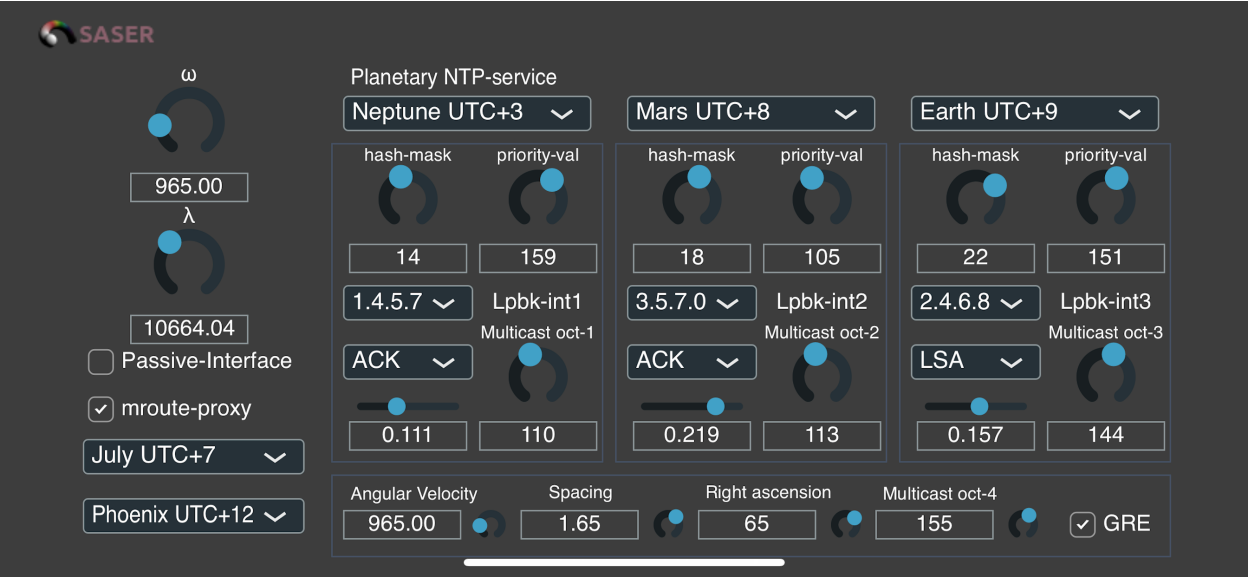


Compositor Software

SASER Manual

Embedded real-time operating system



SASER 2.0 SAS48P4L

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Dispute resolution

This document describes the work of the main modules by chapter. This description method does not imply a complete description of each module and its work, and is not a complete documentation of the parameters and functions of SASER RTOS.

About this document

This document is a working documentation for the embedded real-time operating system SASER RTOS (real-time operating system, RTOS) with virtualization of OSI L1-L7 network functions from Compositor Software. It includes a description and technical documentation for the SASER SAS48P4L.

Audience

This document assumes knowledge of the operation of Radio Navigation systems, Radars and software for work in the Ethernet network.

1.Introduction

Frequency modulation is designed to improve the purity of the transmitted signal in U.S. and North American telephone networks. The quality of the transmitted sound signal in the telephone line is the main interest of the author, as his specialty is television and Radio sound engineering. The objectives of studying the prototype of the Compositor NRTOS, which are given below, relate mainly to wired DSL (Digital Subscriber Line) communication. My task was to provide a preset system and the line of the Compositor NRTOS multiplexer. Over time, the project has grown into a full-fledged radio simulation studio. That is, it is a virtual radio station with multi-channel playlists, quality of service, simulated Ethernet protocols, created to study multi-channel routing on radio relay Ethernet stations.

