



Communications Northwest  
 624 McLoughlin Blvd.  
 Oregon City OR 97045  
 United States

www.commnw.com

# Quote

Quote #QU10327

Date: 2/16/2024

This Quote Expires On: 3/17/2024

Bill To	Ship To
BEAU RENFRO WAHAKIACUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States	WAHAKIACUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States

Sales Rep	Terms	PO Number
John Clark	Due on receipt	

Item	Description	Quantity	Price	Total
Notes	SYSTEM PROPOSAL ONE			
Notes	TAIT TB9400 FIVE SITE, FIVE CHANNEL VHF AS-IP			
TB9435S-100T	TB9435 Single 100Watts Chassis Assembly	25	\$990.50	\$24,762.50
T01-01103-BAAA	TB9400 Reciter 136-174MHz	25	\$1,999.33	\$49,983.25
T01-01121-BBBA	TB94 Linear PA 136-174M 100W	25	\$1,579.35	\$39,483.75
TBA30A4-4100	PMU, TB9000,..48VACDC Aux12V	25	\$1,937.35	\$48,433.75
219-01561-00	Cable, PMU IEC, 6.5ft	25	\$10.12	\$253.00
TBAS060	SFE Key- Digital Fixed Station Interface (TB91)	10	\$405.43	\$4,054.30
TBAS062	Simulcast Enable	25	\$3,663.44	\$91,586.00
TBAS071	IP Networking Satellite	15	\$590.12	\$8,851.80
TBAS061	Central Voter	10	\$3,738.08	\$37,380.80
Subtotal				\$304,789.15
Notes	TIMING EQUIPMENT			
Custom Project Materials	950-21116-00 OSC 2402-613 SECURESYNC MODEL 2402-613	5	\$6,184.00	\$30,920.00
Custom Project Materials	TBD SECURESYNC HOT SWAP 12VDC POWER SUPPLY MODULE	5	\$1,300.05	\$6,500.25
Custom Project Materials	950-21118-00 PS 2400-HS-A1 SECURESYNC HOT SWAP AC PS	5	\$716.85	\$3,584.25



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Custom Project Materials	950-00005-14 1204-1C, OPTIONAL MODULE 3X10MHZ OUTPUTS	5	\$820.13	\$4,100.65
Custom Project Materials	950-00005-03 OROLIA MODEL 8226 SURGE SUPP	5	\$376.65	\$1,883.25
Custom Project Materials	950-00005-21 OROLIA MODEL 8230 NSS ANTENNA	5	\$364.50	\$1,822.50
Custom Project Materials	950-00002-84 300380 GROUND KIT FOR LMR-600 GK-S600TT	5	\$34.09	\$170.45
Custom Project Materials	950-00001-43 411476 COLD SHRINK TUBING/ WEATHERPROOFING KIT	5	\$32.56	\$162.80
Custom Project Materials	950-10015-67 475433 N MALE EZ FOR LMR-600	20	\$23.95	\$479.00
Custom Project Materials	950-00001-19 86672 LMR-600 1/2" FOAM CABLE-STAND W/ FOAM DIELECTRIC	250	\$2.74	\$685.00
Subtotal				\$50,308.15
Notes	TAIT ADVANTAGE			
SRVADV-INW-TAM-1	Serv Advantage TAM 1 Yr Infra No Warrant	1	\$26,609.50	\$26,609.50
SRVADV-INW-TAM-2	Tait Advantage TAM Yr#2 Infra No Warrant	1	\$26,609.50	\$26,609.50
SRVADV-INW-TAM-3	Tait Advantage TAM Yr#3 Infra No Warrant	1	\$26,609.50	\$26,609.50
EPW-INF-TAM-1	Extended Warranty TAM Infrastructure 1Yr	1	\$0.00	\$0.00
EPW-INF-TAM-2	Extended Warranty TAM Infrastructure 2Yr	1	\$0.00	\$0.00
EPW-INF-TAM-3	Infrastructure 3 Yr Extend Warranty	1	\$5,321.90	\$5,321.90
Subtotal				\$85,150.40
Notes	CERAGON MICROWAVE EQUIPMENT			
IP-50C-11w	IP-50C, 11, Basic Radio, wide	17	\$12,466.00	\$211,922.00
DXC11-xxxY-ccWdd-H	IP-50C, Diplexer Unit,11,Unspecified-H	8	\$1,558.00	\$12,464.00
DXC11-xxxY-ccWdd-L	IP-50C, Diplexer Unit,11,Unspecified-L	8	\$1,558.00	\$12,464.00
IP-50C-06	IP-50C, 06, Basic Radio	9	\$12,466.00	\$112,194.00
DXCL6-xxxY-ccWdd-H	IP-50C, Diplexer Unit,L6,Unspecified-H	4	\$1,558.00	\$6,232.00



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DXCL6-xxxY-ccWdd-L	IP-50C, Diplexer Unit,L6,Unspecified-L	4	\$1,558.00	\$6,232.00
IP-20C-Pole-Mount	IP-20C DC REMOTE MOUNT KIT	24	\$312.00	\$7,488.00
IP-20C_10-11G_Rmt_Mnt_adpt	IP-20C 10-11G Remote Mount adaptor	16	\$344.00	\$5,504.00
Term-PBR100	IP-20C/RFU-D 10-11 GHz termination	16	\$481.00	\$7,696.00
Custom Project Equipment	RFU-C10_11-OMT-INT-RW	8	\$693.00	\$5,544.00
IP-20C_OMT_kit_10-11G	IP-20C OMT kit 10-11GHz	8	\$723.00	\$5,784.00
IP-20C_RM_OMT_10-11G_adpt	IP-20C_RM_OMT_10-11G_adpt	8	\$545.00	\$4,360.00
Flx-WG-4FT-10_11	Flx WG kit 4FT 10_11GHz PBR 100	16	\$779.00	\$12,464.00
IP-20C_6G_Rmt_Mnt_adpt	IP-20C 6G Remote Mount adaptor	8	\$286.00	\$2,288.00
Term-PDR70	IP-20C/RFU-D 6 GHz termination	8	\$874.00	\$6,992.00
Custom Project Equipment	RFU-C6-OMT-INT-RW	4	\$693.00	\$2,772.00
IP-20C_OMT_kit_6G	IP-20C OMT kit 6GHz	4	\$723.00	\$2,892.00
IP-20C_RM_OMT_6G_adpt	IP-20C_RM_OMT_6G_adpt	4	\$779.00	\$3,116.00
Flx-WG-4FT-6	Flx WG kit 4FT 6GHz PDR 70	8	\$877.00	\$7,016.00
SL-Capacity-250M	SL - Capacity 250M, per carrier	24	\$1,336.00	\$32,064.00
SL-ACM	SL - ACM, per carrier	24	\$390.00	\$9,360.00
SFP-GE-LX-EXT-TEMP	SFP OPTICAL 1000Base-LX,EXT TEMP	26	\$417.00	\$10,842.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_70m	4	\$348.00	\$1,392.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_60m	4	\$309.00	\$1,236.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_50m	14	\$257.00	\$3,598.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_40m	2	\$230.00	\$460.00



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Item	Description	Quantity	Price	Total
CBL-GND	GROUND CABLE FOR IDU and ODU	24	\$28.00	\$672.00
OUTDOOR TIES	OUTDOOR TIES 50pcs	12	\$52.00	\$624.00
IP-20C_DC_Conn	IP-20C_DC_Conn	24	\$13.00	\$312.00
Outdoor_DC_cbl_2x18AWG_drum	CABLE,MATERIAL,2x18AWG,305M (1000ft),OUTDOOR	5	\$1,504.00	\$7,520.00
Fiber_clamp_6cbl_4.0-7.0mm	DUAL FEADER CLAMP FOR 4.0-7.0mm CABLE 6 WAY.	420	\$10.00	\$4,200.00
Subtotal				\$507,704.00
Discount - NASPO	NASPO - 00318		-58%	(\$294,468.32)
Subtotal				\$213,235.68
Custom Project Materials	AM-3-11-RW 3' ANT,SP,11GHz,Crgn&Std UBR100 Int-RW	8	\$25.16	\$201.28
Custom Project Materials	Am-4-6-RW ANT,4FT,5.725-7.125GHz,SP,RFU-C TYPE/UDR70	1	\$3,958.00	\$3,958.00
Custom Project Materials	Am-6-6-RW ANT,6FT,5.725-7.125GHz,SP,RFU-C TYPE/UDR70	3	\$7,735.00	\$23,205.00
Ant Pol mount 1-3FT	Ant Pol mount 1-3FT	5	\$735.00	\$3,675.00
Ant Pol mount 4-6FT	Ant Pol mount 4-6FT	4	\$1,773.00	\$7,092.00
Custom Project Materials	A-2-3-STRT-RW Strut for standard anten 2FT-3FT RADIOWAVES	24	\$1,200.00	\$28,800.00
Custom Project Materials	A-4-6-STRT-RW Strut for standard ant 4FT-6FT RADIOWAVE	12	\$1,697.00	\$20,364.00
Custom Project Materials	****CommNW sourced Monopole Antenna Mount and tieback for 3 struts****	3	\$0.00	\$0.00
Subtotal				\$87,295.28
Sales Discount - Non-Contract	Sales Discount - Non-Contract		-20%	(\$17,459.06)
Subtotal				\$69,836.22
Custom Project Services	Three-Year Warranty Three-Year Warranty	26	\$1,600.00	\$41,600.00
Custom Project Services	FREQ-COORD FCC Frequency Coordination (Excludes FCC License Fee)	12	\$1,500.00	\$18,000.00



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SR-0961-0	e-Product basic for IP50C	1	\$985.00	\$985.00
SR-0958-0	e-Installation - (CCRP) for IP50C	1	\$1,142.00	\$1,142.00
NM-Basic-Perpetual	Basic package - Perpetual subscription.	24	\$795.00	\$19,080.00
Subtotal				\$80,807.00
Notes	AVTEC DISPATCH CONSOLE-NASPO PRICING			
SFW-SCOUT-EX-T1-SK	Scout EX Console - Tier 1 includes a license for a Scout Enterprise Console with Software Audio Package. Includes IRR. Software Key version.	3	\$12,437.12	\$37,311.36
DSACCCPUDTWIN11	PC for Scout Console Packages, Dual NICs, MS Windows 11 Professional 64 bit OS	3	\$2,563.97	\$7,691.91
DSACCTSCS	22" Full HD Touch Screen Monitor, HDMI/ DPort/VGA/DVI Inputs. No driver req.	3	\$2,088.20	\$6,264.60
ACCUSB-FSW-SING	USB PTT Footswitch Accessory, Software Media Workstation	3	\$312.99	\$938.97
ACCUSB-HJB-NENA	Avtec USB Headset/handset jack box (single jack), Integrates NENA phone at the operators position with Scout. Requires Scout version 4.9 or later running Software Media Workstation.	6	\$1,000.98	\$6,005.88
ACCUSB-HUB10	10 Port USB 3.0 Hub with Power Adapter. Mounting kit included. Installs on/under a desk, to a wall or DIN rail using the hardware & included DIN brackets. 3ft USB 3.0 cable included	3	\$159.89	\$479.67
ACCUSB-MIC	Avtec USB PTT Desk Microphone, Scout Software Media Workstation	3	\$751.94	\$2,255.82
ACCUSB-RELAY	USB Relay Kit, 4 each Form C Relays, Software Media Workstation	3	\$477.72	\$1,433.16
ACCUSB-SPK-2	Avtec USB Dual Speaker Kit, Scout Software Media Workstation	3	\$1,125.98	\$3,377.94
ACC-HED-BASE-WLS-6W	Plantronics CA22CD Wireless PTT Headset Base. Headset top is sold separately	3	\$822.68	\$2,468.04
ACC-HED-TOP-SING-NC	Headset top, Single Ear with noise canceling microphone. Requires base.	3	\$113.37	\$340.11
SFW-VPG-L0-SK	Redundant VPGate Software License for a maximum of 24 endpoints; up to 12 may be "B" Licenses. Software license version.	1	\$8,593.09	\$8,593.09
DSACCCPUSTD2022	1 Rack Unit (1RU) Server Solid State hard drive, Windows 2022 Server OS, TPM 2.0. Requires additional package for monitor, keyboard, etc. (DISP-XXXX)	2	\$7,585.33	\$15,170.66



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OUTPOSTPLUS-2R	OUTPOSTPLUS RADIO GATEWAY, VOIP, 2 PORT, POE, POWER SUPPLY NOT INCLUDED.	3	\$2,359.52	\$7,078.56
OUTPOSTPLUS-CFG	OUTPOSTPLUS CONFIGURATION TOOL. 1 REQUIRED PER SITE.	1	\$207.37	\$207.37
DSOPPMDC1200	OUTPOSTPLUS KIT TO ADD SUPPORT FOR (1) MDC1200 ENDPOINT. INCLUDES SOFTWARE LICENSE. OUTPOSTPLUS PURCHASED SEPARATELY.	4	\$531.98	\$2,127.92
SFW-VPG-DFSI-6-SK	Supplementary VPGate P25 DFSI endpoint license, requires SFW-VPG-XXXX. Supports up to 6 each red...	1	\$6,442.88	\$6,442.88
PKG-INPUT-VPGATE	Input Package for Scout and DSPatchNET, includes one each 24-input rack mount panel and power supply. 25 pr cabling is optionally purchased, PKG-INST-AUX-XX.	1	\$2,682.19	\$2,682.19
PKG-OUTPUT-VPGATE	Output Package for Scout, includes one each 24-output rack mount panel and power supply. 25 pr cabling is optionally purchased, PKG-INST-AUX-XX.	1	\$2,682.19	\$2,682.19
PKG-INST-AUX-25	Type 66 Cabling/Punch block kit to install one auxiliary I/O package, 25' cables	2	\$826.56	\$1,653.12
ACC-NETWK-24P-SFP4	24G-Port PoE+ 1U Managed Ethernet Switch with 4 SFP Slots	1	\$3,727.34	\$3,727.34
OUTPOSTPLUS-PS-NA	OUTPOSTPLUS POWER SUPPLY,..NORTH AMERICA	3	\$103.68	\$311.04
OUTPOSTPLUS-SHELF	OUTPOSTPLUS RACKMOUNT..SHELF (HOLDS 2 UNITS)	2	\$207.37	\$414.74
ACC-MTG-1U-RR	Kit to rack mount PS-12V-3BAY-AC , ACCCPU-RM-2012 or -WIN7 in 19" relay rack. 1U high.	2	\$242.25	\$484.50
Notes	***RECOMMENDED SPARE AVTEC ITEMS***			
ACCUSB-FSW-SING	USB PTT Footswitch Accessory, Software Media Workstation	1	\$312.99	\$312.99
ACCUSB-HJB-NENA	Avtec USB Headset/handset jack box (single jack), Integrates NENA phone at the operators position with Scout. Requires Scout version 4.9 or later running Software Media Workstation.	1	\$1,000.98	\$1,000.98
ACCUSB-HUB10	10 Port USB 3.0 Hub with Power Adapter. Mounting kit included. Installs on/under a desk, to a wall or DIN rail using the hardware & included DIN brackets. 3ft USB 3.0 cable included	1	\$159.89	\$159.89
ACCUSB-MIC	Avtec USB PTT Desk Microphone, Scout Software Media Workstation	1	\$751.94	\$751.94



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ACCUSB-RELAY	USB Relay Kit, 4 each Form C Relays, Software Media Workstation	1	\$477.72	\$477.72
ACCUSB-SPK-2	Avtec USB Dual Speaker Kit, Scout Software Media Workstation	1	\$1,125.98	\$1,125.98
ACC-HED-BASE-WLS-6W	Plantronics CA22CD Wireless PTT Headset Base. Headset top is sold separately	1	\$822.68	\$822.68
ACC-HED-TOP-SING-NC	Headset top, Single Ear with noise canceling microphone. Requires base.	1	\$113.37	\$113.37
SCOUTCARE-T1-WARRANTY	ScoutCare Year 1 Tier 1 services provided during the one year warranty period only. Includes Software Maintenance, Remote Support, and Training.	1	\$0.00	\$0.00
SCOUTCARE-T1	Year 2 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 3 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 4 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 5 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
Custom Project Services	***AVTEC LABOR HOURS*** STAGING, INSTALLATION, AND/OR TRAINING FOR CONSOLES, OUTPOSTS, VPGATES, I/O	80	\$168.00	\$13,440.00
Subtotal				\$175,405.33
Notes	KENWOOD PORTABLE, DASH MOUNT MOBILE, AND DESKTOP BASE STATION SUBSCRIBERS			
NX-5200K2	VHF (136-174MHz), 6.0 Watts NXDN Conventional / TYPE-C (Gen1/Gen2) Trunking	194	\$595.87	\$115,598.78
KNB-L3M	Li-ion 3400mAh (High Capacity)	194	\$134.28	\$26,050.32
KRA-25	High gain VHF helically loaded whip antenna 148-162 MHz	194	\$26.84	\$5,206.96
KMC-72W	MIL-SPEC, IP54/55/67 Noise-cancelling Speaker Mic [Intrinsically Safe Option]	194	\$75.55	\$14,656.70
KSC-52BK	Rapid rate single unit charger	194	\$62.46	\$12,117.24
Notes	VEHICLE MOUNTED DASH MOUNT MOBILE RADIO			
NX-5700K	VHF (136-174MHz), 50 Watts NXDN Conventional / TYPE-C (Gen1/Gen2) Trunking	104	\$708.02	\$73,634.08
Notes	DESKTOP BASE STATION RADIO			
NX-5700K	VHF (136-174MHz), 50 Watts NXDN Conventional / TYPE-C (Gen1/Gen2) Trunking	15	\$708.02	\$10,620.30



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KMB-34	Control Station Mounting Case for KPS-15 Power Supply with mobile Note: For mid power mobiles (NX-5700/5700B/5800/5800B/5900/5900B) only.	15	\$42.14	\$632.10
KPS-15	DC Switching Power Supply (117/230 VAC; 23A max. continuous, 25A peak)	15	\$135.29	\$2,029.35
KMC-9C	Control Station Desktop Microphone (8-pin mod. plug) Note: NOT compatible with TDMA operations	15	\$67.28	\$1,009.20
Subtotal				\$261,555.03
Notes	VHF PAGER			
0810133	Swissphone s.QUAD Voice 360 VHF-B 150-160MHz 12.5kHz Pager	1	\$445.00	\$445.00
0810942	Charger with LED for both charging modes including relay and antenna connector	1	\$65.00	\$65.00
Notes	NEW DESKTOP ON-SITE DESKTOP BASE STATION ANTENNA EQUIPMENT			
LMR-400-DB	LMR-400-RR-DB direct burial low loss coaxial cable	2,000	\$2.45	\$4,900.00
EMR150DP	136-174MHz VHF Single Bay Folded Dipole Antenna (Mast NOT included)	15	\$620.00	\$9,300.00
IS-50NX-C2	Flange Arrestor, N/F	15	\$98.98	\$1,484.70
EZ-400-NMH-X	Connector, N-Male Crimp Hex/Knurled Nut for LMR400, Non-Solder Pin	45	\$15.62	\$702.90
RFU-501	UHF Male PL259-RG8,RG213	15	\$6.02	\$90.30
Custom Project Materials	Custom materials necessary to complete project including mast, mounts, clamps, clips, ground wire, brackets, etc.	15	\$2,500.00	\$37,500.00
Custom Project Equipment	Boom lift rental for station antenna installations	1	\$2,500.00	\$2,500.00
Subtotal				\$56,987.90
Notes	STANDARD ROOF MOUNT MOBILE RADIO ANTENNA AND COAXIAL CABLE EQUIPMENT			
AVWB-SM-39-68	ANT WIDEBAND/SPRING 139-168MHz	104	\$76.07	\$7,911.28
MNMOM-10F	MNMO BASE 10.25m(33') COAX CABLE FME(f)	104	\$34.18	\$3,554.72
SAB-181	NMO LOW FREQUENCY ADAPTOR ASSY	104	\$11.16	\$1,160.64
CA-PLP-FP	PL259(m)-FME(m) ADAPTOR	104	\$7.57	\$787.28
Subtotal				\$13,413.92
Sales Discount - Non-Contract	Sales Discount - Non-Contract		-20%	(\$2,682.78)



