

## CARMA CHICAGO TRACON TOUR REPORT

### **Section One - Facility Introduction and Tour Description**

On 18 Aug, 1999, CARMA, through the efforts of member and tour director Ed Przyzycki, was granted a tour of the FAA Elgin TRACON air traffic control facility. The facility is located at 1100 Bowes Road in Elgin. We were the very first non-pilot tour group ever admitted to the TRACON for a group tour. Our Tour guide as Dave Voggesser. He was assisted by Craig Neudahl and Dan Richard. 19 members were in attendance for this, our first tour in many years.

The Elgin TRACON handles all IFR air traffic in and out of O'Hare and it's satellite airports, from the surface to 13,000 feet MSL and out to a 40 mile radius of O'Hare airport. It is the control operation for the Class Bravo airspace surrounding O'Hare, what used to be called the "TCA", or Terminal Control Area.

At the TRACON there are usually about 23 controllers on duty per shift, with between 12 and 18 operational positions (work stations) manned, though normally only 4 on midnights. On average there are between 100 and 125 controllers on staff, including about 20 trainees. The training period for new controllers at the facility is from one to two years. This is something of a misnomer, as nearly everyone who starts working at the Elgin TRACON is already a certified controller with prior experience. The performance goal for these employees is clear and simply stated - to be the best air traffic controllers in the world.

Imagine you go in for your annual performance evaluation at work. Your boss advises you that you need to improve the quality of your work because you aren't the best person in the world at it yet, it's something like that...

Another example - In one phase of training the controller is given a blind map test consisting of 200 geographic points which must be identified. A passing score is ninety-five percent. That's passing, but not acceptable. Someone who scores 95 or 96 percent is considered to need a lot of work and is sent for remedial training.

This work has, of course, a zero tolerance for errors. And there's no shortage of opportunities for them. In 1995 the figures were:

- Between 900,000 and 1 Million operations per year at O'Hare Tower
- Resulting in about 1.3 Million operations at the Elgin TRACON

Today's traffic is considerably busier. The TRACON is estimating adding between 100,000 and 150,000 to the above figures for their 1999 totals.

Much of the traffic pace at the TRACON is naturally determined by what O'Hare is doing at any given time. They compute an average of 40 landings per hour at O'Hare per active arriving runway. As many as 3 runways can operate simultaneously for arrivals at O'Hare. Two and one-half miles must be maintained between arriving aircraft, four miles between "heavies" and five miles between "large" aircraft. Controllers generally don't work more than two hours at a console without a break.

This is a large, secure facility. The building is as close to weather proof as the builders were able to construct. It replaced the former O'Hare TRACON, which was located underground, at the base of the old control tower at O'Hare. That facility was vacated. The City of Chicago may take it over as office space in the near future. There is no real backup facility for the Elgin TRACON. In the event of a total system failure the controllers would be dispersed to O'Hare, Chicago Center at Aurora and satellite fields. A contingency plan would then be put into effect. It's thought to be highly unlikely that would ever be required as the Elgin facility is highly redundant in it's failsafe design.