2.Full-duplex transmission with OSI vRouter SAS48P4L

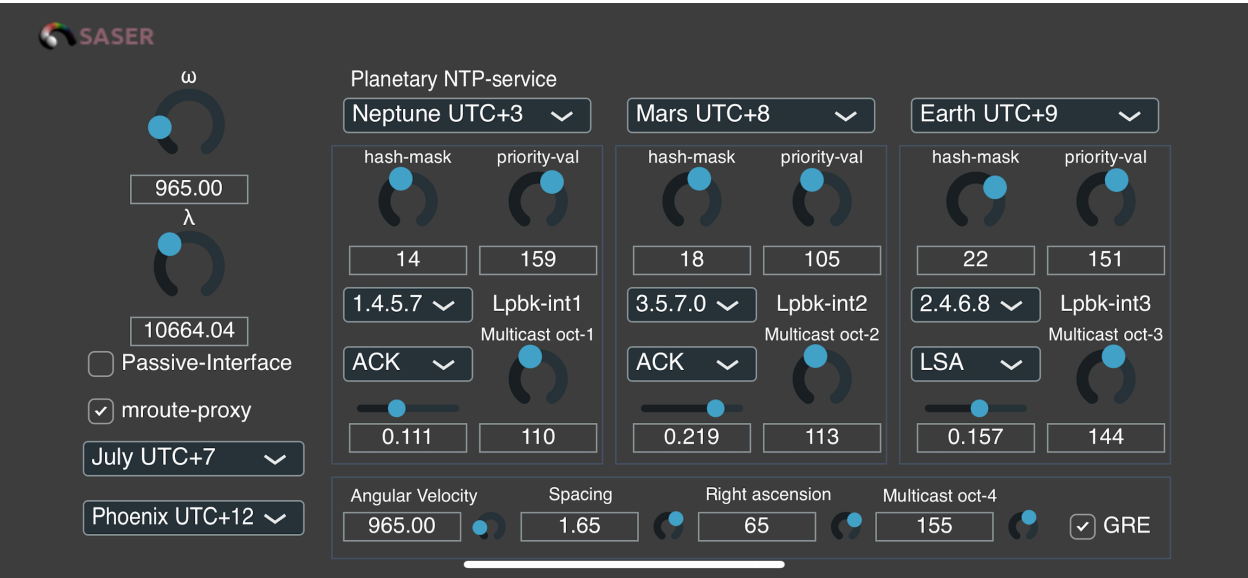


Fig. 1 – OSI vRouter SAS48P4L

OSI vRouter SAS48P4L is designed specifically for the purpose of injecting routing tables and receiving ether from them. The main purpose of the virtual router is to include the required number of modulations and feeder combinations from already received and processed devices. The OSI vRouter SAS48P4L database contains device profiles based on their routing table.

2.1. Angular momentum

For setting the angular momentum you can use the wavelength regulator of VLF (Very Low Frequencies) radiosignal λ and parameter *Right Ascension* in MTI section. You can set the network of a server by ω parameter.

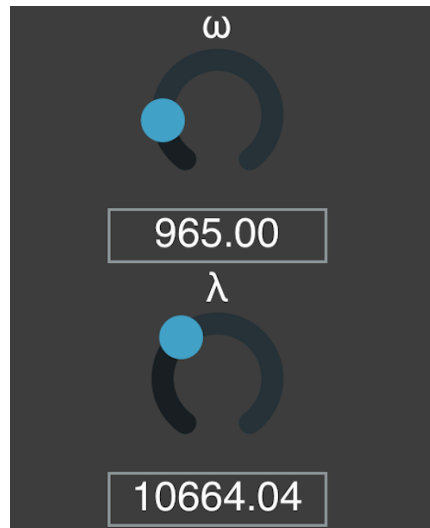


Fig. 2 – Network parameters

2.2. NTP-servers

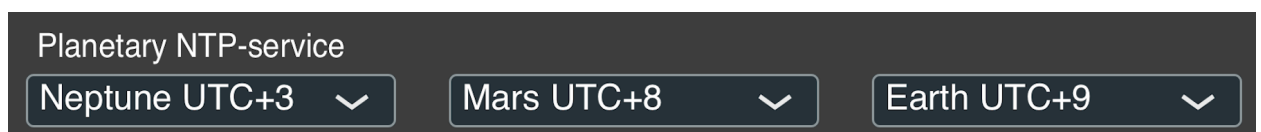


Fig. 3 – NTP-servers section

NTP-servers have names of 12 planets of Solar System. You connect not to a planet but to a named NTP-Server e.g. Mars. NTP-servers serve for navigation in distance-vector system. This deterministic navigation system uses division of three Euler angles rotation. Directly convertible to aerospace industry standard angles Roll, Pitch and Yaw. The twelve servers ascend to twelve VLF antennas located around the world. They run Omega navigation system infrastructure. These antennas uses the ionosphere property to pass the radiowaves coming by the certain angle (approx from 63 degrees of Right Ascension up to 85 degrees of Declination). This correspond to 16-17 hours of Right Ascension in USA and the same value in degrees for Declination in Russian Federation. This difference comes from the geographic placement of the two major countries, which use this navigation system (In Russia it is called Alpha, but interface is existentially the same). Compared to 4th loopback of Omega system, which set Right Ascension parameter, GPS system uses MTI (Multicast Tunnel Interface). This interface connects two points of Ethernet network deployed between antennas and allow for GRE (Generic Routing Encapsulation) tunnel right to antenna amplifier. Next to VLF-antenna amplifier there is a repeater, which multicast on maximum of 256 addresses. The number of multicast addresses set by *Multicast oct-4* parameter.