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Subtotal				\$10,731.14
Notes	ON-SITE DASH MOUNT MOBILE RADIO INSTALLATION			
301 - 12VOLT LABOR	Vehicle Arrival: Vehicle Description (Including VIN): Issue Reported: Troubleshooting: Findings:	104	\$1,385.00	\$144,040.00
Custom Project Equipment	Newmar Commander II power management systems and battery strings for no less than 12 hour back up power at all sites.	1	\$163,631.00	\$163,631.00
316 - PREVAILING WAGE - WASHINGTON	PREVAILING WAGE-DESKTOP BASE STATION RADIO INSTALLATION	16	\$3,024.00	\$48,384.00
320 - PREVAILING WAGE WA - TOWER	PREVAILING WAGE TOWER - Micro wave removal, antenna removal, micro wave install, antenna install, new coax runs with industry clamping into shelters at customer listed sites.	1	\$156,000.00	\$156,000.00
Custom Project Equipment	Telewave Dipole antennas for sites. (6) qty ANT150D7-12, (2) qty ANT150D6-9, (2) qty ANT 150D	1	\$36,178.00	\$36,178.00
Custom Project Equipment	Repeater Site Custom Filtering/Combining Equipment and Cabling	5	\$30,000.00	\$150,000.00
Custom Project Materials	5 site LMR coax (LMR240 / 400 / 600), couplers, polyphasers, hangers, expendable supplies, weather proofing	1	\$50,000.00	\$50,000.00
320 - PREVAILING WAGE WA - TOWER	PREVAILING WAGE TOWER - Line of Site survey for micro wave link Wickiup to High School and Radar to KM.	1	\$17,220.00	\$17,220.00
316 - PREVAILING WAGE - WASHINGTON	PREVAILING WAGE - Site shelter installation work at customer listed sites. Micro wave equipment, Tait RF equipment, switches, timing units, gps, coax, jumper lines.	1	\$90,720.00	\$90,720.00
120010BK	Equipment Rack 19"x84" Black	10	\$935.00	\$9,350.00
CS RMT SRV during installation	Customer Support remote service during installation	5	\$200.00	\$1,000.00
302 - RF TECH LABOR	RF Tech labor to pre stage equipment, prep and configure for installation at sites	140	\$189.00	\$26,460.00
304 - ENGINEERING LABOR	PREVAILING WAGE - Commissioning engineering support	40	\$200.00	\$8,000.00
SVF-CVT	Services - Coverage Verification Testing	1	\$14,800.00	\$14,800.00



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501 - PROJECT MANAGEMENT	Prevailing Wage - Project management, documentation, planning & logistics.	160	\$189.00	\$30,240.00
309 - SERVICE TRAVEL	Service Travel, Per Diem, Lodging	1	\$15,560.00	\$15,560.00
FCC - COORDINATION	Frequency Coordination Assistance **If Necessary**  Please note all frequency usage in proposed systems are reliant of client receiving FCC frequency usage authorization. Communications Northwest will work in the interest of client however, however FCC frequency authorization ultimately is outside of Communications Northwest control	1	\$25,000.00	\$25,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR ONE	1	\$40,000.00	\$40,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR TWO	1	\$42,000.00	\$42,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR THREE	1	\$44,100.00	\$44,100.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR FOUR	1	\$46,305.00	\$46,305.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR FIVE	1	\$48,620.00	\$48,620.00
Subtotal				\$1,207,608.00
Notes	CURRENT AFTER HOURS LABOR RATES @ \$ 252.00 PER HOUR NON-PREVAILING WAGE, \$ 283.50 PER HOUR PREVAILING WAGE			
Notes	RECOMMENDED TAIT SPARE ITEM OPTIONS FOR ON-DEMAND REPLACEMENT (FINAL QUANTITIES AND ITEMS TO ULTIMATELY BE DETERMINED BY WAHAKIUM COUNTY)			
TB9435S-100T	TB9435 Single 100Watts Chassis Assembly	2	\$990.50	\$1,981.00
T01-01103-BAAA	TB9400 Reciter 136-174MHz	2	\$1,999.33	\$3,998.66
T01-01121-BBBA	TB94 Linear PA 136-174M 100W	2	\$1,579.35	\$3,158.70
TBA30A4-4100	PMU, TB9000,..48VACDC Aux12V	2	\$1,937.35	\$3,874.70
Subtotal				\$13,013.06



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# Quote

Quote #QU10327

Date: 2/16/2024

This Quote Expires On: 3/17/2024

<b>Sales Tax(%)</b>	\$197,295.39
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<b>Total</b>	\$2,726,722.45
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<https://www.commnw.com/wp-content/uploads/2021/11/Terms-and-Conditions.pdf>



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Quote #QU10328

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Bill To	Ship To
BEAU RENFRO WAHIAKUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States	WAHIAKUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States

Sales Rep	Terms	PO Number
John Clark	Due on receipt	

Item	Description	Quantity	Price	Total
Notes	SYSTEM TWO PROPOSAL			
Notes	TAIT TB9400 FIVE SITE, FIVE CHANNEL VHF AS-IP			
TB9435S-100T	TB9435 Single 100Watts Chassis Assembly	25	\$990.50	\$24,762.50
T01-01103-BAAA	TB9400 Reciter 136-174MHz	25	\$1,999.33	\$49,983.25
T01-01121-BBBA	TB94 Linear PA 136-174M 100W	25	\$1,579.35	\$39,483.75
TBA30A4-4100	PMU, TB9000,..48VACDC Aux12V	25	\$1,937.35	\$48,433.75
219-01561-00	Cable, PMU IEC, 6.5ft	25	\$10.12	\$253.00
TBAS060	SFE Key- Digital Fixed Station Interface (TB91)	10	\$405.43	\$4,054.30
TBAS062	Simulcast Enable	25	\$3,663.44	\$91,586.00
TBAS071	IP Networking Satellite	15	\$590.12	\$8,851.80
TBAS061	Central Voter	10	\$3,738.08	\$37,380.80
Subtotal				\$304,789.15
Notes	TIMING EQUIPMENT			
Custom Project Materials	950-21116-00 OSC 2402-613 SECURESYNC MODEL 2402-613	5	\$6,184.00	\$30,920.00
Custom Project Materials	TBD SECURESYNC HOT SWAP 12VDC POWER SUPPLY MODULE	5	\$1,300.05	\$6,500.25
Custom Project Materials	950-21118-00 PS 2400-HS-A1 SECURESYNC HOT SWAP AC PS	5	\$716.85	\$3,584.25



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Item	Description	Quantity	Price	Total
Custom Project Materials	950-00005-14 1204-1C, OPTIONAL MODULE 3X10MHZ OUTPUTS	5	\$820.13	\$4,100.65
Custom Project Materials	950-00005-03 OROLIA MODEL 8226 SURGE SUPP	5	\$376.65	\$1,883.25
Custom Project Materials	950-00005-21 OROLIA MODEL 8230 NSS ANTENNA	5	\$364.50	\$1,822.50
Custom Project Materials	950-00002-84 300380 GROUND KIT FOR LMR-600 GK-S600TT	5	\$34.09	\$170.45
Custom Project Materials	950-00001-43 411476 COLD SHRINK TUBING/ WEATHERPROOFING KIT	5	\$32.56	\$162.80
Custom Project Materials	950-10015-67 475433 N MALE EZ FOR LMR-600	20	\$23.95	\$479.00
Custom Project Materials	950-00001-19 86672 LMR-600 1/2" FOAM CABLE-STAND W/ FOAM DIELECTRIC	250	\$2.74	\$685.00
Subtotal				\$50,308.15
Notes	TAIT ADVANTAGE			
SRVADV-INW-TAM-1	Serv Advantage TAM 1 Yr Infra No Warrant	1	\$26,609.50	\$26,609.50
SRVADV-INW-TAM-2	Tait Advantage TAM Yr#2 Infra No Warrant	1	\$26,609.50	\$26,609.50
SRVADV-INW-TAM-3	Tait Advantage TAM Yr#3 Infra No Warrant	1	\$26,609.50	\$26,609.50
EPW-INF-TAM-1	Extended Warranty TAM Infrastructure 1Yr	1	\$0.00	\$0.00
EPW-INF-TAM-2	Extended Warranty TAM Infrastructure 2Yr	1	\$0.00	\$0.00
EPW-INF-TAM-3	Infrastructure 3 Yr Extend Warranty	1	\$5,321.90	\$5,321.90
Subtotal				\$85,150.40
Notes	CERAGON MICROWAVE EQUIPMENT			
IP-50C-11w	IP-50C, 11, Basic Radio, wide	17	\$12,466.00	\$211,922.00
DXC11-xxxY-ccWdd-H	IP-50C, Diplexer Unit,11,Unspecified-H	8	\$1,558.00	\$12,464.00
DXC11-xxxY-ccWdd-L	IP-50C, Diplexer Unit,11,Unspecified-L	8	\$1,558.00	\$12,464.00
IP-50C-06	IP-50C, 06, Basic Radio	9	\$12,466.00	\$112,194.00
DXCL6-xxxY-ccWdd-H	IP-50C, Diplexer Unit,L6,Unspecified-H	4	\$1,558.00	\$6,232.00



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Item	Description	Quantity	Price	Total
DXCL6-xxxY-ccWdd-L	IP-50C, Diplexer Unit,L6,Unspecified-L	4	\$1,558.00	\$6,232.00
IP-20C-Pole-Mount	IP-20C DC REMOTE MOUNT KIT	24	\$312.00	\$7,488.00
IP-20C_10-11G_Rmt_Mnt_adpt	IP-20C 10-11G Remote Mount adaptor	16	\$344.00	\$5,504.00
Term-PBR100	IP-20C/RFU-D 10-11 GHz termination	16	\$481.00	\$7,696.00
Custom Project Equipment	RFU-C10_11-OMT-INT-RW	8	\$693.00	\$5,544.00
IP-20C_OMT_kit_10-11G	IP-20C OMT kit 10-11GHz	8	\$723.00	\$5,784.00
IP-20C_RM_OMT_10-11G_adpt	IP-20C_RM_OMT_10-11G_adpt	8	\$545.00	\$4,360.00
Flx-WG-4FT-10_11	Flx WG kit 4FT 10_11GHz PBR 100	16	\$779.00	\$12,464.00
IP-20C_6G_Rmt_Mnt_adpt	IP-20C 6G Remote Mount adaptor	8	\$286.00	\$2,288.00
Term-PDR70	IP-20C/RFU-D 6 GHz termination	8	\$874.00	\$6,992.00
Custom Project Equipment	RFU-C6-OMT-INT-RW	4	\$693.00	\$2,772.00
IP-20C_OMT_kit_6G	IP-20C OMT kit 6GHz	4	\$723.00	\$2,892.00
IP-20C_RM_OMT_6G_adpt	IP-20C_RM_OMT_6G_adpt	4	\$779.00	\$3,116.00
Flx-WG-4FT-6	Flx WG kit 4FT 6GHz PDR 70	8	\$877.00	\$7,016.00
SL-Capacity-250M	SL - Capacity 250M, per carrier	24	\$1,336.00	\$32,064.00
SL-ACM	SL - ACM, per carrier	24	\$390.00	\$9,360.00
SFP-GE-LX-EXT-TEMP	SFP OPTICAL 1000Base-LX,EXT TEMP	26	\$417.00	\$10,842.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_70m	4	\$348.00	\$1,392.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_60m	4	\$309.00	\$1,236.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_50m	14	\$257.00	\$3,598.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_40m	2	\$230.00	\$460.00



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Item	Description	Quantity	Price	Total
CBL-GND	GROUND CABLE FOR IDU and ODU	24	\$28.00	\$672.00
OUTDOOR TIES	OUTDOOR TIES 50pcs	12	\$52.00	\$624.00
IP-20C_DC_Conn	IP-20C_DC_Conn	24	\$13.00	\$312.00
Outdoor_DC_cbl_2x18AWG_drum	CABLE,MATERIAL,2x18AWG,305M (1000ft),OUTDOOR	5	\$1,504.00	\$7,520.00
Fiber_clamp_6cbl_4.0-7.0mm	DUAL FEADER CLAMP FOR 4.0-7.0mm CABLE 6 WAY.	420	\$10.00	\$4,200.00
Subtotal				\$507,704.00
Discount - NASPO	NASPO - 00318		-58%	(\$294,468.32)
Subtotal				\$213,235.68
Custom Project Materials	AM-3-11-RW 3' ANT,SP,11GHz,Crgn&Std UBR100 Int-RW	8	\$25.16	\$201.28
Custom Project Materials	Am-4-6-RW ANT,4FT,5.725-7.125GHz,SP,RFU-C TYPE/UDR70	1	\$3,958.00	\$3,958.00
Custom Project Materials	Am-6-6-RW ANT,6FT,5.725-7.125GHz,SP,RFU-C TYPE/UDR70	3	\$7,735.00	\$23,205.00
Ant Pol mount 1-3FT	Ant Pol mount 1-3FT	5	\$735.00	\$3,675.00
Ant Pol mount 4-6FT	Ant Pol mount 4-6FT	4	\$1,773.00	\$7,092.00
Custom Project Materials	A-2-3-STRT-RW Strut for standard anten 2FT-3FT RADIOWAVES	24	\$1,200.00	\$28,800.00
Custom Project Materials	A-4-6-STRT-RW Strut for standard ant 4FT-6FT RADIOWAVE	12	\$1,697.00	\$20,364.00
Custom Project Materials	****CommNW sourced Monopole Antenna Mount and tieback for 3 struts****	3	\$0.00	\$0.00
Subtotal				\$87,295.28
Discount - NASPO	NASPO - 00318		-20%	(\$17,459.06)
Subtotal				\$69,836.22
Custom Project Services	Three-Year Warranty Three-Year Warranty	26	\$1,600.00	\$41,600.00
Custom Project Services	FREQ-COORD FCC Frequency Coordination (Excludes FCC License Fee)	12	\$1,500.00	\$18,000.00



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Item	Description	Quantity	Price	Total
SR-0961-0	e-Product basic for IP50C	1	\$985.00	\$985.00
SR-0958-0	e-Installation - (CCRP) for IP50C	1	\$1,142.00	\$1,142.00
NM-Basic-Perpetual	Basic package - Perpetual subscription.	24	\$795.00	\$19,080.00
Subtotal				\$80,807.00
Notes	AVTEC DISPATCH CONSOLE-NASPO PRICING			
SFW-SCOUT-EX-T1-SK	Scout EX Console - Tier 1 includes a license for a Scout Enterprise Console with Software Audio Package. Includes IRR. Software Key version.	3	\$12,437.12	\$37,311.36
DSACCCPUdTWIN11	PC for Scout Console Packages, Dual NICs, MS Windows 11 Professional 64 bit OS	3	\$2,563.97	\$7,691.91
DSACCTSCS	22" Full HD Touch Screen Monitor, HDMI/ DPort/VGA/DVI Inputs. No driver req.	3	\$2,088.20	\$6,264.60
ACCUSB-FSW-SING	USB PTT Footswitch Accessory, Software Media Workstation	3	\$312.99	\$938.97
ACCUSB-HJB-NENA	Avtec USB Headset/handset jack box (single jack), Integrates NENA phone at the operators position with Scout. Requires Scout version 4.9 or later running Software Media Workstation.	6	\$1,000.98	\$6,005.88
ACCUSB-HUB10	10 Port USB 3.0 Hub with Power Adapter. Mounting kit included. Installs on/under a desk, to a wall or DIN rail using the hardware & included DIN brackets. 3ft USB 3.0 cable included	3	\$159.89	\$479.67
ACCUSB-MIC	Avtec USB PTT Desk Microphone, Scout Software Media Workstation	3	\$751.94	\$2,255.82
ACCUSB-RELAY	USB Relay Kit, 4 each Form C Relays, Software Media Workstation	3	\$477.72	\$1,433.16
ACCUSB-SPK-2	Avtec USB Dual Speaker Kit, Scout Software Media Workstation	3	\$1,125.98	\$3,377.94
ACC-HED-BASE-WLS-6W	Plantronics CA22CD Wireless PTT Headset Base. Headset top is sold separately	3	\$822.68	\$2,468.04
ACC-HED-TOP-SING-NC	Headset top, Single Ear with noise canceling microphone. Requires base.	3	\$113.37	\$340.11
SFW-VPG-L0-SK	Redundant VPGate Software License for a maximum of 24 endpoints; up to 12 may be "B" Licenses. Software license version.	1	\$8,593.09	\$8,593.09
DSACCCPUSTD2022	1 Rack Unit (1RU) Server Solid State hard drive, Windows 2022 Server OS, TPM 2.0. Requires additional package for monitor, keyboard, etc. (DISP-XXXX)	2	\$7,585.33	\$15,170.66



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Item	Description	Quantity	Price	Total
OUTPOSTPLUS-2R	OUTPOSTPLUS RADIO GATEWAY, VOIP, 2 PORT, POE, POWER SUPPLY NOT INCLUDED.	3	\$2,359.52	\$7,078.56
OUTPOSTPLUS-CFG	OUTPOSTPLUS CONFIGURATION TOOL. 1 REQUIRED PER SITE.	1	\$207.37	\$207.37
DSOPPMDC1200	OUTPOSTPLUS KIT TO ADD SUPPORT FOR (1) MDC1200 ENDPOINT. INCLUDES SOFTWARE LICENSE. OUTPOSTPLUS PURCHASED SEPARATELY.	4	\$531.98	\$2,127.92
SFW-VPG-DFSI-6-SK	Supplementary VPGate P25 DFSI endpoint license, requires SFW-VPG-XXXX. Supports up to 6 each red...	1	\$6,442.88	\$6,442.88
PKG-INPUT-VPGATE	Input Package for Scout and DSPatchNET, includes one each 24-input rack mount panel and power supply. 25 pr cabling is optionally purchased, PKG-INST-AUX-XX.	1	\$2,682.19	\$2,682.19
PKG-OUTPUT-VPGATE	Output Package for Scout, includes one each 24-output rack mount panel and power supply. 25 pr cabling is optionally purchased, PKG-INST-AUX-XX.	1	\$2,682.19	\$2,682.19
PKG-INST-AUX-25	Type 66 Cabling/Punch block kit to install one auxiliary I/O package, 25' cables	2	\$826.56	\$1,653.12
ACC-NETWK-24P-SFP4	24G-Port PoE+ 1U Managed Ethernet Switch with 4 SFP Slots	1	\$3,727.34	\$3,727.34
OUTPOSTPLUS-PS-NA	OUTPOSTPLUS POWER SUPPLY,..NORTH AMERICA	3	\$103.68	\$311.04
OUTPOSTPLUS-SHELF	OUTPOSTPLUS RACKMOUNT..SHELF (HOLDS 2 UNITS)	2	\$207.37	\$414.74
ACC-MTG-1U-RR	Kit to rack mount PS-12V-3BAY-AC , ACCCPU-RM-2012 or -WIN7 in 19" relay rack. 1U high.	2	\$242.25	\$484.50
Notes	***RECOMMENDED SPARE AVTEC ITEMS***			
ACCUSB-FSW-SING	USB PTT Footswitch Accessory, Software Media Workstation	1	\$312.99	\$312.99
ACCUSB-HJB-NENA	Avtec USB Headset/handset jack box (single jack), Integrates NENA phone at the operators position with Scout. Requires Scout version 4.9 or later running Software Media Workstation.	1	\$1,000.98	\$1,000.98
ACCUSB-HUB10	10 Port USB 3.0 Hub with Power Adapter. Mounting kit included. Installs on/under a desk, to a wall or DIN rail using the hardware & included DIN brackets. 3ft USB 3.0 cable included	1	\$159.89	\$159.89
ACCUSB-MIC	Avtec USB PTT Desk Microphone, Scout Software Media Workstation	1	\$751.94	\$751.94