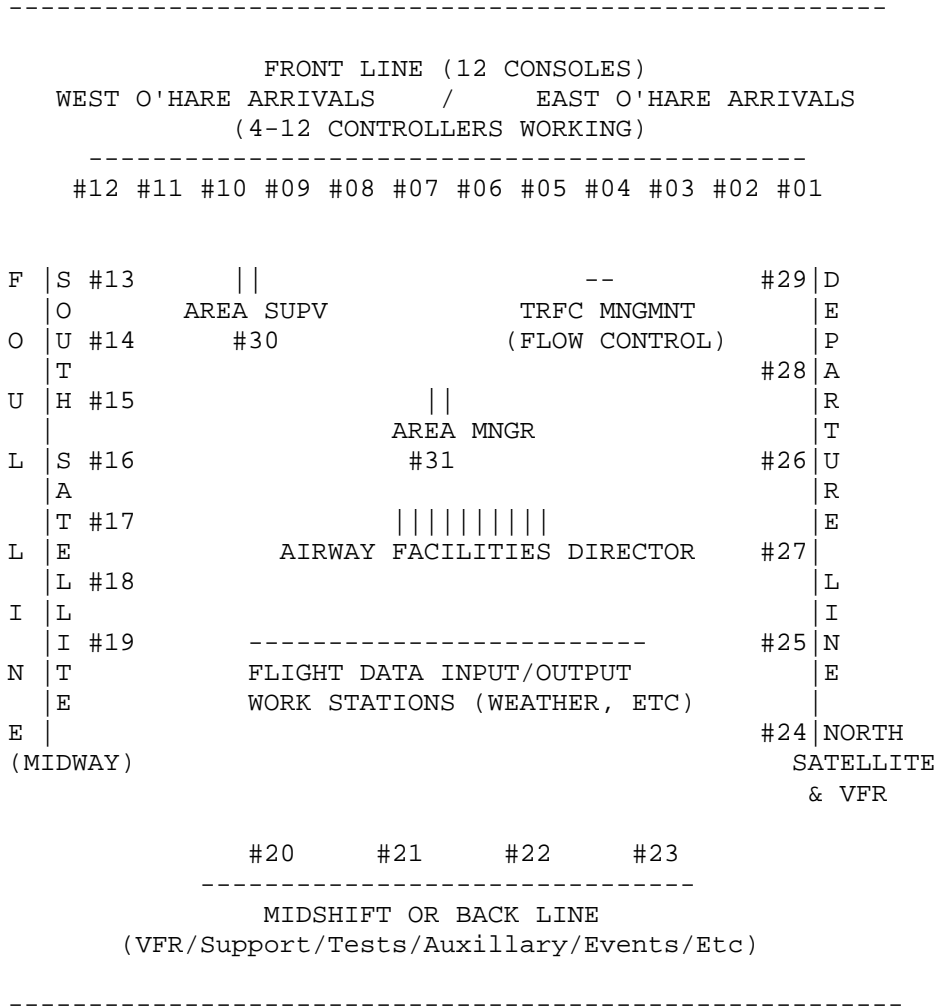
The entire facility is Y2K compliant. It has a massive backup diesel generator for electrical power. It's remote operations are carried on dedicated fiber optic telephone lines with microwave and conventional phone line backup. There are several tiers of fall-back communications support systems. Our guides described, on several occasions, the facility switching to it's generator during local power outages. The only effect was a slight flicker of the hallway fluorescent lights. The primary radar site for the TRACON's surveillance radar is located in Tinley Park, though there are other backup sites as well. The Elgin TRACON has been in operation for about two and one-half years.

After an extensive (>1Hr) lecture on how the facility operates our tour began. It was divided into two parts. One, the actual working area where the controllers operate. Two, the electronic support area. Our tour concluded with debrief, question and answer session and casual chit chat. Ed presented our tour guide with a plaque dedicated to the profession of air traffic control as thanks for our tour. It will be on display in the lobby of the TRACON entrance. Our guides spent well over three hours with us and answered all our questions. The staff went above and beyond to provide us with information we were interested in. Our hats are off to the Elgin TRACON, it's staff and our new Tour Director Ed Przyzycki.

**Section Two - TRACON Console Layout**

The work area at the Elgin TRACON consists of a dimly lit, partially enclosed, large, rectangular work area, within in a room that can only be described as enormous. This design allows for future expansion. The original plans were for other arrival / departure controllers to work from this room as well, such as Rockford and Milwaukee, though funds ran short and those plans were cancelled.

Main Work Area Physical Organization Layout:



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CONSOLE DATA

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Front Line:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#01-	#F20	- ORDPM1	- RSS	CH01	- NID#01h	Parallel Right
#02-	#F21	- ORDPM2	- RSS	CH01	- NID#02h	Parallel Left
#03-	#F22	- ORDTHO	- RSS	CH02	- NID#03h	Trip HO
#04-	#F23	- ORDTA	- RSS	CH03	- NID#04h	Trip Approach
#05-	#F24	- ORDEAF	- RSS	CH04	- NID#05h	East Arrival Feeder
#06-	#F25	- ORDEAHO	- RSS	CH05	- NID#06h	East Arrival HO
#07-	#F26	- ORDEA	- RSS	CH06	- NID#07h	East Arrival
#08-	#F27	- ORDWA	- RSS	CH07	- NID#08h	West Arrival
#09-	#F28	- ORDWAHO	- RSS	CH08	- NID#09h	West Arrival HO
#10-	#F29	- ORDWAF	- RSS	CH09	- NID#0Ah	West Arrival Feeder
#11-	#F30	- ORDFU1	- RSS	CH10	- NID#0Bh	Future 2
#12-	#F31	- ORDFU2	- RSS	CH10	- NID#0Ch	Future 1