Each NTP-server is connected to it's own VLF antenna, that is why by setting different planet-servers you are triangulating. This means you are trisecting the planesphere on three parts

equal to the lengths of $(\sqrt{3}/4)a^2 \times h$ (where a is a side of equilateral triangle and h is λ). The side a is set by selecting a UTC (Coordinated Universal Time) zone where planet-server is situated and it is equal to hours of right ascension.

Note: when you refer to equilateral triangle you refer to antennas placement and not a servers placement. That is why side a is selected by dividing first NTP-server UTC value from the third one.

Triangulation is needed for the work of inertial navigation system based on virtual gyroscope, which is a part of SASER SAS48P4L software.

2.3.MTI-interface

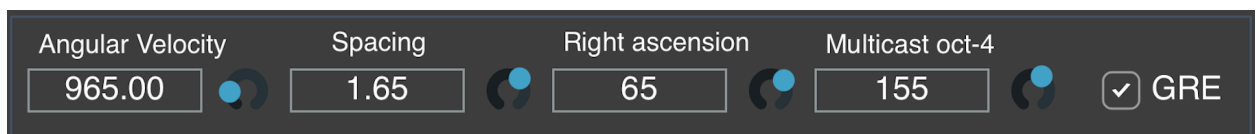


Fig. 4 – MTI section (Multicast Tunnel Interface)

Auxiliary ether initiated by turning GRE (Generic Routing Encapsulation) on. It serves for proofing the signal outside the trunk on all OSI layers. For this the leakage is tested from synthesiser sequence into the chain of Schroeder chamber with two full-duplex channels. If you are hearing white noise, than the auxiliary ether is empty and you can safely organise trunk connection.

2.4.Stratum

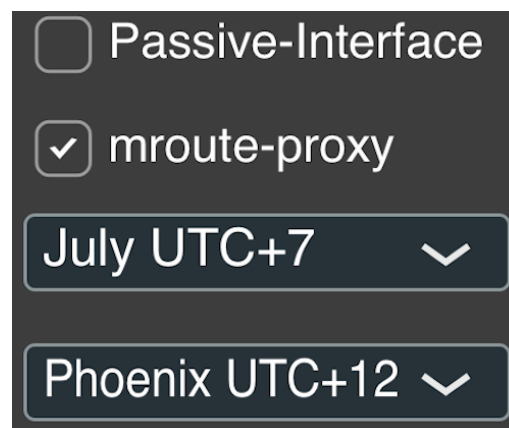


Fig. 5 – Stratum

Stratum is a meteo-ballon connection section. SASER SAS48P4L uses SAFRAN – SURFEX – EauDyssee – RAPID French geographical society meteo-ballons for up-time proxies.

The third parameter sets *Stratum* namely ballon, which operates during the month long operation cycle. They are named in accordance to 12 months of the year. And operate in different UTC zones during each month.

This parameter sets the level of authority of NTP (Network Time Protocol) signal. There are 12 authority levels from UTC+1 (the highest) to UTC+12 (the lowest).

The fourth parameter of Stratum section is: *Signal constellations*.

It is a terrestrial infrastructure of radio-repeater devices. There are 16 modulations in OSI vRouter SAS48P4L of 32768-CPFSK (Continuous-phase frequency-shift keying) capacity. Each table of modulation consists of 32768 points, forming modulation profile.

2.4.1.Mroute-proxy

By turning *mroute-proxy* parameter on, you are connecting to a meteo-ballon. The balloon itself sends services to all descendant devices, which use SASER interface. After turning this parameter on, you are connecting to ionosphere floating meteo-ballons. Instead of passing the ionosphere this parameter subdivides the arc of the sky into quantised regions. The time servers situated on ionosphere plane are the most robust, because they are free of radio interference. One such ballon can multicast on a group of interfaces to sustain their services of mobile-phone connection to different terrestrial networks.