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Item	Description	Quantity	Price	Total
ACCUSB-RELAY	USB Relay Kit, 4 each Form C Relays, Software Media Workstation	1	\$477.72	\$477.72
ACCUSB-SPK-2	Avtec USB Dual Speaker Kit, Scout Software Media Workstation	1	\$1,125.98	\$1,125.98
ACC-HED-BASE-WLS-6W	Plantronics CA22CD Wireless PTT Headset Base. Headset top is sold separately	1	\$822.68	\$822.68
ACC-HED-TOP-SING-NC	Headset top, Single Ear with noise canceling microphone. Requires base.	1	\$113.37	\$113.37
SCOUTCARE-T1-WARRANTY	ScoutCare Year 1 Tier 1 services provided during the one year warranty period only. Includes Software Maintenance, Remote Support, and Training.	1	\$0.00	\$0.00
SCOUTCARE-T1	Year 2 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 3 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 4 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 5 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
Custom Project Services	***AVTEC LABOR HOURS*** STAGING, INSTALLATION, AND/OR TRAINING FOR CONSOLES, OUTPOSTS, VPGATES, I/O	80	\$168.00	\$13,440.00
Subtotal				\$175,405.33
Notes	TAIT TP9600 PORTABLE, TM9400 DASH MOUNT MOBILE, AND DESKTOP BASE STATION SUBSCRIBERS			
TP9655B1BC-T	P25 4Key 136-174MHz Body Only - Black	194	\$1,093.59	\$212,156.46
T03-00011-EAAA	TP9 Battery High Capacity Li-Ion 3300mAh	194	\$87.92	\$17,056.48
TPA-AN-003	TP8/9 Ant 150-162MHz Helical	194	\$17.71	\$3,435.74
T03-00045-PCAA	TP3/TP9 SpkMic TSM4 IP68 F-bttm-org 3.5 F-bttm-blk	194	\$123.34	\$23,927.96
TPA-CA-201	TP8/9 Belt Clip 55mm	194	\$8.22	\$1,594.68
T03-00012-AEAA	TP8/TP9 Charger Single Fast Li-Ion US/CAN Plug Pack	194	\$63.88	\$12,392.72
SRVADV-P25-TWW-3	P25 Terminal - flat rate for three years additional coverage (5 years total)	194	\$105.80	\$20,525.20
Notes	VEHICLE MOUNTED DASH MOUNT MOBILE RADIO			
TM9400B1DA-T	136-174MHz MUHF 50Watts Body ExtAlm Only	104	\$792.52	\$82,422.08



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Item	Description	Quantity	Price	Total
T02-00065-1001	TCH3 Head only	104	\$202.40	\$21,049.60
T02-00005-AAAA	TM Standard Microphone TDMA	104	\$61.35	\$6,380.40
T02-00026-2001	Mounting Kit, U-Cradle	104	\$17.08	\$1,776.32
T02-00026-1004	Install Kit Cable, Install Kit, M-UHF, 30-50W	104	\$51.23	\$5,327.92
SRVADV-P25-TWW-3	P25 Terminal - flat rate for three years additional coverage (5 years total)	104	\$105.80	\$11,003.20
Notes	DESKTOP BASE STATION RADIO			
TM9400B1DA-T	136-174MHz MUHF 50Watts Body ExtAlm Only	15	\$792.52	\$11,887.80
T02-00065-1001	TCH3 Head only	15	\$202.50	\$3,037.50
T02-00005-ACAA	Desktop Microphone	15	\$141.68	\$2,125.20
T02-00036-AACA	Desktop Power Supply 13V8 23A DC	15	\$222.64	\$3,339.60
T02-00026-2001	Mounting Kit, U-Cradle	15	\$17.08	\$256.20
T02-00026-1004	Install Kit Cable, Install Kit, M-UHF, 30-50W	15	\$51.23	\$768.45
Subtotal				\$440,463.51
Notes	VHF PAGER			
0810133	Swissphone s.QUAD Voice 360 VHF-B 150-160MHz 12.5kHz Pager	1	\$445.00	\$445.00
0810942	Charger with LED for both charging modes including relay and antenna connector	1	\$65.00	\$65.00
Subtotal				\$510.00
Notes	NEW DESKTOP ON-SITE DESKTOP BASE STATION ANTENNA EQUIPMENT			
LMR-400-DB	LMR-400-RR-DB direct burial low loss coaxial cable	2,000	\$2.45	\$4,900.00
EMR150DP	136-174MHz VHF Single Bay Folded Dipole Antenna (Mast NOT included)	15	\$620.00	\$9,300.00
IS-50NX-C2	Flange Arrestor, N/F	15	\$98.98	\$1,484.70
EZ-400-NMH-X	Connector, N-Male Crimp Hex/Knurled Nut for LMR400, Non-Solder Pin	45	\$15.62	\$702.90
RFU-501	UHF Male PL259-RG8, RG213	15	\$6.02	\$90.30
Custom Project Materials	Custom materials necessary to complete project including mast, mounts, clamps, clips, ground wire, brackets, etc.	15	\$2,500.00	\$37,500.00



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Item	Description	Quantity	Price	Total
Custom Project Equipment	Boom lift rental for station antenna installations	1	\$2,500.00	\$2,500.00
Subtotal				\$56,477.90
Notes	STANDARD ROOF MOUNT MOBILE RADIO ANTENNA AND COAXIAL CABLE EQUIPMENT			
AVWB-SM-39-68	ANT WIDEBAND/SPRING 139-168MHZ	104	\$76.07	\$7,911.28
MNMOM-10F	MNMO BASE 10.25m(33') COAX CABLE FME(f)	104	\$34.18	\$3,554.72
SAB-181	NMO LOW FREQUENCY ADAPTOR ASSY	104	\$11.16	\$1,160.64
CA-PLP-FP	PL259(m)-FME(m) ADAPTOR	104	\$7.57	\$787.28
Subtotal				\$13,413.92
Sales Discount - Non-Contract	Sales Discount - Non-Contract		-20%	(\$2,682.78)
Subtotal				\$10,731.14
Notes	ON-SITE DASH MOUNT MOBILE RADIO INSTALLATION			
301 - 12VOLT LABOR	Vehicle Arrival: Vehicle Description (Including VIN): Issue Reported: Troubleshooting: Findings:	104	\$1,385.00	\$144,040.00
Custom Project Equipment	Newmar Commander II power management systems and battery strings for no less than 12 hour back up power at all sites.	1	\$163,631.00	\$163,631.00
316 - PREVAILING WAGE - WASHINGTON	PREVAILING WAGE-DESKTOP BASE STATION RADIO INSTALLATION	16	\$3,024.00	\$48,384.00
320 - PREVAILING WAGE WA - TOWER	PREVAILING WAGE TOWER - Micro wave removal, antenna removal, micro wave install, antenna install, new coax runs with industry clamping into shelters at customer listed sites.	1	\$156,000.00	\$156,000.00
Custom Project Equipment	Telewave Dipole antennas for sites. (6) qty ANT150D7-12, (2) qty ANT150D6-9, (2) qty ANT 150D	1	\$36,178.00	\$36,178.00
Custom Project Equipment	Repeater Site Custom Filtering/Combining Equipment and Cabling	5	\$30,000.00	\$150,000.00
Custom Project Materials	5 site LMR coax (LMR240 / 400 / 600), couplers, polyphasers, hangers, expendable supplies, weather proofing	1	\$50,000.00	\$50,000.00
320 - PREVAILING WAGE WA - TOWER	PREVAILING WAGE TOWER - Line of Site survey for micro wave link Wickiup to High School and Radar to KM.	1	\$17,220.00	\$17,220.00



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Item	Description	Quantity	Price	Total
316 - PREVAILING WAGE - WASHINGTON	PREVAILING WAGE - Site shelter installation work at customer listed sites. Micro wave equipment, Tait RF equipment, switches, timing units, gps, coax, jumper lines.	1	\$90,720.00	\$90,720.00
120010BK	Equipment Rack 19"x84" Black	10	\$935.00	\$9,350.00
CS RMT SRV during installation	Customer Support remote service during installation	5	\$200.00	\$1,000.00
302 - RF TECH LABOR	RF Tech labor to pre stage equipment, prep and configure for installation at sites	140	\$189.00	\$26,460.00
304 - ENGINEERING LABOR	PREVAILING WAGE - Commissioning engineering support	40	\$200.00	\$8,000.00
SVF-CVT	Services - Coverage Verification Testing	1	\$14,800.00	\$14,800.00
501 - PROJECT MANAGEMENT	Prevailing Wage - Project management, documentation, planning & logistics.	160	\$189.00	\$30,240.00
309 - SERVICE TRAVEL	Service Travel, Per Diem, Lodging	1	\$15,560.00	\$15,560.00
FCC - COORDINATION	Frequency Coordination Assistance **If Necessary**  Please note all frequency usage in proposed systems are reliant of client receiving FCC frequency usage authorization. Communications Northwest will work in the interest of client however, however FCC frequency authorization ultimately is outside of Communications Northwest control	1	\$25,000.00	\$25,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR ONE	1	\$40,000.00	\$40,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR TWO	1	\$42,000.00	\$42,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR THREE	1	\$44,100.00	\$44,100.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR FOUR	1	\$46,305.00	\$46,305.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR FIVE	1	\$48,620.00	\$48,620.00
Subtotal				\$1,207,608.00



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# Quote

Quote #QU10328

Date: 2/16/2024

This Quote Expires On: 3/17/2024

Item	Description	Quantity	Price	Total
Notes	CURRENT AFTER HOURS LABOR RATES @ \$ 252.00 PER HOUR NON-PREVAILING WAGE, \$ 283.50 PER HOUR PREVAILING WAGE			
Notes	RECOMMENDED REPEATER SITES SPARE TAIT ITEM OPTIONS FOR ON-DEMAND REPLACEMENT (FINAL QUANTITIES AND ITEMS TO ULTIMATELY BE DETERMINED BY WAHKIAKUM COUNTY)			
TB9435S-100T	TB9435 Single 100Watts Chassis Assembly	2	\$990.50	\$1,981.00
T01-01103-BAAA	TB9400 Reciter 136-174MHz	2	\$1,999.33	\$3,998.66
T01-01121-BBBA	TB94 Linear PA 136-174M 100W	2	\$1,579.35	\$3,158.70
TBA30A4-4100	PMU, TB9000,..48VACDC Aux12V	2	\$1,937.35	\$3,874.70
Subtotal				\$13,013.06

**Sales Tax(%)** \$211,250.24

**Total** \$2,919,585.78

<https://www.commnw.com/wp-content/uploads/2021/11/Terms-and-Conditions.pdf>



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# Quote

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Bill To	Ship To
BEAU RENFRO WAHAKIACUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States	WAHAKIACUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States

Sales Rep	Terms	PO Number
John Clark	Due on receipt	

Item	Description	Quantity	Price	Total
Notes	SYSTEM PROPOSAL THREE			
Notes	TAIT TB9400 FIVE SITE, FIVE CHANNEL VHF AS-IP			
TB9435S-100T	TB9435 Single 100Watts Chassis Assembly	25	\$990.50	\$24,762.50
T01-01103-BAAA	TB9400 Reciter 136-174MHz	25	\$1,999.33	\$49,983.25
T01-01121-BBBA	TB94 Linear PA 136-174M 100W	25	\$1,579.35	\$39,483.75
TBA30A4-4100	PMU, TB9000,..48VACDC Aux12V	25	\$1,937.35	\$48,433.75
219-01561-00	Cable, PMU IEC, 6.5ft	25	\$10.12	\$253.00
TBAS060	SFE Key- Digital Fixed Station Interface (TB91)	10	\$405.43	\$4,054.30
TBAS062	Simulcast Enable	25	\$3,663.44	\$91,586.00
TBAS071	IP Networking Satellite	15	\$590.12	\$8,851.80
TBAS061	Central Voter	10	\$3,738.08	\$37,380.80
Subtotal				\$304,789.15
Notes	TIMING EQUIPMENT			
Custom Project Materials	950-21116-00 OSC 2402-613 SECURESYNC MODEL 2402-613	5	\$6,184.00	\$30,920.00
Custom Project Materials	TBD SECURESYNC HOT SWAP 12VDC POWER SUPPLY MODULE	5	\$1,300.05	\$6,500.25
Custom Project Materials	950-21118-00 PS 2400-HS-A1 SECURESYNC HOT SWAP AC PS	5	\$716.85	\$3,584.25



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Item	Description	Quantity	Price	Total
Custom Project Materials	950-00005-14 1204-1C, OPTIONAL MODULE 3X10MHZ OUTPUTS	5	\$820.13	\$4,100.65
Custom Project Materials	950-00005-03 OROLIA MODEL 8226 SURGE SUPP	5	\$376.65	\$1,883.25
Custom Project Materials	950-00005-21 OROLIA MODEL 8230 NSS ANTENNA	5	\$364.50	\$1,822.50
Custom Project Materials	950-00002-84 300380 GROUND KIT FOR LMR-600 GK-S600TT	5	\$34.09	\$170.45
Custom Project Materials	950-00001-43 411476 COLD SHRINK TUBING/ WEATHERPROOFING KIT	5	\$32.56	\$162.80
Custom Project Materials	950-10015-67 475433 N MALE EZ FOR LMR-600	20	\$23.95	\$479.00
Custom Project Materials	950-00001-19 86672 LMR-600 1/2" FOAM CABLE-STAND W/ FOAM DIELECTRIC	250	\$2.74	\$685.00
Subtotal				\$50,308.15
Notes	TAIT ADVANTAGE			
SRVADV-INW-TAM-1	Serv Advantage TAM 1 Yr Infra No Warrant	1	\$26,609.50	\$26,609.50
SRVADV-INW-TAM-2	Tait Advantage TAM Yr#2 Infra No Warrant	1	\$26,609.50	\$26,609.50
SRVADV-INW-TAM-3	Tait Advantage TAM Yr#3 Infra No Warrant	1	\$26,609.50	\$26,609.50
EPW-INF-TAM-1	Extended Warranty TAM Infrastructure 1Yr	1	\$0.00	\$0.00
EPW-INF-TAM-2	Extended Warranty TAM Infrastructure 2Yr	1	\$0.00	\$0.00
EPW-INF-TAM-3	Infrastructure 3 Yr Extend Warranty	1	\$5,321.90	\$5,321.90
Subtotal				\$85,150.40
Notes	CERAGON MICROWAVE EQUIPMENT			
IP-50C-11w	IP-50C, 11, Basic Radio, wide	17	\$12,466.00	\$211,922.00
DXC11-xxxY-ccWdd-H	IP-50C, Diplexer Unit,11,Unspecified-H	8	\$1,558.00	\$12,464.00
DXC11-xxxY-ccWdd-L	IP-50C, Diplexer Unit,11,Unspecified-L	8	\$1,558.00	\$12,464.00
IP-50C-06	IP-50C, 06, Basic Radio	9	\$12,466.00	\$112,194.00
DXCL6-xxxY-ccWdd-H	IP-50C, Diplexer Unit,L6,Unspecified-H	4	\$1,558.00	\$6,232.00



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Item	Description	Quantity	Price	Total
DXCL6-xxxY-ccWdd-L	IP-50C, Diplexer Unit,L6,Unspecified-L	4	\$1,558.00	\$6,232.00
IP-20C-Pole-Mount	IP-20C DC REMOTE MOUNT KIT	24	\$312.00	\$7,488.00
IP-20C_10-11G_Rmt_Mnt_adpt	IP-20C 10-11G Remote Mount adaptor	16	\$344.00	\$5,504.00
Term-PBR100	IP-20C/RFU-D 10-11 GHz termination	16	\$481.00	\$7,696.00
Custom Project Equipment	RFU-C10_11-OMT-INT-RW	8	\$693.00	\$5,544.00
IP-20C_OMT_kit_10-11G	IP-20C OMT kit 10-11GHz	8	\$723.00	\$5,784.00
IP-20C_RM_OMT_10-11G_adpt	IP-20C_RM_OMT_10-11G_adpt	8	\$545.00	\$4,360.00
Flx-WG-4FT-10_11	Flx WG kit 4FT 10_11GHz PBR 100	16	\$779.00	\$12,464.00
IP-20C_6G_Rmt_Mnt_adpt	IP-20C 6G Remote Mount adaptor	8	\$286.00	\$2,288.00
Term-PDR70	IP-20C/RFU-D 6 GHz termination	8	\$874.00	\$6,992.00
Custom Project Equipment	RFU-C6-OMT-INT-RW	4	\$693.00	\$2,772.00
IP-20C_OMT_kit_6G	IP-20C OMT kit 6GHz	4	\$723.00	\$2,892.00
IP-20C_RM_OMT_6G_adpt	IP-20C_RM_OMT_6G_adpt	4	\$779.00	\$3,116.00
Flx-WG-4FT-6	Flx WG kit 4FT 6GHz PDR 70	8	\$877.00	\$7,016.00
SL-Capacity-250M	SL - Capacity 250M, per carrier	24	\$1,336.00	\$32,064.00
SL-ACM	SL - ACM, per carrier	24	\$390.00	\$9,360.00
SFP-GE-LX-EXT-TEMP	SFP OPTICAL 1000Base-LX,EXT TEMP	26	\$417.00	\$10,842.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_70m	4	\$348.00	\$1,392.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_60m	4	\$309.00	\$1,236.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_50m	14	\$257.00	\$3,598.00
Custom Project Materials	IP-20_FO_SM_LC2LC_ARM_40m	2	\$230.00	\$460.00



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Item	Description	Quantity	Price	Total
CBL-GND	GROUND CABLE FOR IDU and ODU	24	\$28.00	\$672.00
OUTDOOR TIES	OUTDOOR TIES 50pcs	12	\$52.00	\$624.00
IP-20C_DC_Conn	IP-20C_DC_Conn	24	\$13.00	\$312.00
Outdoor_DC_cbl_2x18AWG_drum	CABLE,MATERIAL,2x18AWG,305M (1000ft),OUTDOOR	5	\$1,504.00	\$7,520.00
Fiber_clamp_6cbl_4.0-7.0mm	DUAL FEADER CLAMP FOR 4.0-7.0mm CABLE 6 WAY.	420	\$10.00	\$4,200.00
Subtotal				\$507,704.00
Discount - NASPO	NASPO - 00318		-58%	(\$294,468.32)
Subtotal				\$213,235.68
Custom Project Materials	AM-3-11-RW 3' ANT,SP,11GHz,Crgn&Std UBR100 Int-RW	8	\$25.16	\$201.28
Custom Project Materials	Am-4-6-RW ANT,4FT,5.725-7.125GHz,SP,RFU-C TYPE/UDR70	1	\$3,958.00	\$3,958.00
Custom Project Materials	Am-6-6-RW ANT,6FT,5.725-7.125GHz,SP,RFU-C TYPE/UDR70	3	\$7,735.00	\$23,205.00
Ant Pol mount 1-3FT	Ant Pol mount 1-3FT	5	\$735.00	\$3,675.00
Ant Pol mount 4-6FT	Ant Pol mount 4-6FT	4	\$1,773.00	\$7,092.00
Custom Project Materials	A-2-3-STRT-RW Strut for standard anten 2FT-3FT RADIOWAVES	24	\$1,200.00	\$28,800.00
Custom Project Materials	A-4-6-STRT-RW Strut for standard ant 4FT-6FT RADIOWAVE	12	\$1,697.00	\$20,364.00
Custom Project Materials	****CommNW sourced Monopole Antenna Mount and tieback for 3 struts****	3	\$0.00	\$0.00
Subtotal				\$87,295.28
Discount - NASPO	NASPO - 00318		-20%	(\$17,459.06)
Subtotal				\$69,836.22
Custom Project Services	Three-Year Warranty Three-Year Warranty	26	\$1,600.00	\$41,600.00
Custom Project Services	FREQ-COORD FCC Frequency Coordination (Excludes FCC License Fee)	12	\$1,500.00	\$18,000.00