Foul Line:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#13-	#F32	- QXMS4	- RSS	CH11	- NID#0Dh	Sector 4 HO
#14-	#F34	- QXMS1	- RSS	CH12	- NID#0Fh	South Satellite 1
#15-	#F35	- QXMS1HO	- RSS	CH13	- NID#0Eh	South Satellite 1HO
#16-	#F36	- QXMS2	- RSS	CH14	- NID#10h	Sector 2
#17-	#F37	- QXMS2HO	- RSS	CH15	- NID#11h	Sector 2 HO
#18-	#F38	- ORDS3	- RSS	CH29	- NID#12h	Sector 3
#19-	#F40	- OQDWS	- RSS	CH17	- NID#13h	West Satellite HO

Back Line:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#20-	#F42	- QXMSSS	- RSS	CH18	- NID#14h	South Satellite Supv
#21-	#F43	- ORDEVA	- RSS	CH19	- NID#15h	South VFR Advisory
#22-	#F44	- ORDML	- RSS	CH20	- NID#16h	Mid-ORD
#23-	#F45	- QXMM2	- RSS	CH21	- NID#17h	Mid-MDW

(Note: the above consoles #20 & #21 were programmed to be easily switched over to serve as arrival / departure consoles for the airshow)

Departure Line:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#24-	#F46	- ORDWVA	- RSS	CH22	- NID#18h	West Departure
#25-	#F48	- ORDNS	- RSS	CH22	- NID#19h	South Departure
#27-	#F50	- ORDED	- RSS	CH23	- NID#1Bh	North Departure
#26-	#F52	- ORDND	- RSS	CH24	- NID#1Ah	East Departure
#28-	#F54	- ORDSD	- RSS	CH25	- NID#1Ch	North Satellite
#29-	#F56	- ORDWD	- RSS	CH26	- NID#1Dh	N. VFR Advisory

Area Supervisor:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#30-	#F58	- ORDFLS	- RSS	CH10	- NID#1Eh	Area Supervisor

Area Manager

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#31-	#F73	- ORDFS	- RSS	CH10	- NID#1Fh	Area Manager

Note: At console #31 sat the the Area Manager, he was very busy. On top of his work station sat a VHF Motorola Visar in a desk charger. Our guide technicians later informed us his Visar is programmed for the FAA's NARACS repeater network and for simplex and in-house repeater communications with technicians inside the facility.

Other consoles not in primary work area:

Hot Spare Area: (not toured)

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#50-	#F--	-	RSS	CH11	- NID#26h	Spare M1
#51-	#F--	-	RSS	CH11	- NID#27h	Spare M1

ETG Training Lab (not toured) Configuration:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#44-	#F77	- E EDHO	- RSS	CH21	- NID#20h	North Satellite
#45-	#F79	- E SDHO	- RSS	CH20	- NID#21h	South Satellite S1
#46-	#F80	- E EAHO	- RSS	CH19	- NID#22h	West Arrival
#47-	#F81	- E WAHO	- RSS	CH19	- NID#23h	East Arrival
#48-	#F83	- E SSHO	- RSS	CH18	- NID#24h	South Departure
#49-	#F85	- E NSHO	- RSS	CH18	- NID#25h	East Departure

Equipment Room: (Note: Our diagram shows consoles below in light gray as installed in the seperate electronic equipment room. We toured this area and did not see these consoles, but there was what appeared to be racks where they could be installed. This is likely for backup / redundancy)

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#41-	#Fdna-	LBP 0	- RSS	CH30	- NID#80h	ARR
#39-	#Fdna-	LBP 3	- RSS	CH30	- NID#83h	PWK
#40-	#Fdna-	LBP 6	- RSS	CH30	- NID#86h	DPA
#43-	#Fdna-	LBP 9	- RSS	CHxx	- NID#89h	NOT USED
#36-	#Fdna-	LBP 1	- RSS	CH16	- NID#81h	MDW 1
#37-	#Fdna-	LBP 4	- RSS	CH16	- NID#84h	MDW 2
#38-	#Fdna-	LBP 7	- RSS	CH16	- NID#87h	MDW 3
#42-	#Fdna-	LBP10	- RSS	CH16	- NID#8Ah	GYG
#32-	#Fdna-	LBP 2	- RSS	CH27	- NID#82h	ORD 1
#33-	#Fdna-	LBP 5	- RSS	CH27	- NID#85h	ORD 2
#34-	#Fdna-	LBP 8	- RSS	CH28	- NID#88h	ORD 3
#35-	#Fdna-	LBP11	- RSS	CH28	- NID#8Bh	ORD 4
#---	#Fdna-	LBP13	- RSS	CHxx	- NID#8Dh	NOT CONFIGURED