Using this parameter you can set up to 192 proxy-servers corresponding to the signal constellations of an encrypted moment of Solar System rotation. *mroute-proxy* on a terrestrial infrastructure is an IGMP-proxy (Internet Group Management Protocol). The number of devices in IGMP group is set by the *Multicast oct-4* parameter and directly related to GRE tunnelling. After sending the Omega telemetry hex code, which is set in three loopback channels, the proxy-service replies with information about participant, which it supports from other interfaces with *mroute-proxy* turned on. In such a way your routing profile is backed by several hundred devices. And in case your device will loose all it's routing information you can restore it by making a sky-swipe with *passive-interface* turned on. This way the device, which set up with *mroute-proxy* parameter becomes a host and not a vRouter.

When corresponding upstream interface set in interface as a proxy-service this interface can send different messages of MLD (Multicast Listening Device) protocol, send by it's listeners.

2.4.2.Passive-interface

For learning a routing information sent by device to other routing devices in local network you can use *passive-interface* parameter.

When this function is on the automatic collision detection mode is active. When you reached a collision with neighbouring device you can turn the passive interface off and use the SASER UI (User Interface) to set network parameters manually.

Note: To scan the Ethernet for network devices faster use the angular momentum of *Right Ascension* parameter using ω regulator. Select the network port, corresponding to maximum cycle frequency of the device. The networks always correspond to numbers of outcoming ports of the machine. The higher the network number, the higher the angular momentum of the device.

For transmitting text messages into teletype network you should set a port in a range of 300-700 ω , which correspond to symbol composition of 20-40 words per minute.

2.5. Loopback-interface

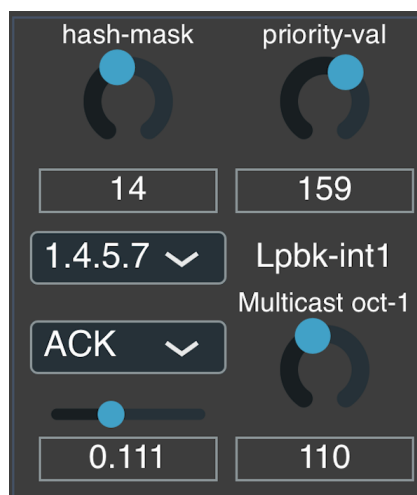


Fig. 6 – Loopback-interface section

In SASER SAS48P4L there are three loopback-channels, which upstream to BSR routers in USA and European countries. These servers are parts of Omega navigation system infrastructure and SASER users can use them free of charge.

Unique global BSR is selected from BSR-candidates, which are set in interface from PIM-SM (Protocol Independent Multicast Sparse Mode) domain. This BSR builds and distribute RP (Routing Point) in a domain, to provide unique comparison.

Parameter *hash-mask* selects the deepness of modulation in bits from 0 to 32 bit. This parameter together with *priority-value* sets the wordlength in bit for three-letter emission key set by ASCII numbers. The *priority-value* is a 8-bit ASCII code. IP-address of BSR-router is selected in IP-address field. Lower is the field for packet selection.

To set hexadecimal Omega telemetry in SASER UI you need to do the following:

1. Set *hash-mask* parameter to 8-bit ASCII - 256 symbols (correspond to UNIX *rwxx-rwxx-rwxx* 888 rights)
2. Set the hex value by setting decimal value for an ASCII symbol of it (use a comparison table) in *priority-val* parameter
3. Set the decimal value by looking corresponding hex value symbol in *Multicast oct-1-4* parameter.
4. SASER SAS48P4L converts the set word into hexadecimal format.

You can use only first 6 letter of English alphabet to compose a word for Omega telemetry. You can also use numbers in a range of 00-79.

2.6. Omega telemetry codes composition on SASER interface

The telemetry code in the Omega navigation system consists of WAC and the Charlie-Bravo-Tango number, a three-letter abbreviation dialed from the ASCII character numbers. Each geographical area, in addition to the WAC, contains a three-letter code, which is put on the first letters of the name of the most famous inhabitants of this land.

