$
sel11$[n_gw+6]=gw101$
sel11$[n_gw+7]=gw30$
sel11$[n_gw+8]="Ok"
!
DIALOG.SELECT sel11,sel11$[],"Weitere Objekte: Darstellung/Projektion:"
IF sel11=1:gw00=gw00*-1:IF gw00=-1 THEN RETURN:ENDIF
IF sel11=2:GOSUB objdatei:GOSUB weitere_in:    ENDIF
FOR i_gw=1 TO n_gw                       % Weitere Objekte
 IF sel11=i_gw+2:gw_p[i_gw]=gw_p[i_gw]*-1:    ENDIF
NEXT
IF sel11=n_gw+3:GOSUB weitere_out:GOSUB weitere_in:ENDIF
IF sel11=n_gw+4:GOSUB gwreset:gw99=gw99*-1:        ENDIF
IF sel11=n_gw+5
 GOSUB dlgvgr:vgr_w1=_vgr:vgr=vgr_w1
ENDIF
IF sel11=n_gw+6:gw101=gw101*-1:ENDIF
IF sel11=n_gw+7:t06gw=t06gw*-1:ENDIF
IF sel11=n_gw+8:RETURN:        ENDIF
!
GOSUB menu11
GOTO std11
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menu11:
IF n_gw>0 THEN DIM gwmn$[n_gw]
IF gw00=1: gw00$=smb$+"  Ebene an": ENDIF
IF gw00=-1:gw00$=  "     Ebene aus":ENDIF
FOR i_gw=1 TO n_gw                       % Weitere Objekte
 IF gw_p[i_gw]=1:  gwmn$[i_gw]=smb$+"  "+gw$[i_gw]:ENDIF
 IF gw_p[i_gw]=-1: gwmn$[i_gw]="     "+  gw$[i_gw]:ENDIF
NEXT
gw99$=smq$+"  Projektion an/aus"
gw100$=smq$+"  Vergrößerung: "+INT$(vgr_w1)+" ×"
IF gw101=-1:gw101$=_smbl$+"     Symbol":  ENDIF
IF gw101=1: gw101$=_mst$+ "     Maßstab": ENDIF
IF t06gw=1: gw30$=smb$+     "  Text":    ENDIF
IF t06gw=-1:gw30$=         "     Text aus":ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
gwreset:
IF gw99=1
 FOR i_gw=1 TO n_gw
  gw_p[i_gw]=-1
 NEXT
ENDIF
IF gw99=-1
```

```
 FOR i_gw=1 TO n_gw
  gw_p[i_gw]=1
 NEXT
ENDIF
RETURN
! % Dialog Größenvergleich %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
menuvgl:
vg01$=        "Beteigeuze ["+STR$(ROUND(r_btg_ae,2))+    "AE]"
vg02$=        "Orionnebel ["+STR$(ROUND(r_orn_ae/Lj_,2))+"Lj]"
vg03$=        "Aldebaran ["+ STR$(ROUND(r_adb_ae,2))+    "AE]"
vg04$= _ga$+" Centauri A ["+STR$(ROUND(r_acn_ae,3))+    "AE]"
vg05$=        "Sirius ["+    STR$(ROUND(r_srs_ae,3))+    "AE]"
vg06$=        "RSGC2-01 ["+  STR$(ROUND(r_rsg_ae,2))+    "AE]"
ARRAY.LOAD vgl$[],vg04$,vg05$,vg03$,vg01$,vg06$,vg02$
DIALOG.SELECT vglst,vgl$[],"Größenvergleich:"
objv$=vgl$[vglst]
RETURN
! % Dialog Skalen %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog10prm:
s01=-1
s02=-1
s03=-1
s04=-1
s08=-1
s10=1
t31=-1
t34=-1
t37=-1
t39=-1
t99=-1
t98=-1
RETURN
dialog10:
GOSUB menu10
std10:
ARRAY.LOAD
sel10$[],o11$,sk01$,sk02$,sk03$,sk04$,sk06$,o01$,o02$,o03$,o04$,o08$,o09$,sk05$,o10$,
"Ok"
DIALOG.SELECT sel10, sel10$[],"Skalen:"
IF sel10=1:GOSUB calc:ENDIF
IF sel10=2:s10=s10*-1:ENDIF
IF sel10=3:t31=t31*-1
 IF t31=1
  INPUT"Stunde h=…",h_,0
  INPUT"Minute min=…",m_,0
  INPUT"Sekunde sec=…",s_,0
  rk$=" "+ INT$(h_)+_rh$
  rk$= rk$+INT$(m_)+"'"
  rk$= rk$+INT$(s_)+_rsc$
 ENDIF
 IF t31=-1 THEN t39=-1
ENDIF
IF sel10=4:t39=t39*-1
 IF t31=-1 THEN t39=-1
 IF t39=1
  INPUT "Grad °=…",dg_,0
  INPUT "Minute min=…",dm_,0
  INPUT "Sekunde sec=…",ds_,0
  dkl$=" "+  INT$(dg_)+"°"
  dkl$= dkl$+INT$(dm_)+"'"
  dkl$= dkl$+INT$(ds_)+_rsc$