Equipment Room Radar Maintenance Area:

Nmbr	Positn	Name	RSS	Circuit	NID##	Description
#52-	#Fdna-	MTNC 1	- RSS	CH32	- NID#28h	Radar Maintenance
#53-	#Fdna-	MTNC 2	- RSS	CH32	- NID#29h	(Not Installed)

(Note: our tour guide pointed out that #52 above, installed close to where the radar feeds come into the facility from Tinley Park, is in fact the only real radar display in the entire building! It actually appeared to be a slightly older console than the one in the TRACON work area. What actually happens is the computers in the electronic equipment room reproduce the video displays on the TRACON operators consoles, right down to the rotating sweep line and sparkling radar return "blips". Our tour guide described the controllers perhaps not really being aware of this, but that they had to keep the controllers happy, and real controllers were only happy when they were sure they were looking at "real" radar screens!)

We were allowed to tour the (unmanned) back line and the the end of the foul line. Here are some actual sets of frequencies that had been configured at these consoles:

(frequency / Ted's notes for freq use)

#23 (Mid-MDW)

118.400 Meigs/Midway Arv/Dep VHF, w/388.0 UHF  
388.000 Meigs/Midway Arv/Dep UHF, w/118.4 VHF  
119.350 O'Hare Aux Arv/Dep  
133.500 Chgo VFR South w/371.9 UHF  
125.000 O'Hare North Departure  
127.400 O'Hare South Departure  
120.550 Lakeshore Arv/Dep VFR VHF w/290.200 UHF  
290.200 Lakeshore Arv/Dep VFR UHF w/120.550 VHF

#21 (South VFR Advisory)

119.000 O'Hare East Approach w/393.100 UHF  
128.450 O'Hare Eat Approach feeder to 119.0  
133.100 Chgo VFR Advisory w/285.600 UHF  
120.250 -No Local Info-  
121.700 Pal-Waukee Ground (?)  
124.700 O'Hare Aux Arv/Dep  
121.500 VHF Emergency Guard  
243.000 UHF Emergency Guard

#19 (West Satellite)

124.425 -No Local Info-  
348.650 Dogfighting Freq at Volk Field Wisc  
120.250 -No Local Info-  
121.700 Pal-Waukee Ground (?)  
118.400 Meigs/Midway Arv/Dep VHF, w/388.0 UHF  
119.350 O'Hare Aux Arv/Dep  
133.500 Chgo VFR South w/371.9 UHF

#18 (Sector 30)

126.050 Meigs/Midway Arv/Dep  
127.875 -No Local Info-  
132.175 -No Local Info-  
118.275 -No Local Info-  
119.575 -No Local Info- (Weather outlets)  
125.175 -No Local Info-  
128.200 -No Local Info-  
121.500 UHF Emergency Guard  
243.000 UHF Emergency Guard

We asked our tour guide what determined if a controller was simulcasting VHF air traffic control direction on the associated UHF paired military frequency. He advised that this is largely random, and may reflect when the frequency was last checked by a controller or inquired on by a pilot (the simulcasts are often casually activated to bring it up on the display to verify what freq is programmed and then is left turned on).

### Section Three - Work console description

Individual Work Station Console Description:

These are updated consoles for TRACON operation.

At the top of the console is a radio frequency selection panel. The console operator is free to monitor / work any of the available frequencies while working. Which frequencies are programmed is determined by the master computer (see sections four and five). UHF simulcasting is controlled here. 8 pairs of VHF and UHF frequencies are generally available.

Directly below the radio control panel is the IDS-4 display and computer. This is an advanced FAA information management system. A wealth of information, such as frequency data, approach and departure plates, terminal diagrams, weather, emergency operations and a host of other data is instantly available.

Below the IDS-4 display, at eye level, is the familiar, green, sweeping radar display. It is surrounded by it's associated controls.

To the left of the radar display is supposed to be a strip bay. In all of the consoles we saw these had been replaced by RVR displays for various local airports. These sensors use a short range laser link at the airports to automatically measure / estimate current visibility. Our tour guide advised that they initially attempted to print out and display all the flight strips coming through the TRACON. They regularly burned out a printer every single day with this load, and no longer rely on the printed flight strips at the TRACON.

Below the radar display sits an adjustable shelf for a heavy duty computer keyboard and mouse / trackball combination. This is used with both the radar display and the IDS-4 system.