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Item	Description	Quantity	Price	Total
SR-0961-0	e-Product basic for IP50C	1	\$985.00	\$985.00
SR-0958-0	e-Installation - (CCRP) for IP50C	1	\$1,142.00	\$1,142.00
NM-Basic-Perpetual	Basic package - Perpetual subscription.	24	\$795.00	\$19,080.00
Subtotal				\$80,807.00
Notes	AVTEC DISPATCH CONSOLE-NASPO PRICING			
SFW-SCOUT-EX-T1-SK	Scout EX Console - Tier 1 includes a license for a Scout Enterprise Console with Software Audio Package. Includes IRR. Software Key version.	3	\$12,437.12	\$37,311.36
DSACCCPUDTWIN11	PC for Scout Console Packages, Dual NICs, MS Windows 11 Professional 64 bit OS	3	\$2,563.97	\$7,691.91
DSACCTSCS	22" Full HD Touch Screen Monitor, HDMI/ DPort/VGA/DVI Inputs. No driver req.	3	\$2,088.20	\$6,264.60
ACCUSB-FSW-SING	USB PTT Footswitch Accessory, Software Media Workstation	3	\$312.99	\$938.97
ACCUSB-HJB-NENA	Avtec USB Headset/handset jack box (single jack), Integrates NENA phone at the operators position with Scout. Requires Scout version 4.9 or later running Software Media Workstation.	6	\$1,000.98	\$6,005.88
ACCUSB-HUB10	10 Port USB 3.0 Hub with Power Adapter. Mounting kit included. Installs on/under a desk, to a wall or DIN rail using the hardware & included DIN brackets. 3ft USB 3.0 cable included	3	\$159.89	\$479.67
ACCUSB-MIC	Avtec USB PTT Desk Microphone, Scout Software Media Workstation	3	\$751.94	\$2,255.82
ACCUSB-RELAY	USB Relay Kit, 4 each Form C Relays, Software Media Workstation	3	\$477.72	\$1,433.16
ACCUSB-SPK-2	Avtec USB Dual Speaker Kit, Scout Software Media Workstation	3	\$1,125.98	\$3,377.94
ACC-HED-BASE-WLS-6W	Plantronics CA22CD Wireless PTT Headset Base. Headset top is sold separately	3	\$822.68	\$2,468.04
ACC-HED-TOP-SING-NC	Headset top, Single Ear with noise canceling microphone. Requires base.	3	\$113.37	\$340.11
SFW-VPG-L0-SK	Redundant VPGate Software License for a maximum of 24 endpoints; up to 12 may be "B" Licenses. Software license version.	1	\$8,593.09	\$8,593.09
DSACCCPUSTD2022	1 Rack Unit (1RU) Server Solid State hard drive, Windows 2022 Server OS, TPM 2.0. Requires additional package for monitor, keyboard, etc. (DISP-XXXX)	2	\$7,585.33	\$15,170.66



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Item	Description	Quantity	Price	Total
OUTPOSTPLUS-2R	OUTPOSTPLUS RADIO GATEWAY, VOIP, 2 PORT, POE, POWER SUPPLY NOT INCLUDED.	3	\$2,359.52	\$7,078.56
OUTPOSTPLUS-CFG	OUTPOSTPLUS CONFIGURATION TOOL. 1 REQUIRED PER SITE.	1	\$207.37	\$207.37
DSOPPMDC1200	OUTPOSTPLUS KIT TO ADD SUPPORT FOR (1) MDC1200 ENDPOINT. INCLUDES SOFTWARE LICENSE. OUTPOSTPLUS PURCHASED SEPARATELY.	4	\$531.98	\$2,127.92
SFW-VPG-DFSI-6-SK	Supplementary VPGate P25 DFSI endpoint license, requires SFW-VPG-XXXX. Supports up to 6 each red...	1	\$6,442.88	\$6,442.88
PKG-INPUT-VPGATE	Input Package for Scout and DSPatchNET, includes one each 24-input rack mount panel and power supply. 25 pr cabling is optionally purchased, PKG-INST-AUX-XX.	1	\$2,682.19	\$2,682.19
PKG-OUTPUT-VPGATE	Output Package for Scout, includes one each 24-output rack mount panel and power supply. 25 pr cabling is optionally purchased, PKG-INST-AUX-XX.	1	\$2,682.19	\$2,682.19
PKG-INST-AUX-25	Type 66 Cabling/Punch block kit to install one auxiliary I/O package, 25' cables	2	\$826.56	\$1,653.12
ACC-NETWK-24P-SFP4	24G-Port PoE+ 1U Managed Ethernet Switch with 4 SFP Slots	1	\$3,727.34	\$3,727.34
OUTPOSTPLUS-PS-NA	OUTPOSTPLUS POWER SUPPLY,..NORTH AMERICA	3	\$103.68	\$311.04
OUTPOSTPLUS-SHELF	OUTPOSTPLUS RACKMOUNT..SHELF (HOLDS 2 UNITS)	2	\$207.37	\$414.74
ACC-MTG-1U-RR	Kit to rack mount PS-12V-3BAY-AC , ACCCPU-RM-2012 or -WIN7 in 19" relay rack. 1U high.	2	\$242.25	\$484.50
Notes	***RECOMMENDED SPARE AVTEC ITEMS***			
ACCUSB-FSW-SING	USB PTT Footswitch Accessory, Software Media Workstation	1	\$312.99	\$312.99
ACCUSB-HJB-NENA	Avtec USB Headset/handset jack box (single jack). Integrates NENA phone at the operators position with Scout. Requires Scout version 4.9 or later running Software Media Workstation.	1	\$1,000.98	\$1,000.98
ACCUSB-HUB10	10 Port USB 3.0 Hub with Power Adapter. Mounting kit included. Installs on/under a desk, to a wall or DIN rail using the hardware & included DIN brackets. 3ft USB 3.0 cable included	1	\$159.89	\$159.89
ACCUSB-MIC	Avtec USB PTT Desk Microphone, Scout Software Media Workstation	1	\$751.94	\$751.94



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Item	Description	Quantity	Price	Total
ACCUSB-RELAY	USB Relay Kit, 4 each Form C Relays, Software Media Workstation	1	\$477.72	\$477.72
ACCUSB-SPK-2	Avtec USB Dual Speaker Kit, Scout Software Media Workstation	1	\$1,125.98	\$1,125.98
ACC-HED-BASE-WLS-6W	Plantronics CA22CD Wireless PTT Headset Base. Headset top is sold separately	1	\$822.68	\$822.68
ACC-HED-TOP-SING-NC	Headset top, Single Ear with noise canceling microphone. Requires base.	1	\$113.37	\$113.37
SCOUTCARE-T1-WARRANTY	ScoutCare Year 1 Tier 1 services provided during the one year warranty period only. Includes Software Maintenance, Remote Support, and Training.	1	\$0.00	\$0.00
SCOUTCARE-T1	Year 2 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 3 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 4 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
SCOUTCARE-T1	Year 5 Annual Software Maintenance and Technical support.	1	\$9,264.18	\$9,264.18
Custom Project Services	***AVTEC LABOR HOURS*** STAGING, INSTALLATION, AND/OR TRAINING FOR CONSOLES, OUTPOSTS, VPGATES, I/O	80	\$168.00	\$13,440.00
Subtotal				\$175,405.33
Notes	TAIT TP9800 PORTABLE, TM9400 DASH MOUNT MOBILE, AND DESKTOP BASE STATION SUBSCRIBERS			
TP9855N0BC-T	VHF/UHF/700-800Mhz 4Ky Full 3w Blk BodyOnly	194	\$1,251.72	\$242,833.68
T03-00011-EAAA	TP9 Battery High Capacity Li-Ion 3300mAh	194	\$87.92	\$17,056.48
TPA-AN-051	TP98 Multi Ant 136-870MHz	194	\$75.90	\$14,724.60
T03-00045-PCAA	TP3/TP9 SpkMic TSM4 IP68 F-bttn-org 3.5 F-bttn-blk	194	\$123.34	\$23,927.96
TPA-CA-201	TP8/9 Belt Clip 55mm	194	\$8.22	\$1,594.68
T03-00012-AEAA	TP8/TP9 Charger Single Fast Li-Ion US/CAN Plug Pack	194	\$63.88	\$12,392.72
SRVADV-P25-TWW-3	P25 Terminal - flat rate for three years additional coverage (5 years total)	194	\$105.80	\$20,525.20
Notes	VEHICLE MOUNTED DASH MOUNT MOBILE RADIO			
TM9400B1DA-T	136-174MHz MUHF 50Watts Body ExtAlm Only	104	\$792.52	\$82,422.08



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Item	Description	Quantity	Price	Total
T02-00065-1001	TCH3 Head only	104	\$202.40	\$21,049.60
T02-00005-AAAA	TM Standard Microphone TDMA	104	\$61.35	\$6,380.40
T02-00026-2001	Mounting Kit, U-Cradle	104	\$17.08	\$1,776.32
T02-00026-1004	Install Kit Cable, Install Kit, M-UHF, 30-50W	104	\$51.23	\$5,327.92
SRVADV-P25-TWW-3	P25 Terminal - flat rate for three years additional coverage (5 years total)	104	\$105.80	\$11,003.20
Notes	DESKTOP BASE STATION RADIO			
TM9400B1DA-T	136-174MHz MUHF 50Watts Body ExtAlm Only	15	\$792.52	\$11,887.80
T02-00065-1001	TCH3 Head only	15	\$202.50	\$3,037.50
T02-00005-ACAA	Desktop Microphone	15	\$141.68	\$2,125.20
T02-00036-AACA	Desktop Power Supply 13V8 23A DC	15	\$222.64	\$3,339.60
T02-00026-2001	Mounting Kit, U-Cradle	15	\$17.08	\$256.20
T02-00026-1004	Install Kit Cable, Install Kit, M-UHF, 30-50W	15	\$51.23	\$768.45
Subtotal				\$482,429.59
Notes	VHF PAGER			
0810133	Swissphone s.QUAD Voice 360 VHF-B 150-160MHz 12.5kHz Pager	1	\$445.00	\$445.00
0810942	Charger with LED for both charging modes including relay and antenna connector	1	\$65.00	\$65.00
Subtotal				\$510.00
Notes	NEW DESKTOP ON-SITE DESKTOP BASE STATION ANTENNA EQUIPMENT			
LMR-400-DB	LMR-400-RR-DB direct burial low loss coaxial cable	2,000	\$2.45	\$4,900.00
EMR150DP	136-174MHz VHF Single Bay Folded Dipole Antenna (Mast NOT included)	15	\$620.00	\$9,300.00
IS-50NX-C2	Flange Arrestor, N/F	15	\$98.98	\$1,484.70
EZ-400-NMH-X	Connector, N-Male Crimp Hex/Knurled Nut for LMR400, Non-Solder Pin	45	\$15.62	\$702.90
RFU-501	UHF Male PL259-RG8,RG213	15	\$6.02	\$90.30
Custom Project Materials	Custom materials necessary to complete project including mast, mounts, clamps, clips, ground wire, brackets, etc.	15	\$2,500.00	\$37,500.00



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Item	Description	Quantity	Price	Total
Custom Project Equipment	Boom lift rental for station antenna installations	1	\$2,500.00	\$2,500.00
Subtotal				\$56,477.90
Notes	STANDARD ROOF MOUNT MOBILE RADIO ANTENNA AND COAXIAL CABLE EQUIPMENT			
AVWB-SM-39-68	ANT WIDEBAND/SPRING 139-168MHZ	104	\$76.07	\$7,911.28
MNMOM-10F	MNMO BASE 10.25m(33') COAX CABLE FME(f)	104	\$34.18	\$3,554.72
SAB-181	NMO LOW FREQUENCY ADAPTOR ASSY	104	\$11.16	\$1,160.64
CA-PLP-FP	PL259(m)-FME(m) ADAPTOR	104	\$7.57	\$787.28
Subtotal				\$13,413.92
Sales Discount - Non-Contract	Sales Discount - Non-Contract		-20%	(\$2,682.78)
Subtotal				\$10,731.14
Notes	ON-SITE DASH MOUNT MOBILE RADIO INSTALLATION			
301 - 12VOLT LABOR	Vehicle Arrival: Vehicle Description (Including VIN): Issue Reported: Troubleshooting: Findings:	104	\$1,385.00	\$144,040.00
Custom Project Equipment	Newmar Commander II power management systems and battery strings for no less than 12 hour back up power at all sites.	1	\$163,631.00	\$163,631.00
316 - PREVAILING WAGE - WASHINGTON	PREVAILING WAGE-DESKTOP BASE STATION RADIO INSTALLATION	15	\$3,024.00	\$45,360.00
320 - PREVAILING WAGE WA - TOWER	PREVAILING WAGE TOWER - Micro wave removal, antenna removal, micro wave install, antenna install, new coax runs with industry clamping into shelters at customer listed sites.	1	\$156,000.00	\$156,000.00
Custom Project Equipment	Telewave Dipole antennas for sites. (6) qty ANT150D7-12, (2) qty ANT150D6-9, (2) qty ANT 150D	1	\$36,178.00	\$36,178.00
Custom Project Equipment	Repeater Site Custom Filtering/Combining Equipment and Cabling	5	\$30,000.00	\$150,000.00
Custom Project Materials	5 site LMR coax (LMR240 / 400 / 600), couplers, polyphasers, hangers, expendable supplies, weather proofing	1	\$50,000.00	\$50,000.00
320 - PREVAILING WAGE WA - TOWER	PREVAILING WAGE TOWER - Line of Site survey for micro wave link Wickiup to High School and Radar to KM.	1	\$17,220.00	\$17,220.00



Communications Northwest  
 624 McLoughlin Blvd.  
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 United States

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# Quote

Quote #QU10329

Date: 2/16/2024

This Quote Expires On: 3/17/2024

Item	Description	Quantity	Price	Total
316 - PREVAILING WAGE - WASHINGTON	PREVAILING WAGE - Site shelter installation work at customer listed sites. Micro wave equipment, Tait RF equipment, switches, timing units, gps, coax, jumper lines.	1	\$90,720.00	\$90,720.00
120010BK	Equipment Rack 19"x84" Black	10	\$935.00	\$9,350.00
CS RMT SRV during installation	Customer Support remote service during installation	5	\$200.00	\$1,000.00
302 - RF TECH LABOR	RF Tech labor to pre stage equipment, prep and configure for installation at sites	140	\$189.00	\$26,460.00
304 - ENGINEERING LABOR	PREVAILING WAGE - Commissioning engineering support	40	\$200.00	\$8,000.00
SVF-CVT	Services - Coverage Verification Testing	1	\$14,800.00	\$14,800.00
501 - PROJECT MANAGEMENT	Prevailing Wage - Project management, documentation, planning & logistics.	160	\$189.00	\$30,240.00
309 - SERVICE TRAVEL	Service Travel, Per Diem, Lodging	1	\$15,560.00	\$15,560.00
FCC - COORDINATION	Frequency Coordination Assistance **If Necessary**  Please note all frequency usage in proposed systems are reliant of client receiving FCC frequency usage authorization. Communications Northwest will work in the interest of client however, however FCC frequency authorization ultimately is outside of Communications Northwest control	1	\$25,000.00	\$25,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR ONE	1	\$40,000.00	\$40,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR TWO	1	\$42,000.00	\$42,000.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR THREE	1	\$44,100.00	\$44,100.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR FOUR	1	\$46,305.00	\$46,305.00
312 - SERVICE LEVEL AGREEMENT	POST SYSTEM IMPLEMENTATION ANNUAL SERVICE LEVEL AGREEMENT-YEAR FIVE	1	\$48,620.00	\$48,620.00
Subtotal				\$1,204,584.00



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# Quote

Quote #QU10329

Date: 2/16/2024

This Quote Expires On: 3/17/2024

Item	Description	Quantity	Price	Total
Notes	CURRENT AFTER HOURS LABOR RATES @ \$ 252.00 PER HOUR NON-PREVAILING WAGE, \$ 283.50 PER HOUR PREVAILING WAGE			
Notes	RECOMMENDED REPEATER SITES SPARE TAIT ITEM OPTIONS FOR ON-DEMAND REPLACEMENT (FINAL QUANTITIES AND ITEMS TO ULTIMATELY BE DETERMINED BY WAHKIAKUM COUNTY)			
TB9435S-100T	TB9435 Single 100Watts Chassis Assembly	2	\$990.50	\$1,981.00
T01-01103-BAAA	TB9400 Reciter 136-174MHz	2	\$1,999.33	\$3,998.66
T01-01121-BBBA	TB94 Linear PA 136-174M 100W	2	\$1,579.35	\$3,158.70
TBA30A4-4100	PMU, TB9000,..48VACDC Aux12V	2	\$1,937.35	\$3,874.70
Subtotal				\$13,013.06

Sales Tax(%) \$214,287.74

**Total** \$2,961,565.36

<https://www.commnw.com/wp-content/uploads/2021/11/Terms-and-Conditions.pdf>



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# Quote

Quote #QU10292

Date: 2/9/2024

This Quote Expires On: 3/10/2024

Bill To	Ship To
BEAU RENFRO WAHIAKUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States	WAHIAKUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States

Sales Rep	Terms	PO Number
John Clark	Due on receipt	

Item	Description	Quantity	Price	Total
SVR-350UA	SVR-350 Guardian Analog Vehicular Repeater 380-470 MHz 12.5 KHz	1	\$2,250.00	\$2,250.00
BPF-1604-B	Pre-selector (170-174) MHz, Factory Tuned	1	\$365.00	\$365.00
BRF-1602-C	Dual Notch Filter (171-174) MHz, Factory Tuned	1	\$365.00	\$365.00
TCK-206	6' TNC cable kit for use with BPF/BRF filters	1	\$115.00	\$115.00
7500-10-1211	Tait TM series interface cable	1	\$165.00	\$165.00
Subtotal				\$3,260.00
Sales Discount - Non-Contract	Sales Discount - Non-Contract		-20%	(\$652.00)
AVWB-SM-39-68	ANT WIDEBAND/SPRING 139-168MHz	1	\$76.07	\$76.07
MNMOM-5F	MNMO BASE 5.25m(17') COAX FME(f)	1	\$23.71	\$23.71
SAB-181	NMO LOW FREQUENCY ADAPTOR ASSY	1	\$11.16	\$11.16
CA-PLP-FP	PL259(m)-FME(m) ADAPTOR	1	\$7.57	\$7.57
Notes				
301 - 12VOLT LABOR	Vehicle Arrival: Vehicle Description (Including VIN): Issue Reported: Troubleshooting: Findings:  Install, configure and test MVR system	6	\$168.00	\$1,008.00
Shipping Note	*Shipping and Handling to be determined and included in the invoice*			



**COMMUNICATIONS  
NORTHWEST**

Communications Northwest  
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United States

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# Quote

Quote #QU10292

Date: 2/9/2024

This Quote Expires On: 3/10/2024

<b>Sales Tax(%)</b>	\$291.31
<b>Total</b>	\$4,025.82

<https://www.commnw.com/wp-content/uploads/2021/11/Terms-and-Conditions.pdf>



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# Quote

Quote #QU10330

Date: 2/16/2024

This Quote Expires On: 3/17/2024

Bill To	Ship To
BEAU RENFRO WAHIAKUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States	WAHIAKUM COUNTY 64 MAIN STREET CATHLAMET WA 98612 United States

Sales Rep	Terms	PO Number
John Clark	Due on receipt	

Item	Description	Quantity	Price	Total
Notes	DESKTOP BASE STATION RADIO TONE REMOTE CONTROL OPTION			
Custom Project Equipment	ZETRON M284 MULTI-LINE TONE REMOTE	1	\$4,208.00	\$4,208.00
Custom Project Equipment	ZETRON M250 TONE REMOTE ADAPTER	1	\$1,595.00	\$1,595.00

**Sales Tax(%)** \$452.64

**Total** \$6,255.64

<https://www.commnw.com/wp-content/uploads/2021/11/Terms-and-Conditions.pdf>

2024

# Wahkiakum County

## Emergency Responder Radio Systems Upgrade Project



**COMMUNICATIONS  
NORTHWEST**



Wahkiakum County Sheriff's Office

February 12, 2024

PO Box 65  
64 Main Street  
Cathlamet, WA 98612  
Attn: Beau Renfro

Mr. Renfro,

Thank you for the opportunity to present to you and Wahkiakum County for this public safety radio system upgrade project. Communications Northwest, and our manufacturing partners represented in the estimates, are excited about the prospect of providing a quality and reliable communication system to support the law, fire, and EMS users of the radio communication system who provide support to the citizens of Wahkiakum County.

Per the county's request for system options, Communications Northwest is providing three separate cost/budget proposals. All three proposals include Tait infrastructure radio equipment, Ceragon microwave, and Avtec dispatch consoles. Two of the three cost/budget proposals include Tait portable, mobile, and desktop base station radio subscribers, while the third proposal includes Kenwood portable, mobile, and desktop base station radio subscribers. Both Tait and Kenwood subscriber equipment are Public Safety grade and P25 upgradable. The individual site equipment estimates, including Tait infrastructure, Ceragon Microwave, AVTEC dispatch, and subscriber equipment provide the desired equipment and system support for many years to come. All three cost/budget proposals are designed to meet the expectations of this RFP for the immediate system needs, plus potential upgrades and enhancements to the system in the future.

Communications Northwest is committed to working with our manufacturers to ensure full support during system implementation as well as after the new system is operational. Tait communications and Ceragon Microwave have three-year extended warranties, and AVTEC for a total of three-year extended warranty support. Communications Northwest will maintain the system under a service level agreement for a period of five years.