 ENDIF
ENDIF
IF sel10=5:t34=t34*-1:ENDIF
IF sel10=6:t99=t99*-1:ENDIF
IF sel10=7:s01=s01*-1:ENDIF
IF sel10=8:s02=s02*-1:ENDIF
IF sel10=9
 s03=s03*-1
 swu=-1:ur$=""
 IF s07=1 & s03=1
  GOSUB dialogu
 ENDIF
ENDIF
IF sel10=10:s04=s04*-1:ENDIF
IF sel10=11:s08=s08*-1
 IF s08=1 THEN GOSUB dialogk
```

```
        ENDIF
        IF sel10=13
         swvgl=swvgl*-1
          IF swvgl=1 THEN GOSUB menuvgl
        ENDIF
        IF sel10=12:t98=t98*-1: ENDIF
        IF sel10=14:GOSUB lbrte:ENDIF
        IF sel10=15:RETURN:     ENDIF
        GOSUB menu10
        GOTO std10
        RETURN
        menu10:
        o11$=_clc$+"  Berechnungen..." % +cpb$
        IF s10=1:   sk01$=smb$+"  Entfernung und Zeit":    ENDIF
        IF s10=-1:  sk01$=  "     Entfernung und Zeit aus":ENDIF
        IF t31=1:   sk02$=smb$+"  Rektaszension "+_ga$+rk$:ENDIF
        IF t31=-1:  sk02$=  "     Rektaszension "+_ga$:    ENDIF
        IF t39=1:   sk03$=smb$+"  Deklination "+_gd$+dkl$: ENDIF
        IF t39=-1:  sk03$=  "     Deklination "+_gd$:      ENDIF
        IF t99=1:   sk06$=smb$+"  Tierkreis "+_tkz$:       ENDIF
        IF t99=-1:  sk06$=  "     Tierkreis aus":          ENDIF
        IF t34=1:   sk04$=smb$+"  Himmelsgewölbe "+_hgw$:  ENDIF
        IF t34=-1:  sk04$=  "     Himmelsgewölbe aus":     ENDIF
        IF s01=1:   o01$= smb$+"  Jahreszeiten "+_jzt$:    ENDIF
        IF s01=-1:  o01$=   "     Jahreszeiten aus":       ENDIF
        IF s02=1:   o02$= smb$+"  Monate "+_mnte$:         ENDIF
        IF s02=-1:  o02$=   "     Monate aus":             ENDIF
        IF s03=1:   o03$= smb$+"  Horizont "+ur$:          ENDIF
        IF s03=-1:  o03$=   "     Horizont aus":           ENDIF
        IF s04=1:   o04$= smb$+"  Erdprojektion "+_epr$:   ENDIF
        IF s04=-1:  o04$=   "     Erdprojektion aus":      ENDIF
        IF s08=1:   o08$= smb$+"  Kompass "+kp$:           ENDIF
        IF s08=-1:  o08$=   "     Kompass aus":            ENDIF
        IF swvgl=1: sk05$=smb$+"  = "+objv$:               ENDIF
        IF swvgl=-1:sk05$=  "     Größenvergleich aus":    ENDIF
        IF t98=1:   o09$= smb$+"  Historie "+_hist$:       ENDIF
        IF t98=-1:  o09$=   "     Historie aus":           ENDIF
        o10$=smq$+"  Linienbreite: "+INT$(skl)
        RETURN
        ! Berechnungen %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
        calc::calcst::CLIPBOARD.GET cpb$
        calcn=11:DIM sel$[calcn]:DIM sel0$[calcn-2]
        sel0$[1]="Faktor x zu Lichtgeschwindigkeit c[m/s]"
        sel0$[2]="Faktor x zu Astronomischer Einheit AE[km]"
        sel0$[3]="Parallaxe pi[mas] zu Parsec pc"
        sel0$[4]="Modulus mu[mag] zu Parsec pc"
        sel0$[5]="Parsec pc zu Lichtjahr Lj"
        sel0$[6]="Hexagesimal [°/h:min:sec] zu Dezimal [°]"
        sel0$[7]="Winkelgrad [°] zu Bogenmaß [rad]"
        sel0$[8]="Winkelausdehnung V[°] bei Dist. d zu Radius r"
        sel0$[9]="Zehnerpotenz zu Einheit"
        !