To the right of the Radar display is a patch panel controlling intercom, landline audio. These are primarily used to communicate with other controllers in the TRACON, though in some cases external intercom lines are also configured. While we were there the flight data input / output console operator answered telephone calls from Palwaukee and Waukegan towers, both had special requests from out of town pilots who were unfamiliar with the area.

Below the patch panel and to the right of the keyboard are the jacks where the controller plugs in their custom made headset / microphone cables.

Above each large group of consoles was hung a special radio panel. This panel is used to access or test the emergency backup transmitters and backup sites.

#### Section Four - Electronic Support Area

This is the real "behind the scenes" area where the nuts and bolts of the operation are located. Here are the enormous, yet perfectly organized, cable runs, wire pairs, video feeds, audio connections and the whole gamut of stuff that makes those clean displays, perfect communications, and enable the controllers to do their jobs. Our escorts were totally patient, helpful, open, and forth coming with whatever information we requested which they could locate.

We first saw a set of radios. These are in fact the only base radios located at the facility, everything else is remoted out. These are the last ditch back ups. When all the gas for the diesel generator is gone, when the last of the batteries drain out, there are special, reserved backup batteries for these radios, which can be configured for the consoles in the work area and then operated locally. These radios are programmable, but here is how they were configured when we visited: (The numbers relate to the consoles in the work area).

#37 - 133.500

#29 - 135.075

#28 - 118.925

#31 - 124.425

#56 - 125.400

#27 - 128.450

We next were shown a massive set of floor to ceiling patch racks. This was the demarcation point, where the outside phone lines enter the facility and change over to being the responsibility of the in-house technicians.

Nearby was the computer which kept all the radio frequencies straight going to the work stations upstairs. Scotch taped to it's panels were master lists of all the TRACON's remoted frequencies. Our technicians actually took the time and made the effort to copy this information for us. We are deeply indebted. They are reproduced in Section Five.

Entering the next hall in the room we were shown another floor to ceiling rack. Protruding from a panel was a mobile control head for a Motorola Quantar VHF programmable radio. It was prominently marked as the FAA's NARACS network. Our tour guide advised it was used for communications with field technicians and was regularly tested. We asked them if they knew or had the frequencies for this radio. They said it was VHF, and then went to search their computers for the programming software. Sadly, they could not locate it, and we did not get the frequencies programmed into this radio. There was, however, an interesting channel guide scotch taped to the panel next to the control head:

F1 - Naperville Repeater  
F2 - O'Hare Repeater  
F4 - Lake Zurich repeater  
F5 - Marengo Repeater  
F6 - New Lenox Repeater  
F7 - Dixon Repeater



The other channels were not marked. The techs thought F3 might be simplex. Here is one published channel plan for NARACS & notes:

F01 - 172.925 out / 169.325 in - Active Chgo Area (136.5)  
F02 - 172.950 out / 169.350 in - Active Chgo Area (136.5)  
F03 - 172.975 out / 169.375 in - Active Chgo Area (136.5)  
F04 - 172.850 out / 169.250 in - Active Chgo Area (136.5)  
F05 - 172.875 out / 169.275 in  
F06 - 172.900 out / 169.300 in - Active Chgo Area (136.5)  
F07 - 172.825 out / 169.225 in  
F08 - 172.125 simplex  
F09 - 172.150 simplex  
F10 - 172.175 simplex - Active Chicago Area  
F11 - 166.175 simplex - Active Chicago Area  
A01 - 172.900 out / 172.100 in  
A02 - 170.200 out / 169.250 in  
H01 - 170.150 out / 169.225 in  
H02 - 172.150 out / 171.2625 in

There is also a HF component to NARACS. It is listed below, though our guides advised us there is NO access to HF systems from the TRACON facility.

NARACS HF:

F01 - 4.675	F10 - 19.410
F02 - 6.870	F11 - 20.852
F03 - 7.611	F12 - 3.428
F04 - 8.125	F13 - 5.512
F05 - 9.914	F14 - 8.912
F06 - 11.637	F15 - 11.288
F07 - 13.475	F16 - 13.312
F08 - 15.815	F17 - 17.925
F09 - 16.348	F18 - 10.493

Following the NARACS radio we were shown an advanced, digital audio logging system. This rack of equipment and computers records, stores and archives all of the audio going in and out of the facility. The audio sound bytes are time stamped, converted to compressed digital audio and archived on laser discs. Scotch taped to the panels surrounding this rack were, of course, more frequencies, these associated with the audio tracks being recorded. This was an extensive listing, broken down into small groups. As this is being written we are still awaiting the processing of some digital photography of these posts and there will undoubtedly be another future posting of this information. In the meantime, here is what we were able to scribble down:

119.350 - Sector 2	133.500 - Sector 3
120.550 - North Satellite	134.400 - North Departure
124.350 - East Feeder	135.075 - West Feeder
126.050 - Sector 4	118.400 - Sector 1
128.575 - EW HO	

From here we were shown a massive rack of 56K modems which handle all the ingoing and outgoing digital information. Also located here was a station for testing and analysis of this information. Nearby was a tool cage and hardware repair area.