Our team at Communications Northwest, and our partners, are eager to move forward with this project, so please let us know how we may assist and support you during your internal processes.

Respectfully,

The team at Communications Northwest

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(503) 232-9031  
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(800) 283-COMM





FEBRUARY 12, 2024

Wahkiakum County Sherrif's Office  
PO Box 65  
64 Main Street  
Cathlamet, WA 98612  
Attn: Beau Renfro

Communications Northwest is honored to present our proposal for the overhaul of the radio system for the Wahkiakum County Sheriff's Office. With over 30 years of expertise in designing, installing, and maintaining communication systems across the Pacific Northwest, we stand poised to deliver a solution that exceeds your expectations and meets the unique needs of Wahkiakum County.

Our commitment to excellence is evident in every aspect of our proposal, aligning with the objectives outlined in the Request for Proposal (RFP) issued by the Wahkiakum County Sheriff's Office. Allow us to highlight why Communications Northwest is the ideal partner for this transformative project. Please note all frequency usage in proposed systems are reliant of client receiving FCC frequency usage authorization.

Firstly, in response to Segment One of the RFP, we propose a comprehensive communications transport system that seamlessly links all six locations, utilizing a combination of fiber and microwave technology. Our experience in implementing similar solutions ensures reliable connectivity and optimal performance, essential for the critical operations of the Wahkiakum County Sheriff's Office.

In segment Two, Communications Northwest offers a state-of-the-art Analog Simulcast over IP system replacement for the current VHF repeater systems. Our solution not only facilitates seamless roaming between sites without user interaction but also integrates innovative technology for tracking subscriber units, enhancing radio system coverage, and improving responder safety. Our solutions also allow for system expansion of additional future sites as well as being P25 upgradable if the need arises. We are committed to maximizing the efficiency and effectiveness of your communication infrastructure.

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In response to Segment Three, our proposal includes the total replacement of obsolete radio dispatch consoles with three new, current-generation consoles and backend radio infrastructure. These consoles are designed to optimize functionality, user-friendliness, and reliability, ensuring seamless integration with existing systems and minimal disruption during the transition process. Our implementation, integration, and support of Avtec dispatch systems is provided to both public and private users throughout the United States.

Addressing the subscriber requests in Segment Four, Communications Northwest offers a comprehensive plan for the replacement of end-users' equipment, encompassing portable, mobile, and base stations including good, better, and best portable radio options. Each mobile and portable radio option is capable of MDC-1200 signaling, P25 upgradable, and Encryption upgradable. Our solution prioritizes compatibility, reliability, and ease of use, empowering your team with the tools they need to fulfill their mission effectively and safely.

Throughout our proposal, Communications Northwest emphasizes our commitment to delivering results on time and within budget, aligning with the performance period outlined in the RFP. Furthermore, our dedication to customer satisfaction is unwavering, evidenced by our robust maintenance and support services, ensuring the long-term success of your investment.

In conclusion, Communications Northwest is the trusted local partner you need to realize the vision outlined in the Wahkiakum County Sheriff's Office RFP supported with included references from Whatcom County and Deschutes County, OR, as well as providing service and sales support to other public safety agencies throughout the Pacific Northwest including Pacific County, Cowlitz County, Lewis County, and Mason County agencies. With our proven record, innovative solutions, and unwavering commitment to excellence, we are confident in our ability to deliver a communication system that empowers your team, enhances public safety, and serves the community for years to come. Thank you for considering Communications Northwest for this critical project.

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**SUBJECT: PROJECT APPROACH**

The Communications Northwest team is comprised of our Executive team, Project Management Team, Technical Services Team, and Sales Team. Each morning company wide, we have a teams meeting to discuss the daily schedule, any urgent needs, etc. so that we all understand the day ahead for each department. This enables us to coordinate and confirm the daily requirements for projects, service-related items, etc. We also have a specific projects meeting with select individuals from each department to discuss in further detail project progress, weekly. This Project meeting does not exclude any other specific department meetings throughout the week to discuss specific topics and requirements.

The schedule of our technical services team is a collaboration between our service department scheduling team, project management teams based in Oregon City, Kalama, Bellingham, and our client. Day-to-day scheduling is managed by utilizing QuickBooks time which allows our team members to access their specific schedules. Scheduling is a function of equipment arrival, equipment staging and configuration, site/location access and availability, plus client representative availability. The Project Management team will also utilize and provide the client with a Project Management Gantt chart which will provide overall project timeline progress and benchmarks to ensure the project meets the 12/31/2024 deadline for system completion.

In coordination and oversight from our Project Management Team, Communications Northwest may utilize a certified tower install company for repeater sites and microwave antenna systems installation.

Communications Northwest intends to pay prevailing wage labor rates when applicable in this project, per Washington State Department of Labor and Industries requirements.

Please see attached resumes for our Project Management Team, and Technical Services Team, plus references and experience:

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(800) 283-COMM



# PERSONAL PROFILE

**CHAD LUND**

**PROJECT MANAGER, CPM**



## QUALIFICATIONS AND AFFILIATIONS

- More than 30 Years Experience in Public Safety, Commercial, and Cellular Communications.
- Tait, Kenwood, & Icom P25 and DMR Trained
- Experienced in Operation of RF Test Equipment
- OSHA 30

## EXPERIENCE

- Communications Northwest – Project Manager
- J5 Infrastructure Partners – AT&T Oregon 5G Construction Engineer, AT&T New Site Build Implementation Engineer, Verizon New Site Build Project Manager
- Smartlink LLC – Verizon, AT&T, & T-Mobile Lead Construction Manager New Site Build, Verizon Fiber/Microwave Data Transport Design Engineer & Utility Coordination, Verizon Site Modification Project Manager
- Velocitel – AT&T New Site Build Construction Manager & Utility Coordination
- Event Communications – General Manager & Technician, Public Safety & Commercial RF Systems

## SPECIALIST FIELDS

- RF System Design and Implementation
- Tait P25, DMR, and Simulcast Systems
- Radio Broadcast Tower Construction
- DAS System Design Engineer

## REFERENCE PROJECTS

- Yamhill County, OR – Tait ASIP Simulcast Paging System
- Maritime Fire & Safety Assoc. – Tait ASIP Simulcast and Conventional Radio System with Avtec Consoles.
- Whatcom County Sheriff's Office – Tait ASIP Simulcast Radio System with Avtec Integration.
- Coos Bay Police Department – 911 Center Upgrade with Avtec Consoles

# PERSONAL PROFILE

**Vic Leatzow**

## PROJECT MANAGER

### QUALIFICATIONS AND AFFILIATIONS

- 35 Years Experience in pre-hospital Emergency Medical delivery.
- 30 Years Experience in public safety, fire service and wildland.
- Tait, Kenwood, & Icom P25 and DMR Trained.

### EXPERIENCE

- Communications Northwest – Project Manager
- Public Safety communications
- Governmental budgeting and funding

### SPECIALIST FIELDS

- Kenwood NEXEDGE System Install
- Tait P25, DMR, and Simulcast Systems
- Wildland, Haz-Mat, Tech Rescue RF communications

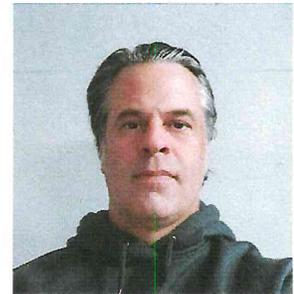
### REFERENCE PROJECTS

- Cowlitz County Fire District #5, Kalama, WA – Kenwood Nexedge DMR system
- Yamhill County, OR – Tait ASIP Simulcast Paging System
- Maritime Fire & Safety Assoc. – Tait ASIP Simulcast and Conventional Radio System with Avtec Consoles.
- Whatcom County Sheriff's Office – Tait ASIP Simulcast Radio System with Avtec Integration.

# PERSONAL PROFILE

**KIRK SLACK, PE**

**PROJECT MANAGER**



## QUALIFICATIONS AND AFFILIATIONS

- 9 Years of Service in Commercial, Public Safety, and Cellular Communications.
- 23 Years in Project Management for Heavy Civil, Light Rail, Heavy Rail, Wind Power Production, Broadcast Tower Construction, and RF Communication Projects.

## EXPERIENCE

- Communications Northwest – Project Manager
- Tool Tech LLC – Project Manager: Cellular site new builds, tower modifications and roof top installations
- City of Portland – Deputy Project Manager: Streetcar Eastside Project
- TriMet – Office Engineer: Downtown 5<sup>th</sup> / 6<sup>th</sup> Ave Light Rail Expansion Project
- Vestas – Structural Engineer: North American Business Unit
- TriMet – Field Engineer / Project Manager: Interstate Ave Light Rail Expansion Project

## SPECIALIST FIELDS

- Registered Professional Engineer (Civil), Oregon & Washington
- Railroad Management Program Certificate – Michigan State University

## REFERENCE PROJECTS

- Whatcom County Sheriff's Office – Tait ASIP Simulcast Radio System with Avtec Integration.
- Yamhill County Microwave Backhaul Design
- US Cellular – DC Powerplant Upgrade Project, Pacific Northwest Region

# PERSONAL PROFILE

**KEVIN FARLEY**

**TECHNICAL SERVICES MANAGER**



## QUALIFICATIONS AND AFFILIATIONS

- Carnegie-Mellon University – BS, Electrical Engineering-Biomedical Engineering
- More than 40 years of technical sales, applications engineering and field engineering experience with semiconductors, test equipment and communications equipment.

## EXPERIENCE

- Communications Northwest – Technical Services Manager
- Cascade Mobile – LMR Communications Manager
- The Sales Group, Inc. – Sales Representative
- Motorola Semiconductor, Network and Communications Systems Group – Product Line Sales Manager, Communications Processors and Encryption Coprocessors
- Motorola Semiconductor, Software Products Division – Western Area Sales Manager
- Lattice Semiconductor – Major Accounts Manager
- Excel Microelectronics – Area Sales Manager
- Xicor, Incorporated – Sr Applications Engineer/District Sales Manager
- TRW Optoelectronics – Applications Engineer
- Hamilton-Standard – Design Engineer
- Schlumberger Offshore Services – Field Engineer

## SPECIALIST FIELDS

- General Radio Operator License with Radar Endorsement - PG00058885
- Avtec Level 3 Certified
- Eventide Certified
- Tait P25 and DMR Trained
- Certified Tower Climber

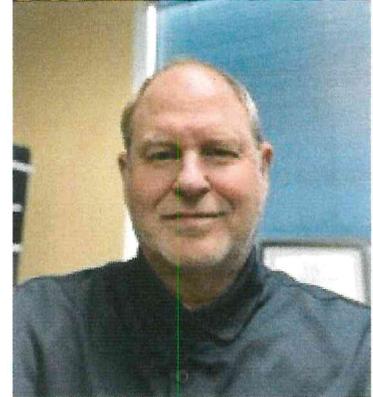
## REFERENCE PROJECTS

- Yamhill County, OR – Tait ASIP Simulcast Paging System
- Maritime Fire & Safety Association – Tait ASIP Simulcast Radio System with Avtec Consoles.
- Whatcom County Sheriff's Office – Tait ASIP Simulcast Radio System with Avtec Integration.

# PERSONAL PROFILE

**MARK BURNETT**

**SENIOR TECHNICIAN**



## **QUALIFICATIONS AND AFFILIATIONS**

- AA ELECTRONICS
- FCC GROL – TWIC CARD – CJIS – AVTEC CERTIFIED
- Over 40 years working with all manner of electronics and technology including 2-way radio installation and systems.

## **EXPERIENCE**

- Bench repair of electronics - telecom and cctv installations - P.A. systems - Alarms - exhibit displays - small business IT support – 2 way radio systems
- CAS St. Helens Oregon 1986-2015, Cascade Mobile 2015-2019, Communications Northwest 2019-currently employed

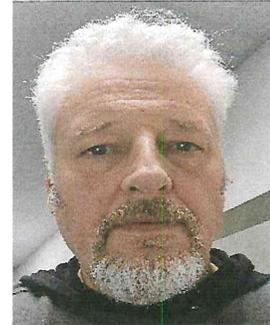
## **REFERENCE PROJECTS**

- Cowlitz County Washington Fire District 5 Multicast VHF – Whatcom County Washington Tait
- Simulcast system installation – Yamhill County Oregon Tait Simulcast installation – MFSA Tait
- Simulcast system installation – Over 40 Avtec console projects/installations involving integration with various radio, intercom and phone systems

# PERSONAL PROFILE

**VANCE PARKER**

**SENIOR TECHNICIAN**



## EXPERIENCE

US ARMY Microwave Technician and Special Projects – 15yrs Honorably Discharged

30+ years Two-way Communications and Public Safety Dispatch Equipment Technician

6 years DAS Engineering and Installation Technician

## QUALIFICATIONS & AFFILIATIONS

30 hours towards an associate degree in engineering with Vincennes University

FCC GROL Licensed

CJIS Security Level 4 certification

ETA Certified Electronics Technician Certification

ETA DAS Technician and DASC Code Compliance Certification

ETA Line and Antenna Sweep Certification

EFJ Atlas & Armada Programmer

Harris RPM1 and 2 Certification

Kenwood D1 Programming Software Certification

Zetron series 4000 and MAX Consoles

Mindshare Consoles Certified

CML Consoles Certified

TAIT 7300, 9300, & 9400 Programming, Configuration, & Support

ICOM P25 Systems Certification

Comba Fiber DAS Certification

Fiplex DAS BDA Certification

PCTEL SeeHawk Touch Certification

## **REFERENCE PROJECTS**

LifeFlight Networks Dispatch Center Boise ID

St. Alphonsus MAC Dispatch Center Boise ID

Blaine County ID Sheriff's Office Dispatch

Elmore County ID Sheriff's Office Dispatch

Gem County ID Sheriff's Office Dispatch

Valley County ID Sheriff's Office Dispatch

Ontario OR Public Safety Voted Communications Project

Cascade Student Transportation Dispatch Center Meridian ID

Amazon Boise Distribution Center DAS

JUMP Center Boise DAS

Pioneer Office Building DAS Boise ID

5<sup>th</sup> and Main Apartments Building DAS Ketchum ID

# PERSONAL PROFILE

**RYAN SHIREY**

**RF TECHNICIAN**



## QUALIFICATIONS AND AFFILIATIONS

- University of Utah, Bachelor's of Science – Computer Engineering
- Stanford University, Certification – Machine Learning, Cloud Networking
- AWS Cloud practitioners' certification

## EXPERIENCE

- RF Technician – Communications Northwest
- Software Developer – College Fund Software Consulting

## SPECIALIST FIELDS

- Telecommunications
- Software engineering
- Avtec – Level 1 certificate

## REFERENCE PROJECTS

- Portland Maritime Fire & Safety Association
- Whatcom County Sheriff's Office – Tait ASIP Simulcast Radio System with Avtec Integration.
- CommNet Distributed Trunking System



**Core Values:**

C- Commitment - To honesty, integrity and a passion for Mission Driven Communications.

A- Accountability - Accountable to Teammates, Customers and Vendors.

R – Respect – We treat everyone with respect.

E- Excellence - Providing excellence through our team members, products, and services.

S- Success - Embracing changes leading to long term success.

**Our Management Team:**

**Scott A. Reilly – President/CEO**

Scott Reilly has 33 years in Management of various companies and assignments. He has more than 20 years in the Public Safety field including 10 years as a Police Officer and Chief of Police. Scott is a graduate of the Oregon Department of Public Safety Standards and Training Police Academy. During his tenure in Public Safety he was assigned as the Communications Officer and responsible for radio operations for his companies and agencies. In 2012, he was hired by Event Rental Communications/Communications Northwest as Project Manager working on the Oregon State Radio Project. He successfully managed install teams which completed more than 3500 mobile vehicle installs throughout the State of Oregon. He was promoted to General Manager in 2013. In 2017 he bought Communications Northwest and has since opened 2 locations; growing the business nearly 8 times its original size.

**Pualani Pond – Vice President/Chief Operating Officer**

Pualani is a graduate of Warner Pacific University and has more than 20 years in Management. She is responsible for all of the company's Day to Day Operations. Through her leadership Communications Northwest has adopted an all-inclusive ERP program, a comprehensive Customer Care Program and most recently she is developing strategic strategies and a future growth model. She has been with Communications Northwest since 2017.

**Steve Watson – Vice President/Director of Technical Services**

Steve Watson is our Director of Technical Services. He has spent most of his career in public safety starting in 9-1-1 with the City of Portland in 1988. In 1991, he joined Columbia 9-1-1 Communications District in Columbia County, retiring in 2017 as the Executive Director. In October of 2017, Steve joined Communications Northwest. Steve has an Associates Degree in Fire Protection Technology from Clackamas Community College. Steve is also a graduate of the Oregon Police Academy and worked with the Clatskanie Police Dept in 1994-95. He has over 2500 hours of training on many topics related to public safety, management, administration and technical training.

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(503) 232-9031  
(503) 232-7384 Fax  
(800) 283-COMM





**James “Kevin” Farley – Technical Services Manager**

Kevin has more than 35 years of technical sales, applications engineering and engineering experience with semiconductors, test equipment and communications equipment, including the last 17 years focused on the 2-way radio and 911 markets. Kevin’s industry qualifications include an FCC General Radiotelephone Operator License with Ship Radar Endorsement and advanced product training certifications from Avtec (VoIP radio consoles), Eventide (logging recorders), Kenwood (trunked radio systems) and Cambium (SCADA/IoT radio links). Kevin received a Bachelor’s Degree in Electrical Engineering-Biomedical Engineering from Carnegie-Mellon University.

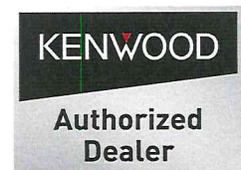
**John Clark – Director of Sales**

John joined Communications Northwest in October of 2020 after gaining more than 25 years of experience in the radio communications industry offering sales and service advice to a broad range of customer types both public and private. During his tenure in the industry, he has gained experience working with customers with basic simplex radio communication needs, up to multi-channel trunked radio systems, wide area coverage systems, in-building signal amplification, and distributed antenna systems (DAS). John has represented many manufacturers over his years and continues to strive to provide the best solutions for his customers, based on their needs and fit. John received a Bachelor’s Degree in Economics from Oregon State University.

**Chad Lund – Project Manager**

Chad began his career in wireless in 1984. He has served in many capacities during his 35+ years in the field. In 2013, Chad pursued opportunities in the LTE and Cellular industry. Chad was a construction manager for Verizon, AT&T, and T-Mobile. During this time directly managed construction of over 200 new cell sites, which were a mix of raw land sites, rooftop, and utility pole mounted. Managed technology upgrades for over 500 existing sites, and many site improvement projects. During this time also served as a project manager for T-Mobile 5G implementation, and was part of the team that helped developed AT&T’s standards and practices for the implementation of their 5G network in Oregon. Having a passion for public safety and commercial wireless communication joined Communications Northwest in 2021 as a project manager and system design engineer. The experience gained over many years working in wireless has provided unique insight into how to solve complex issues.

624 McLoughlin Blvd  
Oregon City, OR 97045  
(503) 232-9031  
(503) 232-7384 Fax  
(800) 283-COMM





# Wahkiakum County

Communications NW

Vic Leatzow - PM

Chad Lund - PM

Project Start: Tue, 2/20/2024

Display Week:

8

TASK	ASSIGNED TO	PROGRESS	START	END	Apr 8, 2024							Apr 15, 2024							Apr 22, 2024							Apr 29, 2024							May 6, 2024							May 13, 2024							May 20, 2024							May 27, 2024						
					8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2
<b>Phase 1 RFP Response &amp; Award</b>																																																												
Bid Submission	John Clark	0%	2/20/24	2/20/24																																																								
Bid Opening & Award	Wahkiakum County	0%	2/20/24	2/27/24																																																								
Contracts - Documents	Wahkiakum County & CommNW	0%	3/12/24	3/27/24																																																								
Kick Off Meeting	Wahkiakum County & CommNW	0%	4/1/24	4/1/24																																																								
<b>Phase 2 Site &amp; System Needs Validation</b>																																																												
Site Visits		0%	4/3/24	4/5/24																																																								
Equipment Validation & Order		0%	4/8/24	4/19/24																																																								
Equipment Delivery		0%	7/8/24	8/9/24																																																								
Staging - Configuration - Factory Acceptance Testing		0%	8/12/24	9/6/24																																																								
<b>Phase 3 System Installation</b>																																																												
Micro Wave - Antenna Tower Work		0%	8/26/24	9/27/24																																																								
Site Shelter Equipment Installation		0%	9/9/24	10/11/24																																																								
911 Dispatch Installation		0%	9/30/24	10/11/24																																																								
System Operations		0%	10/11/24	10/18/24																																																								
<b>Phase 4 Close Out</b>																																																												
System Acceptance		0%	10/21/24	10/21/24																																																								
Project Document Turn Over		0%	10/21/24	10/25/24																																																								
Project Close Out Meeting		0%	10/25/24	10/25/24																																																								

Insert new rows ABOVE this one



### Attachment 3 – Project Reference Form

Proposer must provide project references that can be contacted regarding the quality of workmanship and service provided to current and past customers.