        sel$[1]=sel0$[1]+eq1$
        sel$[2]=sel0$[2]+eq2$
        sel$[3]=sel0$[3]+eq3$
        sel$[4]=sel0$[4]+eq4$
        sel$[5]=sel0$[5]+eq5$
        sel$[6]=sel0$[6]+eq6$
        sel$[7]=sel0$[7]+eq7$
        sel$[8]=sel0$[8]+eq8$
        sel$[9]=sel0$[9]+eq9$
        sel$[10]="=[ "+cpb$+u_eh$+" ]":u_eh$=""
        !
        sel$[11]="Ok"
        DIALOG.SELECT sel, sel$[],_clc$+" Berechnungen:
        IF sel=1                 % Faktor c
         INPUT "Faktor x...",u_fx,1
         %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
         u_xc=u_fx*c_m
         %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
         u_xc$= STR$(ROUND(u_xc,9))
         u_xc0$=STR$(ROUND(u_xc,4))
         CLIPBOARD.PUT u_xc$
         u_dlgm$=""
         u_dlgm$=u_dlgm$+STR$(ROUND(u_fx,2))+"x = "
         u_dlgm$=u_dlgm$+u_xc0$+"m/s"
         DIALOG.MESSAGE sel0$[1]+", wobei xc = x*c[m/s]:",u_dlgm$,u_msg
```

```
 eq1$="=":eq2$="":eq3$="":eq4$="":eq5$="":eq6$="":eq7$="":eq8$="":eq9$=""
ENDIF
IF sel=2                  % Faktor AE
 INPUT "Faktor x...",u_fx,1
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_xa=u_fx*au_/1000
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_xa$= STR$(ROUND(u_xa,9))
 u_xa0$=STR$(ROUND(u_xa,4))
 CLIPBOARD.PUT u_xa$
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_fx,2))+"x = "
 u_dlgm$=u_dlgm$+u_xa0$+"km"
 DIALOG.MESSAGE sel0$[2]+", wobei xAE = x*AE[km]:",u_dlgm$,u_msg
 eq1$="":eq2$="=":eq3$="":eq4$="":eq5$="":eq6$="":eq7$="":eq8$="":eq9$=""
ENDIF
IF sel=3                  % Parallaxe zu pc
 !CLIPBOARD.GET cpb$
 INPUT "Parallaxe mas...",u_px,VAL(cpb$)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_pc=1/(u_px/1000)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_pc$= STR$(ROUND(u_pc,9))
 u_pc0$=STR$(ROUND(u_pc,4))
 CLIPBOARD.PUT u_pc$
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_px,3))+"mas = "
 u_dlgm$=u_dlgm$+u_pc0$+"pc"
 DIALOG.MESSAGE sel0$[3]+", wobei pc = 1/(mas/1000):",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="=":eq4$="":eq5$="":eq6$="":eq7$="":eq8$="":eq9$=""
ENDIF
IF sel=4                  % Modulus mu=m-M zu pc
 !CLIPBOARD.GET cpb$
 INPUT "Modulus mag...",u_mu,10
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_pc=10^((u_mu/5)+1)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_pc$= STR$(ROUND(u_pc,9))
 u_pc0$=STR$(ROUND(u_pc,4))
 CLIPBOARD.PUT u_pc$
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_mu,3))+"mag = "
 u_dlgm$=u_dlgm$+u_pc0$+"pc"
 DIALOG.MESSAGE sel0$[4]+", wobei pc = 10^((mag/5)+1):",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="":eq4$="=":eq5$="":eq6$="":eq7$="":eq8$="":eq9$=""
ENDIF
IF sel=5                  % Pc zu Lj
 CLIPBOARD.GET cpb$