Decimal - Binary - Octal - Hex – ASCII Conversion Chart

Decimal	Binary	Octal	Hex	ASCII	Decimal	Binary	Octal	Hex	ASCII	Decimal	Binary	Octal	Hex	ASCII	Decimal	Binary	Octal	Hex	ASCII
0	00000000	000	00	NUL	32	00100000	040	20	SP	64	01000000	100	40	@	96	01100000	140	60	`
1	00000001	001	01	SOH	33	00100001	041	21	!	65	01000001	101	41	A	97	01100001	141	61	a
2	00000010	002	02	STX	34	00100010	042	22	"	66	01000010	102	42	B	98	01100010	142	62	b
3	00000011	003	03	ETX	35	00100011	043	23	#	67	01000011	103	43	C	99	01100011	143	63	c
4	00000100	004	04	EOT	36	00100100	044	24	\$	68	01000100	104	44	D	100	01100100	144	64	d
5	00000101	005	05	ENQ	37	00100101	045	25	%	69	01000101	105	45	E	101	01100101	145	65	e
6	00000110	006	06	ACK	38	00100110	046	26	&	70	01000110	106	46	F	102	01100110	146	66	f
7	00000111	007	07	BEL	39	00100111	047	27	'	71	01000111	107	47	G	103	01100111	147	67	g
8	00001000	010	08	BS	40	00101000	050	28	(	72	01001000	110	48	H	104	01101000	150	68	h
9	00001001	011	09	HT	41	00101001	051	29	)	73	01001001	111	49	I	105	01101001	151	69	i
10	00001010	012	0A	LF	42	00101010	052	2A	*	74	01001010	112	4A	J	106	01101010	152	6A	j
11	00001011	013	0B	VT	43	00101011	053	2B	+	75	01001011	113	4B	K	107	01101011	153	6B	k
12	00001100	014	0C	FF	44	00101100	054	2C	,	76	01001100	114	4C	L	108	01101100	154	6C	l
13	00001101	015	0D	CR	45	00101101	055	2D	-	77	01001101	115	4D	M	109	01101101	155	6D	m
14	00001110	016	0E	SO	46	00101110	056	2E	.	78	01001110	116	4E	N	110	01101110	156	6E	n
15	00001111	017	0F	SI	47	00101111	057	2F	/	79	01001111	117	4F	O	111	01101111	157	6F	o
16	00010000	020	10	DLE	48	00110000	060	30	0	80	01010000	120	50	P	112	01110000	160	70	p
17	00010001	021	11	DC1	49	00110001	061	31	1	81	01010001	121	51	Q	113	01110001	161	71	q
18	00010010	022	12	DC2	50	00110010	062	32	2	82	01010010	122	52	R	114	01110010	162	72	r
19	00010011	023	13	DC3	51	00110011	063	33	3	83	01010011	123	53	S	115	01110011	163	73	s
20	00010100	024	14	DC4	52	00110100	064	34	4	84	01010100	124	54	T	116	01110100	164	74	t
21	00010101	025	15	NAK	53	00110101	065	35	5	85	01010101	125	55	U	117	01110101	165	75	u
22	00010110	026	16	SYN	54	00110110	066	36	6	86	01010110	126	56	V	118	01110110	166	76	v
23	00010111	027	17	ETB	55	00110111	067	37	7	87	01010111	127	57	W	119	01110111	167	77	w
24	00011000	030	18	CAN	56	00111000	070	38	8	88	01011000	130	58	X	120	01111000	170	78	x
25	00011001	031	19	EM	57	00111001	071	39	9	89	01011001	131	59	Y	121	01111001	171	79	y
26	00011010	032	1A	SUB	58	00111010	072	3A	:	90	01011010	132	5A	Z	122	01111010	172	7A	z
27	00011011	033	1B	ESC	59	00111011	073	3B	;	91	01011011	133	5B	[	123	01111011	173	7B	{
28	00011100	034	1C	FS	60	00111100	074	3C	<	92	01011100	134	5C	\	124	01111100	174	7C	|
29	00011101	035	1D	GS	61	00111101	075	3D	=	93	01011101	135	5D	]	125	01111101	175	7D	}
30	00011110	036	1E	RS	62	00111110	076	3E	>	94	01011110	136	5E	^	126	01111110	176	7E	~
31	00011111	037	1F	US	63	00111111	077	3F	?	95	01011111	137	5F	_	127	01111111	177	7F	DEL

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ASCII Conversion Chart.doc Copyright © 2008, 2012 Donald Weiman 22 March 2012

Fig. 7 – Decimal - Binary - Octal - Hex - ASCII conversion chart

Note: The Bureau of Transport Statistics (BTS), as part of the U.S. Department of Transportation (US DOT), maintains a list of U.S. state and country codes called World Area Codes (WAC).