Further down the room was the radar maintenance area. Located in this area are the incoming radar feeds and specialized radar modems. Also, the computers which produce the images on the screens in the work area upstairs. There are floor to ceiling racks of computers which serve as maintenance and analysis stations for the radar data. There is also a time standard which compares the time standard from GPS satellites and WWVB.

**Section Five - Master Frequency List**

(Dated 09/30/96 but staff advises recently updated)

Site Key:

ORD Site = ORD & ORDF	QXM = Tinley Park	PWK = Palwaukee
A Site = ORDA & ORDG	DPA = Dupage	PWKA= Palwaukee RCAG
B Site = ORDB & ORDH	DPAA= Dupage VOR	GYG = Gary, IN
C Site = ORDC & ORDI	UGN = Waukegan	QDC = Hampshire
D Site = ORDD & ORDJ	UGNA= UGN Loc	AR8 = Crown Point, In
	ZAU = ARTCC	QHU = Downers Grove
	ARR = Aurora	

O'HARE FREQUENCIES:

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CH	FREQUENCY	SITE	S/B	NOTES
--	-----	----	----	-----
01	119.250	A	A	
02	120.250	A	A	NEW
03	120.750	B	B	ELG PREEMPT ORD
04	121.150	C	C	
05	121.500	C	C	SHARED ELG/ORD
06	121.600	A	A	
07	121.675	B	B	
08	121.750	ORD	ORD	
09	121.900	D	D	
10				
11				
12	126.900	D	D	ELG PREEMPT ORD
13	127.925	C	C	NEW / ELG PREEMPT ORD
14				
15	132.700	C	C	ELG PREEMPT ORD
16				
17	135.400	D	D	VHF ATIS
18				
19	243.000	B	B	SHARED ELG/ORD
20	269.900	ORD	ORD	UHF ATIS
21				
22	348.600	D	D	
23				
24	390.900	D	D	ELG PREEMPT ORD

ELGIN FREQUENCIES:

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CH	FREQUENCY	SITE	S/B	NOTES
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25	118.400	QXM	QXM	
25E	118.400	QHU		ECS
26	118.925	J	J	NEW
27	119.000	F	F	
27E	119.000	F		ECS
28	119.350	QXM	QXM	
28E	119.350	QHU	QHU	ECS
29	120.250	QDC	QDC	
30	120.550	UGN	UGN	
30E	120.550	UGN		ECS
31	121.700	ARRZ	ARRZ	REMOTE ARR GND CT 1
32				
33				
34	124.350	I	I	REMOTE PWK GND CT 1
34E	124.350	QHU		ECS
35	124.425	DPAA	DPAA	NEW
36	124.700	PWK	PWK	
37	125.000	F	F	
37E	125.700	F		ECS
38	125.400	H	H	
39				
40	126.050	QXM	QXM	
41	126.800	G	G	
42	127.400	F	F	
42E	127.400	F		ECS
43	127.875	QXM	QXM	NEW
44	128.450	H	H	
45	128.575	F	F	
45E	128.575	QHU		ECS
46				
47				
48				
49	132.175	I	I	NEW
49E	132.175	QHU		ECS
50	133.100	GYG	GYG	
50E	133.100	AR8	AR8	ECS
51	133.500	ZAU	ZAU	
52	133.625	B	B	
53	134.400	UGN	UGN	
53E	134.400	UGNA	UGNA	ECS
54	135.025	H	H	NEW
54E	135.025	F		ECS
55	135.075	G	G	
56				
57	269.500	G	G	
58	284.000	F	F	
59	285.600	GYG	GYG	
60	288.050	J	J	NEW
61	290.200	G	G	
62	307.200	QDC	QDC	
63	308.400	I	I	
64	315.600	H	H	
65	337.400	F	F	
66	345.200	I	I	
67	348.650	DPAA	DPAA	NEW
68	371.900	ZAU	ZAU	

69	381.450	G	G	NEW
70	388.000	G	G	
71	393.100	F	F	
72	398.950	QXM	QXM	NEW