 INPUT "Parsec pc...",u_pc,VAL(cpb$)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_lj=u_pc*pcm_/Lj_m
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_lj$= STR$(ROUND(u_lj,9))
 u_lj0$=STR$(ROUND(u_lj,4))
 CLIPBOARD.PUT u_lj$
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_pc,4))+"pc = "
 u_dlgm$=u_dlgm$+u_lj0$+"Lj"
 DIALOG.MESSAGE sel0$[5]+", wobei Lj = pc*3.26156:",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="":eq4$="":eq5$="=":eq6$="":eq7$="":eq8$="":eq9$=""
ENDIF
IF sel=6                  % hex in dez
 !CLIPBOARD.GET cpb$
 INPUT "°/h...",u_gh,0
 INPUT "min '...",u_min,0
 INPUT "sec ''...",u_sec,0
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_dez=u_gh+u_min/60+u_sec/(60^2)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_dez$= STR$(ROUND(u_dez,9))
 u_dez0$=STR$(ROUND(u_dez,4))
 CLIPBOARD.PUT u_dez$
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_gh,2))+"°/h "
 u_dlgm$=u_dlgm$+STR$(ROUND(u_min,2))+"' "
 u_dlgm$=u_dlgm$+STR$(ROUND(u_sec,4))+"'' = "
 u_dlgm$=u_dlgm$+u_dez0$+"°/h"
```

```
 DIALOG.MESSAGE sel0$[6]+", wobei dx° = hx°+(hx'/60)+(hx''/3600):",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="":eq4$="":eq5$="":eq6$="=":eq7$="":eq8$="":eq9$=""
ENDIF
IF sel=7                   % grad in rad
 INPUT "Winkelgrad a°...",u_wkg,45
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_rad=u_wkg/180*PI()
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_rad$= STR$(ROUND(u_rad,14))
 u_rad0$=STR$(ROUND(u_rad,5))
 CLIPBOARD.PUT u_rad$
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_wkg,2))+"° = "
 u_dlgm$=u_dlgm$+u_rad$+"rad"
 DIALOG.MESSAGE sel0$[7]+", wobei rad = (a°/180) pi: ",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="":eq4$="":eq5$="":eq6$="":eq7$="=":eq8$="":eq9$=""
ENDIF
IF sel=8 % V in r
 !CLIPBOARD.GET cpb$
 INPUT "V°...",u_V,VAL(cpb$)
 INPUT "d...",u_d,100
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 u_Vr=u_v/180*PI()          % zu rad
 u_r=u_d*TAN(u_Vr/2)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 CLIPBOARD.PUT STR$(u_r)
 u_dlgm$="V="
 u_dlgm$=u_dlgm$+STR$(ROUND(u_v,4))+"° bei d="
 u_dlgm$=u_dlgm$+STR$(ROUND(u_d,2))+" : r="
 u_dlgm$=u_dlgm$+STR$(ROUND(u_r,4))
 DIALOG.MESSAGE sel0$[8]+", wobei r = d tan(V[rad]/2): ",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="":eq4$="":eq5$="":eq6$="":eq7$="":eq8$="=":eq9$=""
ENDIF
IF sel=9                   % 10^n in Einheit
 !CLIPBOARD.GET cpb$
 INPUT "x ...",u_xzp,VAL(cpb$)
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 IF u_xzp>=10^3  THEN u_eh=u_xzp/10^3: u_eh$="k"
 IF u_xzp>=10^6  THEN u_eh=u_xzp/10^6: u_eh$="M"
 IF u_xzp>=10^9  THEN u_eh=u_xzp/10^9: u_eh$="G"
 IF u_xzp>=10^12 THEN u_eh=u_xzp/10^12:u_eh$="T"
 IF u_xzp>=10^15 THEN u_eh=u_xzp/10^15:u_eh$="P"