Project Name: Whatcom Countywide UHF Simulcast System

Project Location: Whatcom County Washington

Project Start and End Dates: 05/01/23 – 06/30/23 Project Value: \$1,400,000

Project Owner: Whatcom County Sheriff's Office

Owner Point of Contact and Title: Robert Greene, Public Safety Communications Manager

Phone: 360-778-7166 email: RGreene@co.whatcom.wa.us

#### Project Description:

Based on the needs expressed by Whatcom County, a Tait analog simulcast over IP system was engineered and implemented. Final system utilized a combination of 7 simulcast sites, and 3 sites connected by wireline. System included all new base station hardware, GPS timing units, network switching, power distribution units, and tower material including coaxial cable and antennas. The new system was added to all dispatching centers and consoles, and successfully cutover.

#### Project Challenges:

County budget for the project was obtained through a State of Washington grant and once issued there was only 60 days to fully deliver completed project.

Whatcom County did not have microwave or data connections available at all of the sites that were required to deliver the necessary coverage.

#### Strategies Used to Overcome Challenges and the Results Achieved:

Collectively worked with all equipment vendors to coordinate expedited delivery schedules. Applied additional technical resources to rapidly stage equipment, configure, and transport. Applied multiple Project Managers and senior level technicians to allow installation at multiple sites simultaneously. Coordinated with multiple agencies to utilize alternate microwave and data network connections, and ultimately managed to bring all elements together to allow the system to be cutover and fully operational prior to the deadline.

### Attachment 3 – Project Reference Form

Proposer must provide project references that can be contacted regarding the quality of workmanship and service provided to current and past customers.

Project Name: Deschutes County

Project Location: Bend, Oregon

Project Start and End Dates: 2017-2020 Project Value: \$2,500,000

Project Owner: Deschutes County 9-1-1

Owner Point of Contact and Title: Tim Beuschlien

Phone: 541 322 6117 email: tim.beuschlien@deschutes.org

Project Description:

Comm NW worked with Deschutes County 9-1-1( DC911) on 3 projects:

- Equipment install, configuration and start up for a multi site microwave system
- Radio System overlay project. 800 ASIP system as a backup for LE agencies
- Radio System overlay project. VHF ASIP system as the new primary system for Fire agencies.

Project Challenges:

Coordination of installation of new equipment while customer continued to maintain and operate existing system.

Integration with existing vendors and obtaining assistance as needed and the connectivity to the State System.

Multiple simultaneous projects: System equipment - Radio and Microwave, Subscriber Equipment - testing and installation.

Strategies Used to Overcome Challenges and the Results Achieved:

Comm NW worked closely with the customer to coordinate and educate all involved parties on the timeline which included installation, training and leading to cutover. Comm NW met with all parties, provided overview of project milestones, adjusted work flows and timelines as needed.

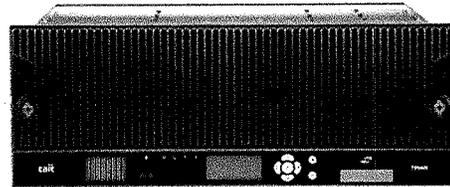
The end result provided customer with a very stable microwave system at multiple sites, a complete new simulcast VHF system for all Fire/EMS responders in the County and the first steps to a county wide 800 system for Law users.

## Intelligent • Flexible • High Performance

The TB9400 base station is the second generation Multimode base station with IP connectivity from Tait. It supports Analog, DMR and P25 Phase1 and Phase2. The multimode capability makes it possible to migrate between Analog/P25/DMR networks as well as simplifying stockholding. The possible P25 Ph1 to Ph2 software migration enables customers to transition to a more spectrally efficient solution with greater capacity while future proofing their investment.

The TB9400 delivers on deployment and operational efficiency with Phase 2 upgradability, Linear Simulcast Modulation (LSM), and remote network management.

The TB9400 base station is the main component of the Tait AS-IP (Analog Simulcast over IP) network. It is an ideal platform to migrate to either DMR or P25 in the future from an Analog



**The TB9400 offers the following features:**

- ▶ P25 Phase1 trunked base station with TDMA hardware and software-upgradability to P25 Phase2 TDMA for increased capacity
- ▶ P25 Phase2 trunked and Analog simulcast operation
- ▶ P25 standards compliance for greater choice and interoperability
- ▶ Analog Conventional Simulcast operation
- ▶ IP connectivity allows efficient network design and scaling
- ▶ Linear Simulcast Modulation (LSM) means simulcast networks with fewer sites
- ▶ Extensive remote management and monitoring options with a focus on security
- ▶ MIL-STD designed and tested for reliability to mitigate network outages

Range	Tait Band	50W	100W	50W DUAL
136-174MHz	B1	✓	✓	✓
378-420MHz	HH*	✓	✓	✓
400-440MHz	H1	✓	✓	✓
440-480MHz	H2	✓	✓	✓
470-520MHz	H3*	✓	✓	✓
762-870MHz	K4*	✓	✓	✓

- C4FM. LSM and Analog modulation only

**Note:**

- ▶ Not all products have compliance in all regions/countries. Please check the Tait Product Specification sheet or contact your Tait Representative for further information.

## Intelligent • Flexible • High Performance

### P25 Phase 2

- ▶ The TB9400 is upgradable by software to enable Phase2 operation.

### Linear Simulcast Modulation (LSM)

- ▶ The TB9400 supports trunked simulcast and with LSM option. P25 Phase1 LSM is highly recommended for Phase2 Simulcast operations.

### Digital Control Design

- ▶ The TB9400 features a state-of-the-art RISC processor and Digital Signal Processor (DSP), providing very fast, reliable processing through the latest in digital technology.

### Analog Simulcast

- ▶ The TB9400 supports Analog Simulcast and is fully re-useable when migrating to P25 Phase1/Phase2

### Convenient Modular Design

- ▶ Designed for ease of hook-up and adaptation in the field, the TB9400 is configured with front-loading modules that can be mixed and matched to meet your system needs. The TB9400 gives you the flexibility to make module changes in the field.

### Built-in Standard Interfaces

- ▶ The TB9400 has built-in a variety of industry-standard IP interfaces to enable easy connectivity to the rest of your system. These include HTTPS web browser access for maintenance and SNMP for monitoring.

### Power Management System

- ▶ The comprehensive power management system provides the ability to automatically switch between AC and DC input power, to move to battery operation in the case of power failure, and to provide an auxiliary output power supply for third-party equipment.

### Complete Remote Accessibility

- ▶ The advanced web interface of the TB9400 makes remote management of your system simple. The web interface uses HTTPS which provide security for the transactions between the web browser and the base station. Parameters can be configured or monitored remotely with a web browser and multiple user accounts are supported for user access control.

### Robust Specifications

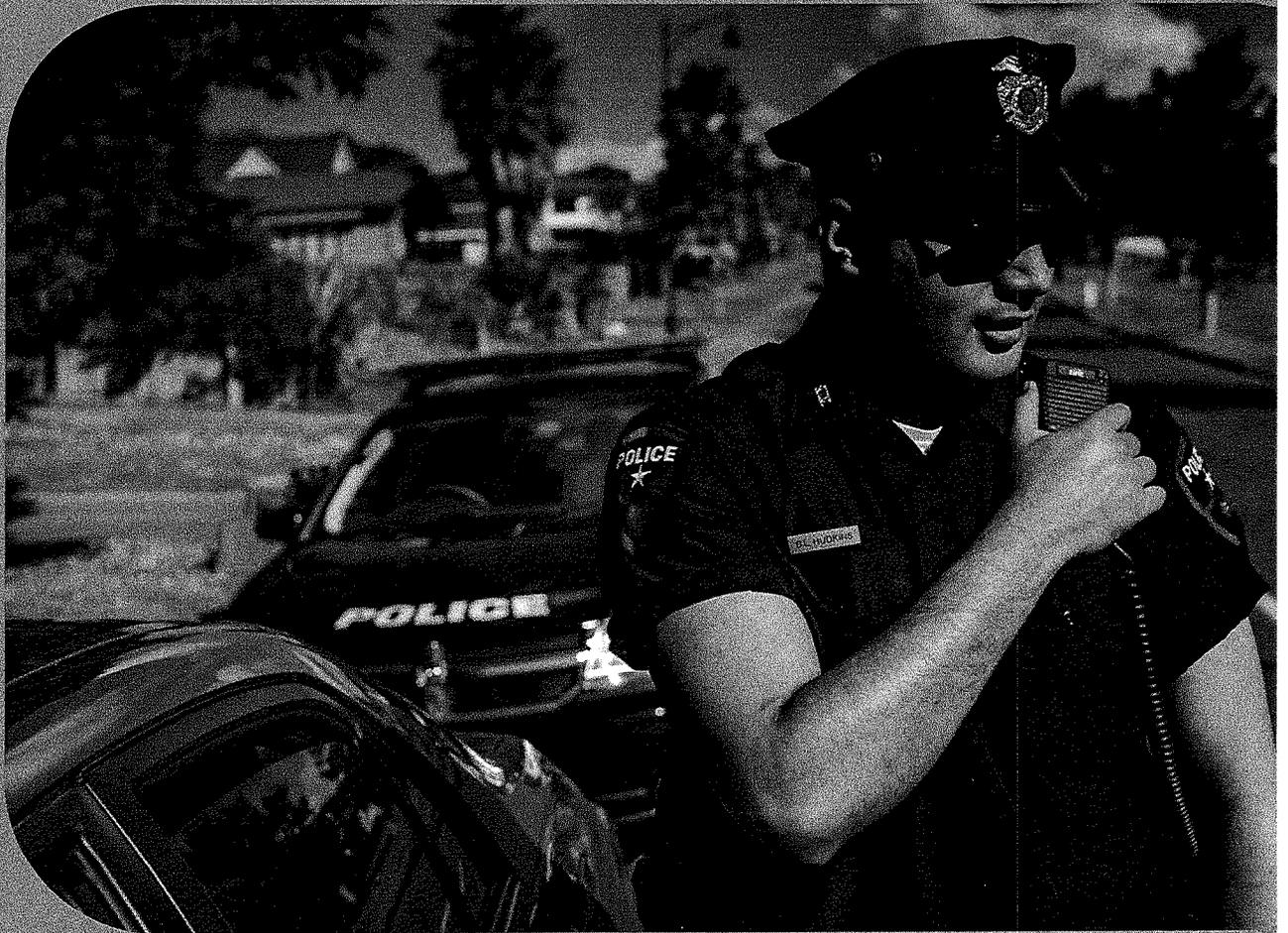
- ▶ Built to exceed standard specifications, the TB9400 is designed to withstand extreme temperature conditions. Engineered for maximum reliability, the TB9400 has large heat sinks, advanced cooling, and the intelligence to maintain the highest possible levels of service in adverse environments.

### Peak RF Performance

- ▶ With outstanding specifications for selectivity, adjacent channel interference and fast key-up times, the TB9400 base station was designed using the best RF practices.

Version 4.0 September 2022

# Tait AS-IP Analog Simulcast System



## PREFACE

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This product catalog outlines the Tait product range.

Custom product and non-standard equipment is not listed. Please contact your Tait representative if you require information on any product not listed within this book.

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## Tait AS-IP Analog Simulcast Overview

Tait AS-IP Analog simulcast networks are IP-based digital systems specifically designed to provide conventional simulcast Analog communications over wide geographic areas.

AS-IP networks can either be stand-alone or used to provide an Analog simulcast overlay to new or existing Tait P25 networks—for example for Analog paging applications or legacy Analog radio users. Because AS-IP networks use the same hardware as Tait P25 networks, they can be upgraded to P25. This system overview aims to provide technical information about these networks.

Simulcast transmission provides a means of achieving wide-area coverage with multiple transmitters utilizing a single frequency. In simulcast systems, audio is broadcast simultaneously over multiple transmitters on a single frequency. Essentially, for simulcast, each transmitter in the system transmits the same signal, with the same characteristics, at the same time.

Simulcast is very useful because frequency allocations in many countries are difficult, and reusing the same frequency over a large area is cost-effective and sometimes the only possible way.

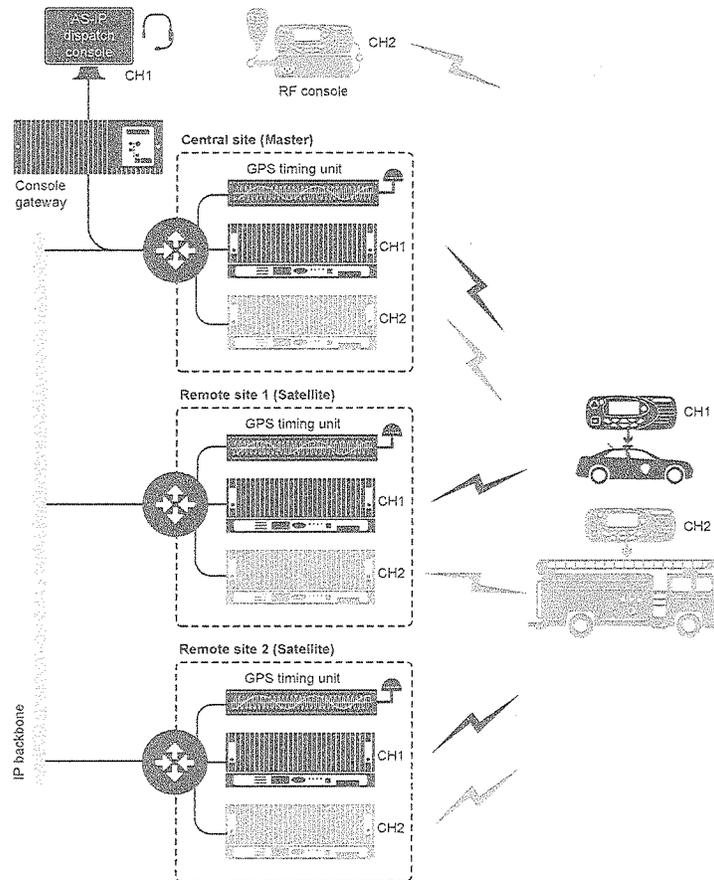
Tait Communications has decades of experience in Private Mobile Radio systems and is well-known for its Tait QS2 Analog simulcast solution, and its P25 Phase 1 and Phase 2 solutions on the Tait P25 and TN9400 networks.

The main differences between the Tait QS2 quasi-sync Analog conventional network and the Tait AS-IP network are:

- QS2 interfaces to Analog lines, whereas AS-IP provides connectivity with the IP network for simplicity.
- QS2 is a fully featured solution supporting some types of paging and complex failure mode support. The AS-IP network portfolio is a compact solution that will be developed according to customer needs, and is designed to meet coverage requirements within the limits of an available spectrum.
- QS2 uses Analog TB8100 base stations, whereas AS-IP uses the IP-capable TB9400 base stations also used by Tait P25 networks.
- AS-IP uses significantly less equipment than Tait QS2, as the voting system is included in the TB9400 with intelligent resiliency. This reduces the possible points of failure, increases reliability and therefore reduces maintenance.
- AS-IP allows the use of an SNMP-Manager (such as Tait EnableMonitor).
- Unlike the QS2 design, AS-IP is resilient to minor changes to link timing without additional equipment.

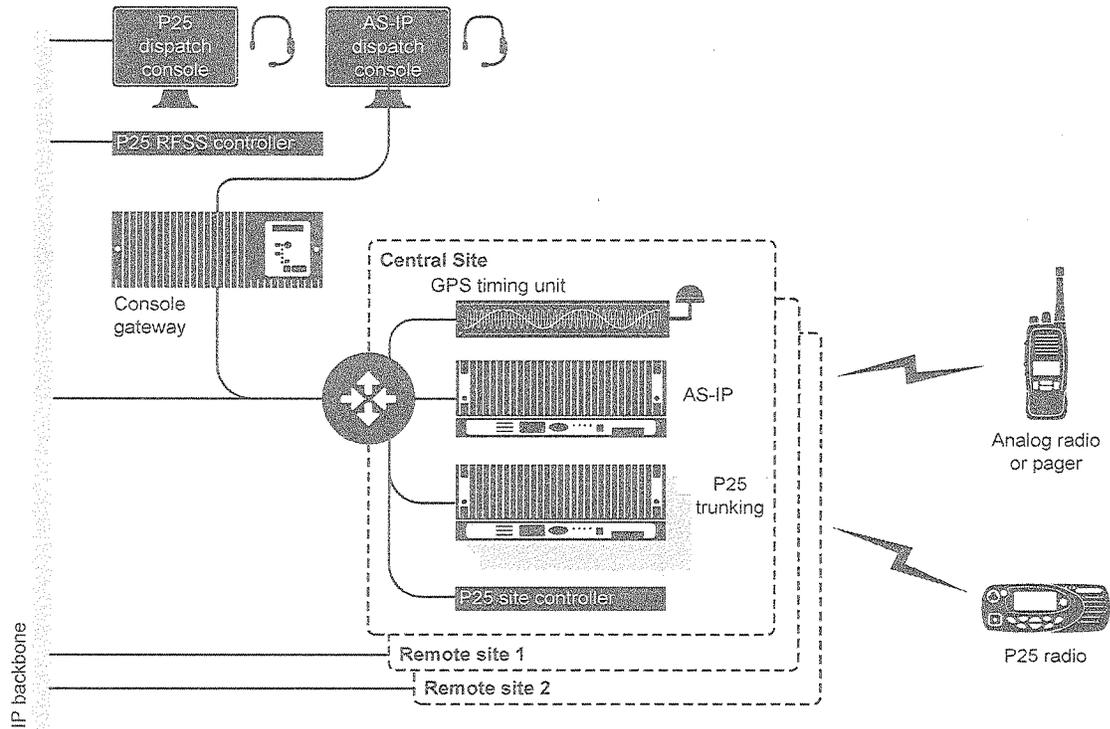
# TAIT AS-IP System

A basic AS-IP network consists of multiple sites. Each site can have several base stations (one for each channel) linked via IP/Ethernet to form a local area network. The sites are linked through routers by an IP backbone. For synchronization, each site also has a GPS timing unit. The base stations are grouped together to form channel groups. One of the base stations in a channel group is declared as the central voter (or master) and the other base stations are its satellites. The master controls the operation of the channel group and performs centralized voting. The operation is synchronized, which means the transmitters all transmit exactly in unison with each other, with slight adjustments to the launch times depending on the overlap zone. The master timestamps the voted voice signal to be transmitted and sends it to all channel group members. The timestamp tells members when to transmit each voice packet. Each channel group requires its own console which can be either a dispatch console connected to the central site via a console gateway, or an RF console which is a mobile on a desktop.



# TAIT AS-IP System

AS-IP networks can complement a P25 network by adding an Analog simulcast overlay to a P25 conventional and P25 trunking solutions. For example for Analog paging applications or legacy Analog radio users such as mutual aid channels



## Network Elements

An AS-IP Analog simulcast network contains the following network elements.

### TB7300 Base Stations

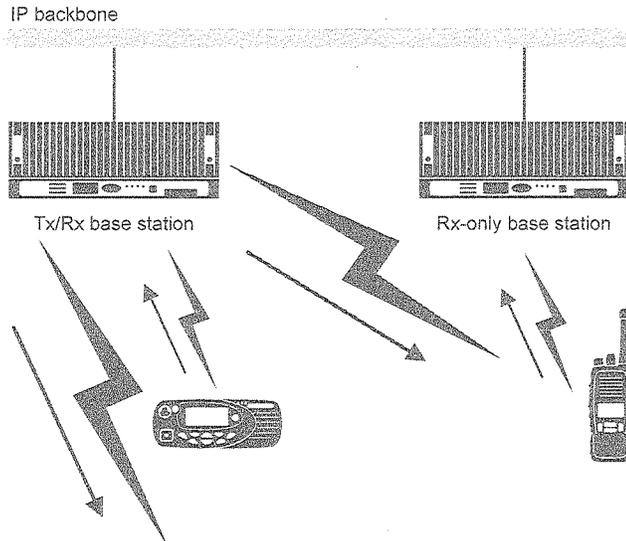
RF channels are provided by TB7300 base stations in a slim 1U chassis. The TB7300 has built-in intelligent voting, which is used in simulcast. The TB7300 base station can be managed remotely from a computer using a web-based application.