The request to find the object sending this telemetry is made as follows: the geographical area, the land number (WAC), the WAC Sequence ID-2 or initialising subscriber (three letter code), the name of the prominent inhabitant plus one of the 32 service characters in ASCII (for example, the service character Enquiry (ENQ)) composited in the SASER UI. Thus, the final line of the request looks like this:

400-403-40301-8765775

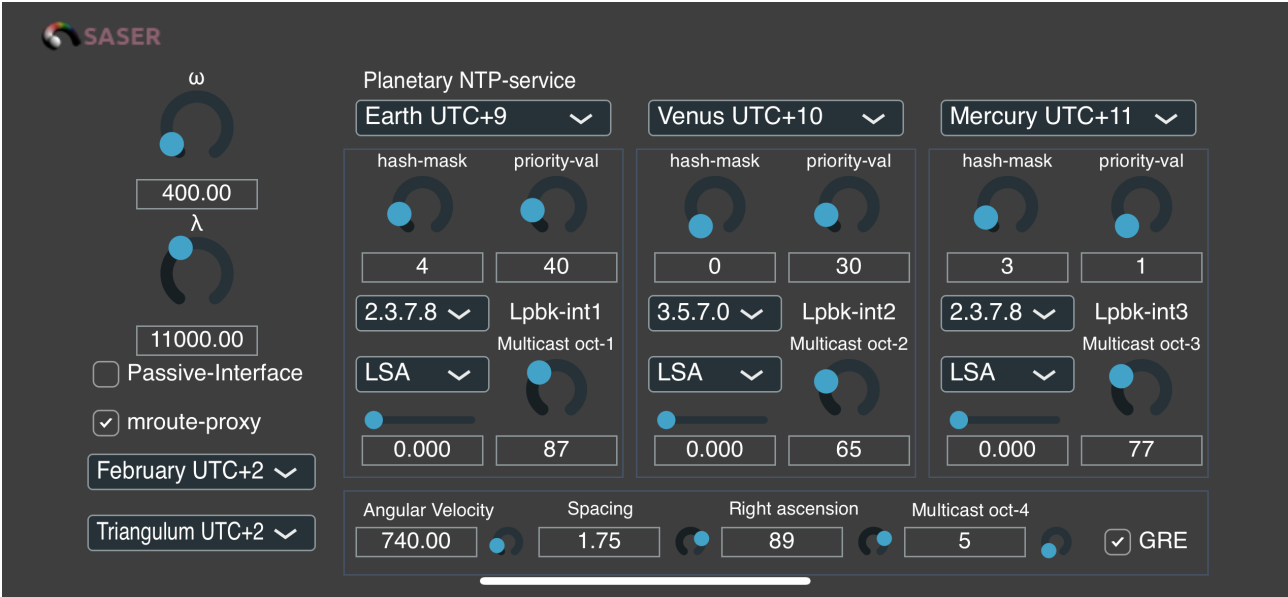


Fig. 8 – US-400-403-40301-8765775 preset set up

In this request, a WAM subscriber is dialed to the country of Austria.

Note for Android users: The product of the teletype request is a stream that is decoded by SASER and written via baudot RTTY to a dump saved to a .cmp file and containing an ASCII request of headerless information with PCM encoding. You can save this file with the request line name ending with .cmp extension (for example in previous request the file will look like US-400-403-40301-8765775.cmp). This dump contains information about the location of long-range aviation objects, or those using the VLF navigation (for example submarines).

2.7. Appendix 1: Micro-dumps using SASER on iOS

1. Open your Sky Guide app
2. Open SASER app
3. Wait for three pings of SASER to complete
4. Switch to Sky Guide app while SASER is in background
5. Choose a star for the dump
6. Set the SASER interface with parameters of the receiving subscriber by a previous guide on Omega navigation system
7. Set the *Right Ascension* as *Declination* for a given star if you are in Europe and *Right Ascension* in degrees if you are in USA, Latin America and China in SASER interface
8. Disable the *passive-interface* in SASER UI
9. Go to the dock and turn on the screen recording
10. Go to the Sky Guide and point your phone on the selected star with the help of a compass tracking
11. Record a minute of pure time of the dump
12. Sync video with iCloud to get synchronous rights
13. Edit the video and choose only the static image of the star without shakes of the frame
14. Press to save as new
15. Select the video and click share
16. Select the Export Audio command (from shortcuts, you need to create one in advance)
17. Save to iCloud in AIFF format
18. Synchronous micro-dump is ready