 IF u_xzp>=10^18 THEN u_eh=u_xzp/10^18:u_eh$="E"
 IF u_xzp>=10^21 THEN u_eh=u_xzp/10^21:u_eh$="Z"
 IF u_xzp>=10^24 THEN u_eh=u_xzp/10^24:u_eh$="Y"
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 CLIPBOARD.PUT STR$(ROUND(u_eh,3))
 u_dlgm$=""
 u_dlgm$=u_dlgm$+STR$(ROUND(u_xzp,4))+" = "
 u_dlgm$=u_dlgm$+STR$(ROUND(u_eh,1))+u_eh$
 DIALOG.MESSAGE sel0$[9]+": ",u_dlgm$,u_msg
 eq1$="":eq2$="":eq3$="":eq4$="":eq5$="":eq6$="":eq7$="":eq8$="":eq9$="="
ENDIF
IF sel=11:CLIPBOARD.GET cpb$:RETURN:ENDIF
!CLIPBOARD.GET cpb$
GOTO calcst
RETURN
! % Dialog Linienbreite %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
lbrte:
ARRAY.LOAD selbr$[],"1 [sehr schmal]","2 [schmal]","3 [normal]","4 [breit]","5 [sehr
breit]"
DIALOG.SELECT skl,selbr$[],"Linienbreite:"
RETURN
! % Dialog Vergrösserung %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dlgvgr:
ARRAY.LOAD vgrf$[],"1 × [Maßstab]","2 ×","3 ×","4 ×","5 ×","10 ×","20 ×"
DIALOG.SELECT vgrf,vgrf$[],"Vergrößerungsfaktor:"
IF vgrf=1 THEN _vgr=1
IF vgrf=2 THEN _vgr=2
IF vgrf=3 THEN _vgr=3
IF vgrf=4 THEN _vgr=4
IF vgrf=5 THEN _vgr=5
IF vgrf=6 THEN _vgr=10
IF vgrf=7 THEN _vgr=20
RETURN
! % Dialog Modus %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialog3:
```

```
r01$="Vollsimulation"
r02$="Simulation"
r03$="Echtzeit"
r04$="Entfernung:"+aed$
r05$="i Information"
ARRAY.LOAD sel3$[],r03$,r02$,r01$,r04$,r05$
DIALOG.SELECT sel3,sel3$[],"Modus:"
IF sel3=1
 INPUT "Zeitrafferfaktor ve[0,1]=…",vse,0.05:s07=1
 vse=vse+1
 IF vse<=1 THEN vse=1.001
 IF vse>2  THEN vse=2
ENDIF
IF sel3=2:INPUT "Beschleunigungsfaktor vsmn[-1,1]=…",vsmn,0.1
 IF ABS(vsmn)>1 THEN vsmn=1
v=0.1:s07=-1:ENDIF
IF sel3=3
 INPUT "Minimaldistanz in AE=…",vsm_mn,0.02
 IF vsm_mn<0.01    THEN vsm_mn=0.01
 IF vsm_mn>100000 THEN vsm_mn=100000
 INPUT "Maximaldistanz in pc=…",vsm_mx,2.5*10^8
 IF vsm_mx<1          THEN vsm_mx=1
 IF vsm_mx>14.25*10^9 THEN vsm_mx=14.25*10^9
 INPUT "Zeitrafferfaktor vs[0,1]=…",vsm,0.05:s07=0
 vsm=vsm+1
 IF vsm<=1 THEN vsm=1.001
 IF vsm>2  THEN vsm=2
ENDIF
IF sel3=4                    % in AE
 ARRAY.LOAD selae0$[],"Astronomische Einheit AE","Lichtjahr Lj","Parsec pc"
 DIALOG.SELECT selae0,selae0$[],"Anfangsentfernung,Einheit
[Lj="+INT$(Lj_)+"AE|pc="+INT$(pc_)+"AE]:"
 IF selae0=1:INPUT "Anfangsentfernung AE0=…",aed,1
  IF aed>14.25*10^9*pc_ THEN aed=14.25*10^9*pc_
 ENDIF
 IF selae0=2:INPUT "Anfangsentfernung Lj0=…",aed,1
  IF aed>14.25*3.26*10^9 THEN aed=14.25*3.26*10^9
 aed=aed*Lj_:ENDIF
 IF selae0=3:INPUT "Anfangsentfernung pc0=…",aed,1
  IF aed>14.25*10^9 THEN aed=14.25*10^9
 aed=aed*pc_
 ENDIF
 IF aed<=0 THEN aed=1
 ed=(sx/2.9)/aed           % Anfangsentfernungsfaktor ed
 GOSUB anfangsentfernung
ENDIF
IF sel3=5
 GOSUB dialoginf:GOTO st0