### TB9400 Base Stations

Compared to the TB7300, the TB9400 adds greater flexibility to mix modules within a 4U sub-rack as well as a 100W power amplifier option. Furthermore, the TB9400 has a linear power amplifier and is capable of linear modulation schemes, including LSM and P25 phase 2. Each 4U sub-rack has one or two reciters (modules providing a receiver and an exciter). Each reciter and power amplifier combination provides one frequency pair. The TB9400 has built-in intelligent voting, which is used in simulcast. The TB9400 base station can be managed remotely from a computer using a web-based application.

### TB9400 Receive-only Base Stations

Mobile and portable radios transmit at a lower power than base stations. In order to improve RF coverage of the RF channels, in-fill receiver sites can be used. Each 4U subrack has one to four receiver modules.



TB9400 receive-only base stations accept the same configuration file as the fully featured TB9400 base stations to provide a simple configuration management of the system. It also has built-in intelligent voting in order to join a simulcast channel group.

# TAIT AS-IP System

## GPS Timing Units

A GPS timing unit is required at each site. Simulcast networks must have a GPS-disciplined external frequency reference, a GPS-derived 1 PPS signal and access to an NTP server. The 1 PPS timing pulse and NTP ensure that simulcast transmissions from each physical site in the channel group are aligned with microsecond precision.

The console gateway should be connected to NTP.

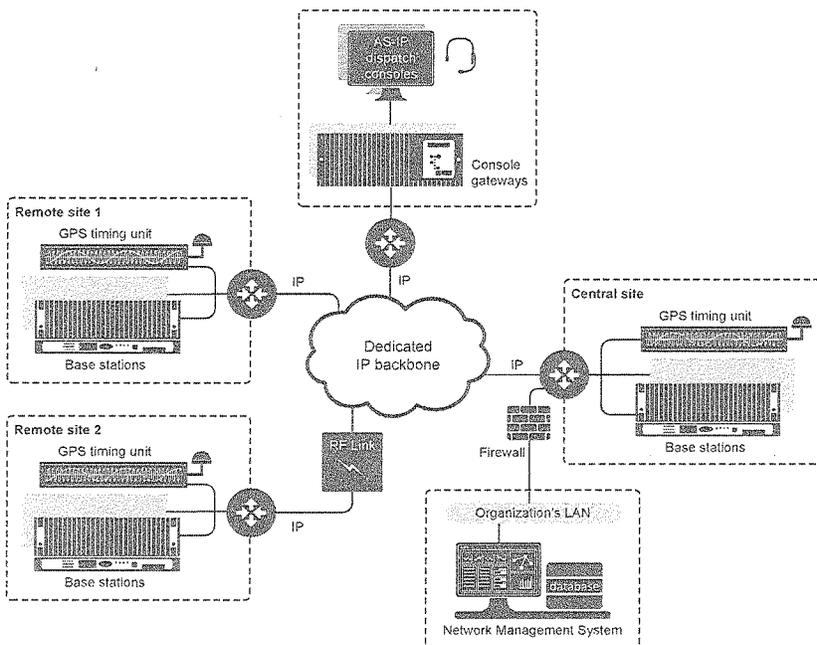
Notes: 800 MHz base stations must have a GPS-disciplined external frequency reference source, to ensure the accuracy of the transmit frequency. NTP is also used for accurate time stamping of the logs.

Tait recommends using the Spectracom SecureSync synchronization system, which can provide a 1 PPS signal and a frequency reference, as well as NTP.

One GPS timing unit can support up to eight daisy-chained TB9400 base stations.

## IP Backbone

The IP backbone interconnects the various elements of the network. It is a dedicated, private wide area network, which can be interfaced via a secure firewall to the organization's LAN. It can also be run on a wide area network provided this is closed and a VLAN configured for the radio traffic as its own private WAN. Secure remote access to the network can be provided over the public Internet.



The backbone consists of COTS IP-based building blocks

The public Internet itself is generally not suited to provide that backbone as it cannot guarantee performance or provide a high level of security

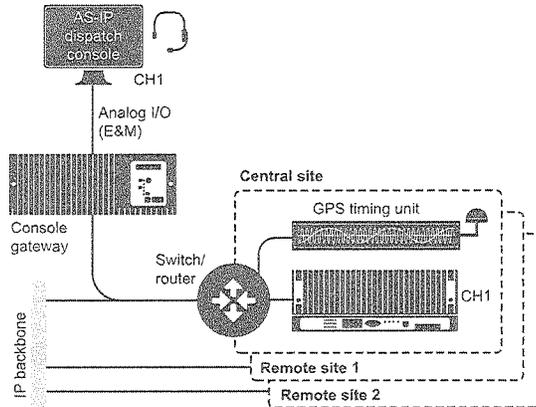
Various physical links can be used in the backbone, including microwave, DSL, E1/T1, MiMOMax narrowband wireless, leased line, and fibre-optic cable. The link must provide Ethernet interfaces at each end and meet bandwidth, latency, jitter and quality of service (QoS) requirements.

Depending on the topology, remote sites may need to be linked using a high-bandwidth, low-latency RF link infrastructure, such as MiMOMax Tornado. The data bandwidth of the link depends on the selected frequency RF link. For more information, refer to the specifications on [www.mimomax.com](http://www.mimomax.com).

# TAIT AS-IP System

## Console Gateway

The console gateway consists of a gateway module in a subrack, optionally with a PMU. A subrack can contain several gateway modules. The console gateway's Analog line connects to the dispatch system, and its Ethernet interface connects to the AS-IP channel group. It has no RF functionality.



The console gateway can be managed remotely from a PC using a Windows application called the Customer Service Software (CSS).

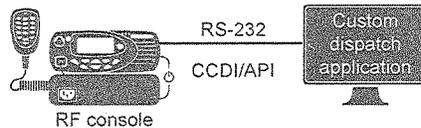
The Tait console gateway supports any type of Analog console using the E&M, a subset of the tone remote control signalling, and Analog input/output.

For more information on the console gateway, see Appendix B.

A redundant console gateway can be used for resiliency, and it is recommended to use a different IP backbone.

## RF Console

Depending on the type of network and the possible migration path, Tait recommends the TM9400 mobile radios listed above as RF consoles of the channels on small systems.

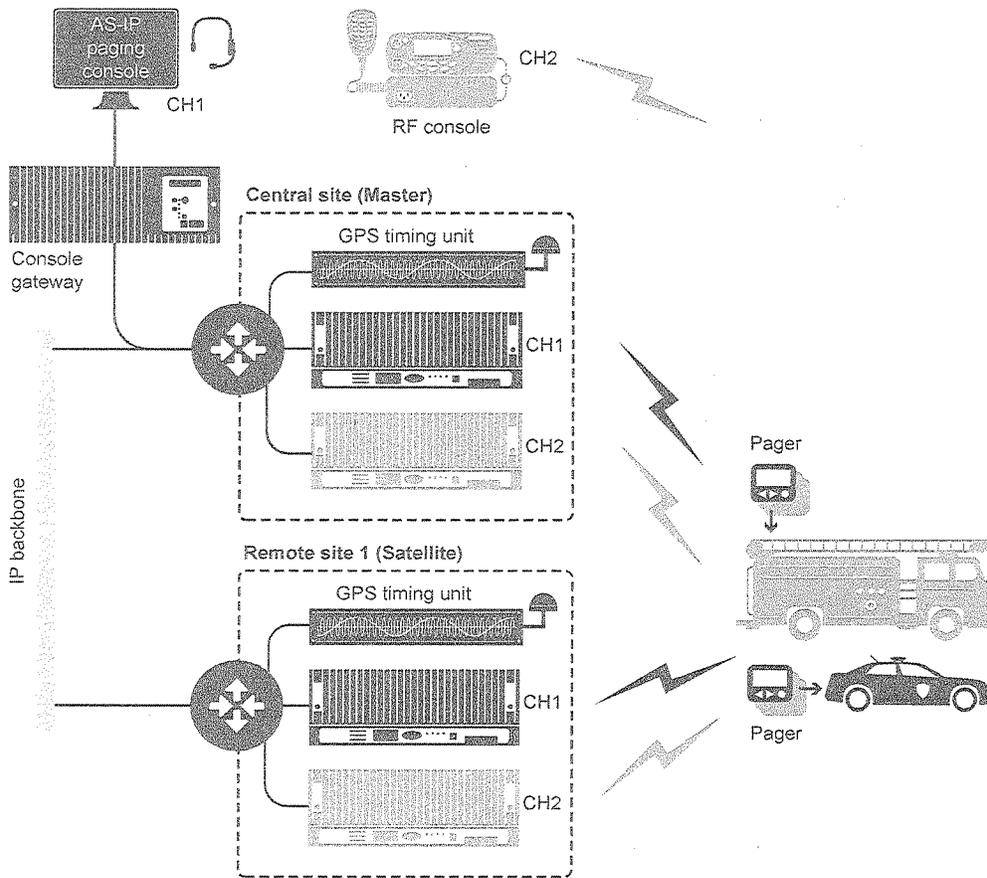


Customers have the ability to create their own dispatch solution using the CCDI or API protocol features available with these radios. For more information visit [taitradio.com](http://taitradio.com) and search for the API Protocol manuals on the Technical Resources website.

# TAIT AS-IP System

## Paging Console and Pagers

Tait AS-IP networks support paging using any two-tone combination. Contact Tait for information on two-tone paging consoles and pagers. A typical plan is shown below.



## Network Management System

Tait AS-IP networks support an SNMP-based network management system (NMS) such as Tait EnableMonitor. Tait recommends that all supporting equipment (such as RF links, switches) support SNMP.

## Network Equipment & Licenses

ITEM CODE	DESCRIPTION
<b>Hardware</b>	
TB9435-B3M0-0000-AzBC-10	Analog 148-174M 100W ACaux12 with Simulcast and Central Voter Master
<b>Satellites</b>	
TB9435-B3M0-0000-AzBD-10	Analog 148-174M 100W ACaux12 with Simulcast and Networking Satellite
<b>Rx-Only Satellites</b>	
TB9444-B3x0-0000-AzAC-10	Analog 148-174M Rx Only ACaux12 with Networking Satellite
<b>P25 Gateway Console</b>	
TN9110-00y0-0000-0000-10	Console Gateway y Channel no PMU
TN9110-00y0-0000-Az00-10	Console Gateway y Channel AC aux12
TN9110-00y0-0000-C000-10	Console Gateway y Channel DC12 aux12
TN9110-00y0-0000-Jz00-10	Console Gateway y Channel ACDC12 aux12
<b>The following licenses will be required for the Tait AS-IP system to operate</b>	
<b>Software Licenses</b>	
TBAS000	SFE Key - Default Radio System (81/91)
TBAS041	SFE Key - Analog Air Interface
TBAS060	SFE Key - Digital Fixed Station Interface (91)
TBAS061*	SFE Key - Central Voter (91/94/73)
TBAS062	SFE Key - Simulcast Enable Phase I (91/94/73)
TBAS067	SFE Key - Transceiver Networking (91)
TBAS071*	SFE Key - IP Networking Satellite

Replace "x" with Receiver only qty (1-4)    Replace "y" with Channel quantity (1-5)    Replace "z" with Power cord (1=NZ/Aus; 2=UK; 3=EU; 4=US/Can)  
 (BC = TBAS061 & TBAS062; BD = TBAS071 & TBAS062; AC = TBAS071)

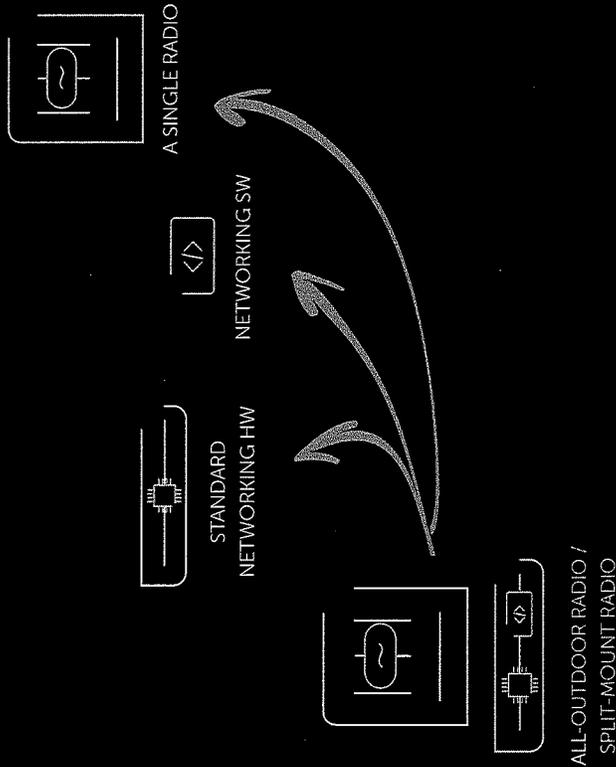
Note: \* One of these two licenses MUST be present

Note: Also able to be purchased as an Analog single site stand-alone repeater (TB9435-B3M0-0000-Az00-10)

## DISAGGREGATED WIRELESS HAULING – STAYING AHEAD OF THE 5G CHALLENGE CURVE

Resolving 5G wireless hauling challenges requires a new approach to wireless hauling – disaggregation. Rather than focusing on a single innovation path, disaggregation allows operating in multiple innovation paths and excelling in every one of them independently.

Ceragon redefines wireless hauling with the IP-50 Platform, which adopts the disaggregation model and implements three independent innovation paths.



## SINGLE RADIO

Thanks to Ceragon's unique multicore technology and decades of radio experience, you can achieve 4G & 5G capacity at any location, in any band. You can now have 4X the capacity with less resources and use new frequency bands. Leveraging multicore technology, you can gain additional capacity with no additional spectrum, densify your network without spectrum constraints, ramp up network capacity without truck rolls, and much more. Moreover, a single radio model can be used at any network scenario (all-outdoor, split-mount, all-indoor), supporting your mass deployment efforts and operational efficiency targets.

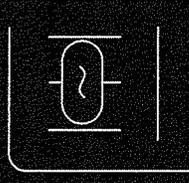
## NETWORKING HARDWARE

Ceragon's wide variety of hardware options allows you to scale your network as required, achieving up to 100 times the capacity while adding interfaces where needed. This is done by developing Ceragon applications in a way that enables them to be executed on any standard merchant silicon, so you can leverage the industry's HW enhancements while leveraging the specific benefits of Ceragon's unique solutions.

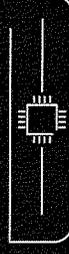
## NETWORKING SOFTWARE

Ceragon combines open SDN and state-of-the-art routing capabilities, such as segment-routing, to allow service orchestration via network slicing, fast service introduction and simpler, more efficient operations. This way, you can make sure each service type is accommodated with the right resources and SLA, regardless of other services running through your network, while keeping the network optimized and cost-efficient.

If your network strategy calls for integrated L3 IP/MPLS and segment routing in your backhaul, then the IP-50 platform is a perfect fit. You can also combine IP-50 products with Ceragon's IP-20 products for a case-by-case optimized solution.



A SINGLE RADIO

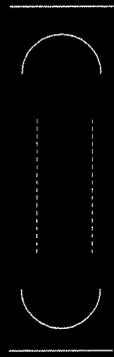


STANDARD NETWORKING HW



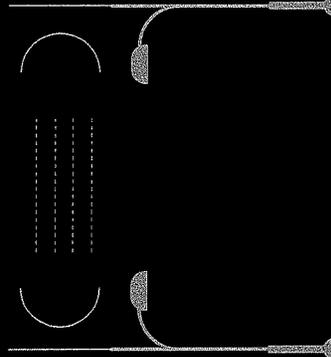
NETWORKING SW

# OUR TECHNOLOGY – YOUR VALUE



5G CAPACITY GROWTH

1 click, double capacity



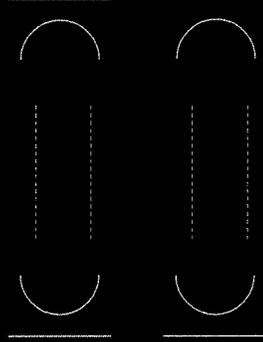
SIMPLIFIED 5G SITE ACQUISITION & INSTALLATION

All-outdoor solutions



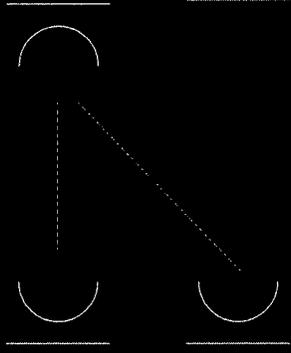
5G CAPACITY WITH NO COMPROMISE

Multiband



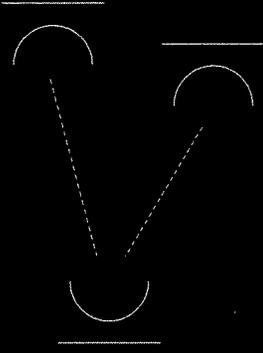
5G CAPACITY IN NARROWBAND SPECTRUM

4x4 LoS MIMO



INCREASED LONG-HAUL EFFICIENCY AND FLEXIBILITY

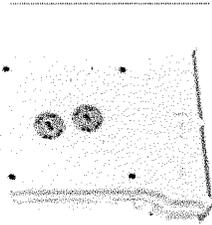
Advanced Space Diversity (ASD)



EASIER 5G NETWORK DENSIFICATION

Advanced Frequency Reuse (AFR)





## IP-50C

Universal multicore microwave radio  
for all deployment scenarios

The world's best all-outdoor microwave radio just became better. The IP-50C universal microwave radio is the evolution of the IP-20C, the world's best-selling wireless backhaul outdoor radio. The IP-50C brings new capabilities that allow you to base your entire network, from small cells to massive aggregation sites, on this single radio – reducing complexity, costs and time to revenue.

The IP-50C can be deployed as a stand-alone all-outdoor radio, or combined with an indoor unit (the IP-50FX) as a scalable aggregation node and cell site router. Either way, you can leverage all the benefits of Ceragon's cutting-edge multicore technology.

A unique configuration of an all-outdoor 4+0 node (utilizing layer-1 carrier aggregation) allows you to achieve up to 8Gbps by layer-1 carrier bonding without a need for an additional indoor unit. Moreover, using the IP-50C, you may upgrade your existing all-outdoor installed base (whether Ceragon IP-20C 2+0 or any third-party all-outdoor) into 4+0 using layer-1 carrier bonding. This enables you to turn more sites in your network into all-outdoor sites, thereby reducing time to market, lowering CAPEX and OPEX, and simplifying site acquisition tasks.