ENDIF
IF s07<>1 THEN ur$=""
RETURN
anfangsentfernung:
IF aed<Lj_:aed$=FORMAT$("#####.##",aed)+" AE":   ENDIF
IF aed>=Lj_
 Ljd=aed/Lj_
 IF Ljd<=pcl_:aed$=FORMAT$("#.##",Ljd)+" Lj":    ENDIF
 IF Ljd>pcl_
  IF Ljd < pcl_*10^3
  aed$= FORMAT$("###.##",Ljd/pcl_)+"pc":         ENDIF
  IF Ljd >= pcl_*10^3 & Ljd< pcl_*10^6
  aed$= FORMAT$("###.##",Ljd/(pcl_*10^3))+" kpc":ENDIF
  IF Ljd >= pcl_*10^6 & Ljd< pcl_*10^9
  aed$= FORMAT$("###.##",Ljd/(pcl_*10^6))+" Mpc":ENDIF
  IF Ljd >= pcl_*10^9
  aed$= FORMAT$("###.##",Ljd/(pcl_*10^9))+" Gpc":ENDIF
 ENDIF
ENDIF
RETURN
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialoginf:
GR.ORIENTATION 1
GR.SCREEN sx,sy            % Bildschirmformat
mx=sx/2:my=sy/2
GR.SET.STROKE 2
ARRAY.LOAD selinf$[],"i Astronomische Parameter","i Sonnensystem Parameter","i Stern
Größenvergleich","i Rotationen im inneren Sonnensystem","i Rotationen im äußeren
Sonnensystem","i Sonne-Mond-Erde Distanz","i Zehnerpotenzen"
```

```
DIALOG.SELECT selinf,selinf$[],"i Information:"
GOSUB global
IF selinf=1:INCLUDE ssr_parameter1.bas:ENDIF
IF selinf=2:INCLUDE ssr_systemgr.bas  :ENDIF
IF selinf=3:INCLUDE ssr_sterngr.bas   :ENDIF
IF selinf=4:INCLUDE ssr_rotat1.bas    :ENDIF
IF selinf=5:INCLUDE ssr_rotat2.bas    :ENDIF
IF selinf=6:INCLUDE ssr_distanz.bas   :ENDIF
IF selinf=7:INCLUDE ssr_potenz.bas    :ENDIF
GR.ORIENTATION -1
GR.SCREEN sx,sy              % Bildschirmformat
mx=sx/2:my=sy/2
RETURN
! % Dialog Uhrzeit, Kalender %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialogu:
x01$="Ja"
x02$="Nein"
ARRAY.LOAD sel4$[],x01$,x02$
DIALOG.SELECT sel4,sel4$[],"Uhrzeit und Kalenderskala:"
IF sel4=1:swu=1:ur$=_ur$:ENDIF
IF sel4=2:swu=-1:ur$="":ENDIF
RETURN
! % Dialog Kompass %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
dialogk:
k01$="Kompass"
k02$="Position"
k03$="Kompass und Position"
ARRAY.LOAD sel5$[],k01$,k02$,k03$
DIALOG.SELECT sel5,sel5$[],"Kompassoptionen:"
IF sel5=1:swk=1:kp$=_kp1$: ENDIF
IF sel5=2:swk=-1:kp$=_kp2$:ENDIF
IF sel5=3:swk=0:kp$=_kp3$: ENDIF
RETURN
source_:
GR.TEXT.SIZE txzi/2
GR.TEXT.ALIGN 3
GR.TEXT.DRAW tx,sx,40,"IAU[2023]"
GR.TEXT.ALIGN 1
GR.TEXT.SIZE txzi
RETURN
sourceg1:
GR.TEXT.SIZE txzi/2
GR.TEXT.ALIGN 3
GR.TEXT.DRAW tx,sx,40,"NASA["+_g1_mon$+"/"+_g1_jar$+"]"
GR.TEXT.ALIGN 1
GR.TEXT.SIZE txzi
RETURN
sourceg2:
GR.TEXT.SIZE txzi/2
GR.TEXT.ALIGN 3
GR.TEXT.DRAW tx,sx,40,"CDS["+_g2_mon$+"/"+_g2_jar$+"]"
GR.TEXT.ALIGN 1
GR.TEXT.SIZE txzi
RETURN
! % Einstellungen Ende %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fin::INCLUDE ssr_fin.bas:RETURN
! % ENDE %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

! %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Acknowledgement

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