## SPECIFICATIONS

### RADIO

- Supported frequency bands: 6-42GHz
- Supported channel spacing: 3.5-224MHz
- ACM steps: 12, BPSK-4096QAM
- 4x4 LoS MIMO
- Advanced Frequency Reuse
- Advanced Space Diversity
- Remote 2nd carrier activation

### INTERFACES

- 1/10GbE (electric)
- 10GbE (SFP+)
- 1/2.5GbE (SFP)
- 10GbE extension port for advanced features or traffic interface (SFP+)

### CAPACITY

- Networking capacity: 16Gbps
- System capacity: 8Gbps (in 4+0 configuration)
- Layer-1 carrier bonding: Up to 4+0 in an all-outdoor configuration using a single cable

### NETWORKING

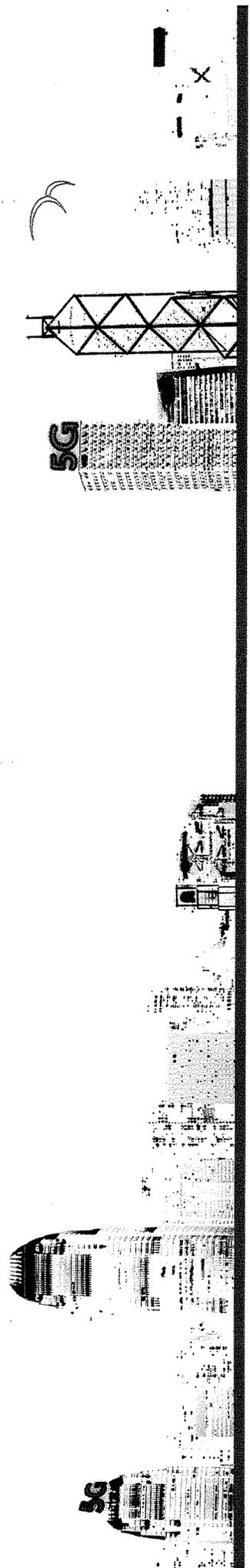
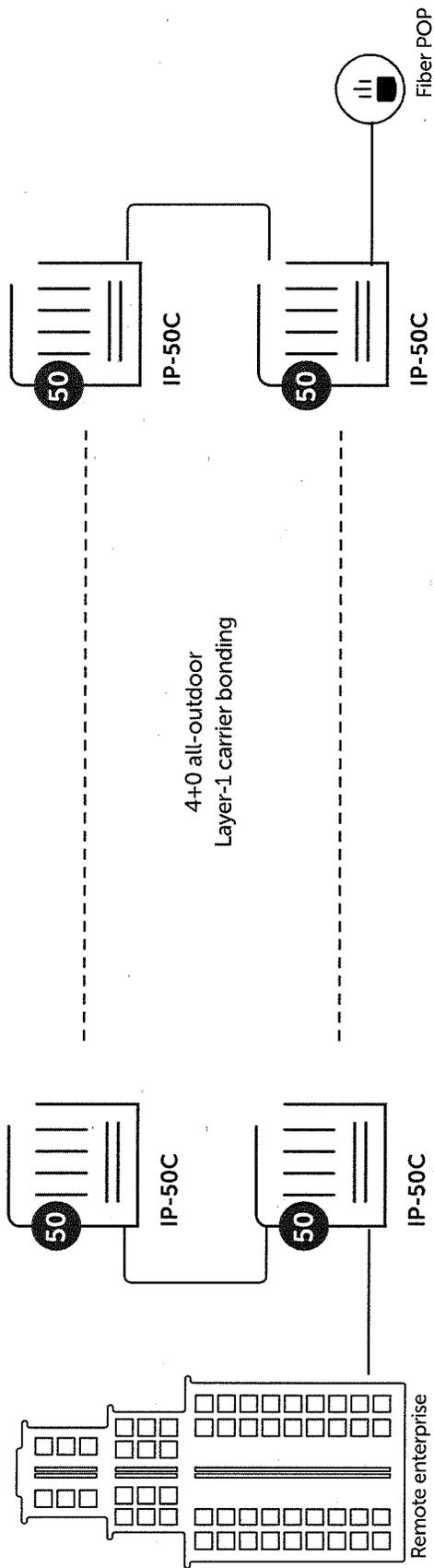
Integrated Carrier Ethernet switching capabilities, MEF Carrier Ethernet 2.0 compliant | up to 30% more capacity using header deduplication | carrier-grade service resiliency (G.8032, MSTP) | SyncE and 1588 synchronization | ITU-T Y.1731 fault and performance management (MEF 35) | SDN | layer 3 (using IP-50FX)

### SECURITY

AES-256 radio encryption | secured protocols and management interfaces (HTTPS, TLS, SSH, SNMPv3) | secured architecture and software design | advanced authentication and identification management

## IP-50C SPOTLIGHT USE CASE

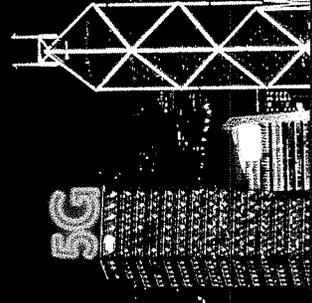
High-capacity all-outdoor enterprise connectivity

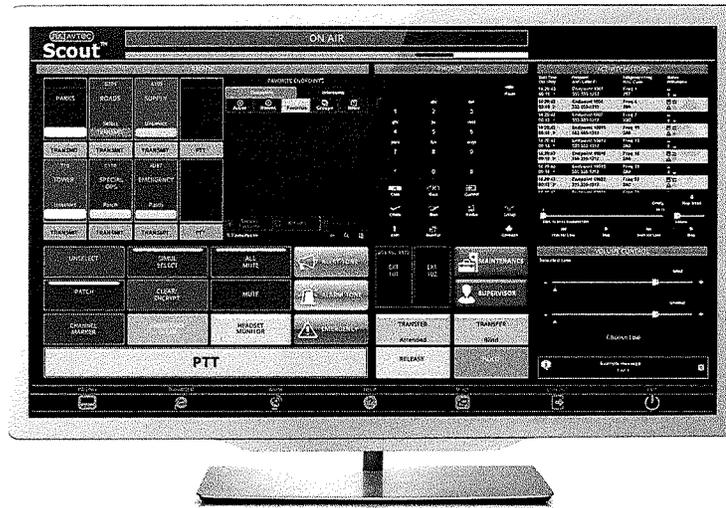




## About Ceragon

Ceragon Networks Ltd. is the world's #1 wireless backhaul specialist. We help operators and other service providers worldwide increase operational efficiency and enhance end customers' quality of experience with innovative wireless backhaul solutions. Our customers include wireless service providers, public safety organizations, government agencies and utility companies, which use our solutions to deliver 4G, mission-critical multimedia services and other applications at high reliability and speed. Ceragon's unique multicore technology provides a highly reliable, high-capacity 4G & 5G wireless backhaul with minimal use of spectrum, power and other resources. It enables increased productivity, as well as simple and quick network modernization. We deliver a range of professional services that ensure efficient network rollout and optimization to achieve the highest value for our customers. Our solutions are deployed by more than 460 service providers, as well as hundreds of private network owners, in more than 130 countries.





## Features

Supports 2000 endpoints (Scout EX), 8 active endpoints (Scout E8), or 4 active endpoints (Scout E4)

Uses Software Audio Package

Supports free seating

Supports ResourcePro screen control

Supports Scout Instant Recall Recorder (IRR)

Connects to 11 speakers

Supports telephony, radio, and auxiliary input/output endpoints

Supports five patches

# Scout Enterprise Consoles

Avtec offers Scout EX, Scout E8, and Scout E4 consoles to support the right number of endpoints for any Scout position.

Scout EX, a software-based communication console which is known for its flexibility and reliability, is easy-to-use and provides interoperability for a dispatching position. Avtec's flagship console, Scout EX is a pure IP solution that provides access to thousands of radio, telephony, intercom, and auxiliary input/output endpoints and features a host of on-screen controls to enable the dispatcher to communicate quickly and effectively.

Scout E8 and Scout E4, two variations of the Scout EX console, function to the full extent of Scout EX but support fewer radio or telephony endpoints that are allowed to operate at one time. The Scout E8 console provides full functionality for eight active endpoints, Scout E4 for four. These consoles provide the same quality, durability, and operational flexibility as the Scout EX console but offer a scaled Scout console for of those who need access to fewer active endpoints. However, when using the ResourcePro screen control with a Scout E4 or Scout E8 console, the dispatcher gains the flexibility to activate the number of endpoints allowed from the wide range of endpoints in the Scout system.

## FEATURE SPECIFICATIONS

FEATURE	SCOUT EX	SCOUT E8	SCOUT E4
Number of Endpoints	2000	8	4
Telephony	Yes	Yes	Yes
Wide Range of Radio Interfaces	Yes	Yes	Yes
Auxiliary Input/Output Endpoints	Yes	Yes	Yes
Scout Instant Recall Recorder (IRR)	Yes	Yes	Yes
Standard VPGate (Level 0, 1, 2, or 3)	Yes	Yes	Yes
Number of Patches	5	5	5
Number of Unselect Channels	10	10	10
Total Number of Speakers	11	11	11
Free Seating	Yes	Yes	Yes

## TIER 1 CONSOLES

The Tier 1 consoles enable access to endpoints using SIP, Outpost, ED-137, and advanced control station interfaces.

MODEL NUMBER	DESCRIPTION
SFW-SCOUT-EX-T1	Scout EX Tier 1 Console. Includes a license for a Scout Enterprise Console with Software Audio Package. Includes IRR.
SFW-SCOUT-E8-T1	Scout E8 Tier 1 Console. Includes a license for a Scout Enterprise Console with Software Audio Package with all features and functionality of Scout EX Console. Scout E8 enables access to maximum of eight channels concurrently. Includes IRR.
SFW-SCOUT-E4-T1	Scout E4 Tier 1 Console. Includes a license for a Scout Enterprise Console with Software Audio Package with all features and functionality of Scout EX Console. Scout E4 enables access to maximum of four channels concurrently. Includes IRR.

## TIER 2 CONSOLES

The Tier 2 consoles enable access to all endpoints supported with Tier 1 consoles, plus endpoints that support trunking.

MODEL NUMBER	DESCRIPTION
SFW-SCOUT-EX-T2	Scout EX Tier 2 Console. Includes a license for a Scout Enterprise Console with Software Audio Package that enables access to conventional and trunked radios. Includes IRR.
SFW-SCOUT-E8-T2	Scout E8 Tier 2 Console. Includes a license for a Scout Enterprise Console with Software Audio Package with all features and functionality of Scout EX Console. Scout E8 enables access to maximum of eight conventional and trunked channels concurrently. Includes IRR.
SFW-SCOUT-E4-T2	Scout E4 Tier 2 Console. Includes a license for a Scout Enterprise Console with Software Audio Package with all features and functionality of Scout EX Console. Scout E4 enables access to maximum of four conventional and trunked channels concurrently. Includes IRR.

# WHY TAIT TOUGH?

## The Toughest Radios in the Industry

Tait radio users have tough jobs. Police, Fire, Emergency Services, Mining, Oil and Gas, and Utility workers face challenging conditions every day. They need communications equipment that is totally reliable. That's why Tait engineers our products to work together to create some of the toughest, mission critical communications solutions ever made.

### Ingress Protection (IP)

- ▶ All TP9000 series radios are dustproof and waterproof. The catalog pages and specification sheets for each Tait portable radio display the IP rating for that product
- ▶ IP68: can be immersed in water:
  - At a depth of two meters for thirty minutes
  - At a depth of one meter for two hours
- ▶ IP67: Can be immersed in water:
  - At a depth of one meter for thirty minutes
- ▶ IP65: Tested against water jets, 12.5L per min, 30kPa from three meters for at least three minutes

### Drop Protection by Design

- ▶ Dual shot molded rubberised corners
- ▶ Strong battery attachment
- ▶ Screen recess

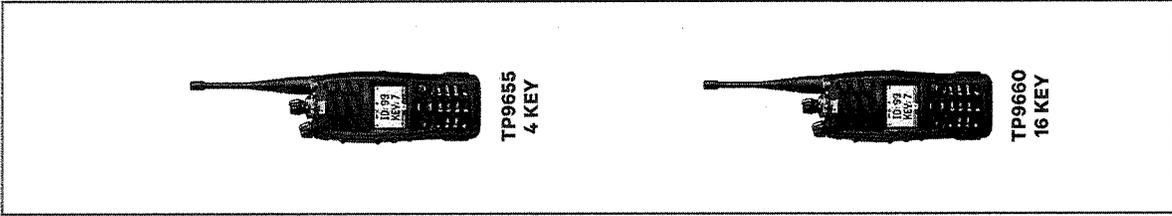
To learn more about Tait Tough solutions download our guide “10 ways to protect and Strengthen your LMR System”.



# TAIT TOUGH

The Toughest Radios in the Industry

\*Supersedes MIL-STD-810C, D, E, F



# TP9600

## Enhanced Usability

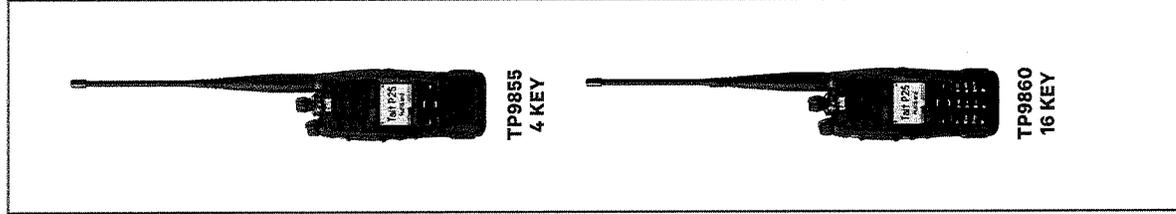
TP9600 portables enhances the user experience with color screen, louder, clearer audio, and more ergonomic controls, all built Tait Tough for critical communications. WiFi connectivity can be used for easy, advanced fleet management.

### FEATURES

- ▶ **Future proof multi-mode flexibility**
  - Conventional Analog
  - P25 Conventional Digital
  - P25 Phase 1 Digital Trunking
  - P25 Phase 2 Digital Trunking
- ▶ **P25 open standards provide choice and interoperability**
- ▶ **Enhanced Usability**
  - Large color screen
  - 3W speaker
  - Clear audio in analog and digital modes with Dual Mic Active Noise Cancellation
  - Increased voice usability with integrated Bluetooth® connectivity for wireless audio accessories
  - Side mounted connector for choice of audio accessories
  - Angled controls for gloved use
  - Zone selector switch
  - Four programmable function keys
- ▶ **A range of batteries, charging options and accessories are available** (refer to the TP9000 Portable Radios Options & Accessories Catalog)
- ▶ **Personalize your radio:**
  - Available in Black, Yellow, Orange, Red and Hi-Vis Green
  - Labeling Options
- ▶ **Safety and Efficiency Features**
  - Lone Worker and Man Down functions
  - Programmable emergency key
  - Integrated GNSS option to improve efficiency and safety for Location Services
  - Location information can be displayed on the radio screen
  - Tait GeoFencing option for Automated Location Controlled Radio Behavior
  - Send and receive text and status messages
- ▶ **Encryption options, including Tait EnableProtect KeyFill Device, Key Management Facility, and Over the Air Rekeying**
- ▶ **Engineered Tait Tough for demanding environments**
  - IP65 & IP68 Dustproof and Waterproof
  - MIL-STD-810G
  - Two-shot molding for extra durability
  - Water shedding speaker grille
- ▶ **Tait EnableFleet Configuration Management options**
  - Wired Connection for all operating modes
  - OTAP for configuration changes and software upgrades over P25 trunked networks
  - WiFi OTAP capability for configuration changes and software upgrades independent of LMR mode, analog or digital, conventional or trunked

### PERSONALIZATION





# TP9800

## Rugged, Lightweight, Multi-Agency Cooperation

Multiple bands. One portable. Customized for you. Increase worker safety and productivity across multiple radio networks and frequency bands with the TP9800 Multiband Portable, a versatile, lightweight and compact radio designed for maximum reliability and interoperability.

### FEATURES

- ▶ **Seamless Multiband Performance**
  - Configurable to operate on any combination of VHF, UHF and 700/800MHz bands.
  - Flexible and simple ordering and deployment of single, dual, and multiband operation at time of purchase, or subsequently over the air.
  - Bands are not locked and can be reconfigured.
- ▶ **Future proof multi-mode flexibility**
  - Conventional Analog
  - P25 Conventional Digital
  - P25 Phase 1 Digital Trunking
  - P25 Phase 2 Digital Trunking
- ▶ **P25 open standards provide choice and interoperability**
- ▶ **Enhanced Usability**
  - Lightweight and compact
  - Large color screen
  - 3W speaker
  - Clear audio in analog and digital modes with Dual Mic Active Noise Cancellation
  - Increased voice usability with integrated Bluetooth® connectivity for wireless audio accessories
  - Side mounted connector for choice of audio accessories
  - Glove friendly control options
- Zone selector switch
- Four programmable function keys
- ▶ **Safety and Efficiency Features**
  - Lone Worker and Man Down functions
  - Programmable emergency key
  - Integrated GNSS option to improve efficiency and safety for Location Services
  - Location information can be displayed on the radio screen
  - Tait Geofencing option for Automated Location Controlled Radio Behavior
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  - OTAP for configuration changes and software upgrades over P25 trunked networks
  - WiFi OTAP capability for configuration changes and software upgrades independent of LMR mode, analog or digital, conventional or trunked
- ▶ **A range of batteries, charging options and accessories are available (refer to the accessories catalog)**

### PERSONALIZATION





# TM9455

## High Performance, Extremely Flexible

The TM9455 is a high performing reliable radio for critical communications. Supporting multiple P25 and analog modes, safety-enhancing features, and a rugged, robust design, the TM9455 is highly configurable to suit your current operation and can adapt to meet future needs.

### FEATURES

▶ **Future proof multi-mode flexibility**

- Conventional Analog
- P25 Conventional Digital
- P25 Phase 1 Digital Trunking
- P25 Phase 2 Digital Trunking

▶ **P25 open standards provide choice and interoperability**

▶ **A variety of user interface options**

- 4W speaker built in to TCH3 and TCH4 Control Heads
- 3W speaker built in to Large Control Head
- 10W and 15W External Speaker Options for TCH and LCH. External Speaker required for TCH6 and HHCH
- Clear audio with Digital Noise Suppression
- Four programmable function keys with LCH and TCH3, five programmable function keys with TCH4 and TCH6, six programmable function keys with HHCH
- Remote Control Head cable options available up to 30ft (9m)
- Dual control head option with LCH and HHCH (refer to Mobiles Options and Accessories Catalog for configuration)
- A range of installation options and accessories are available

▶ **Safety and efficiency features**

- Lone Worker
- Programmable emergency key
- Location Services option<sup>1</sup>
- Tait Geofencing<sup>1,2</sup> option for Automated Location Controlled Radio Behavior

- Send and receive text and status messages

- Encryption options, including Tait EnableProtect KeyFill Device, Key Management Facility, Advanced System Key and Over the Air Rekeying

▶ **Tait Unified Vehicle option / TMX450 option**

- Broadband WiFi and Cellular (Dual SIM)
- On-board computing power
- On-board data storage
- Voice Recorder app
- Application Builder

▶ **Tait EnableFleet configuration management options**

- Wired connection for all operating modes
- Over the Air Programming for configuration changes and software upgrades over P25 Trunked networks, or via WiFi or Cellular with optional Tait Unified Vehicle / TMX450

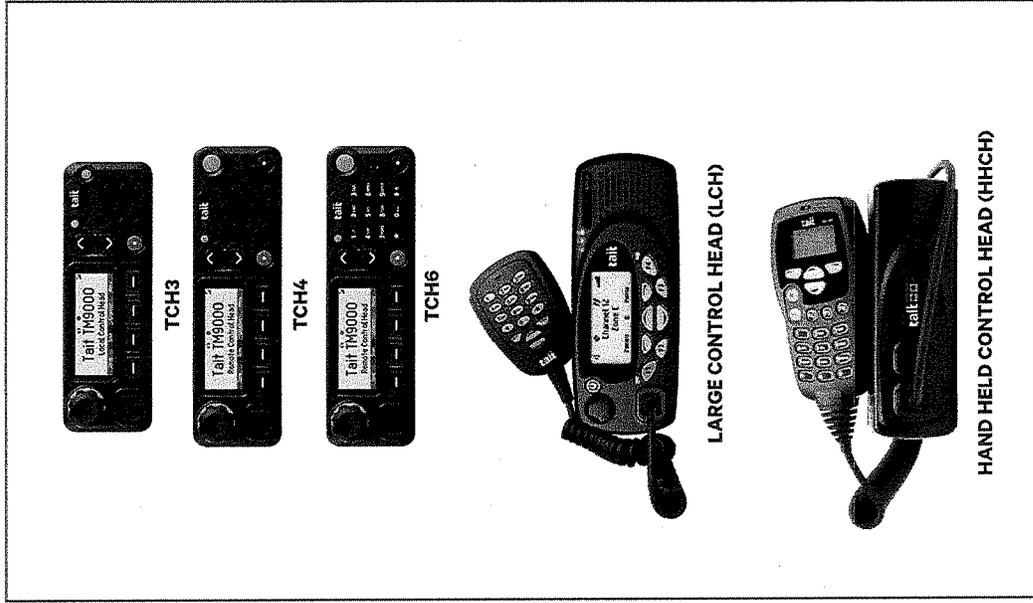
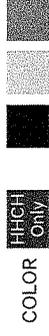
▶ **Personalize your radio:**

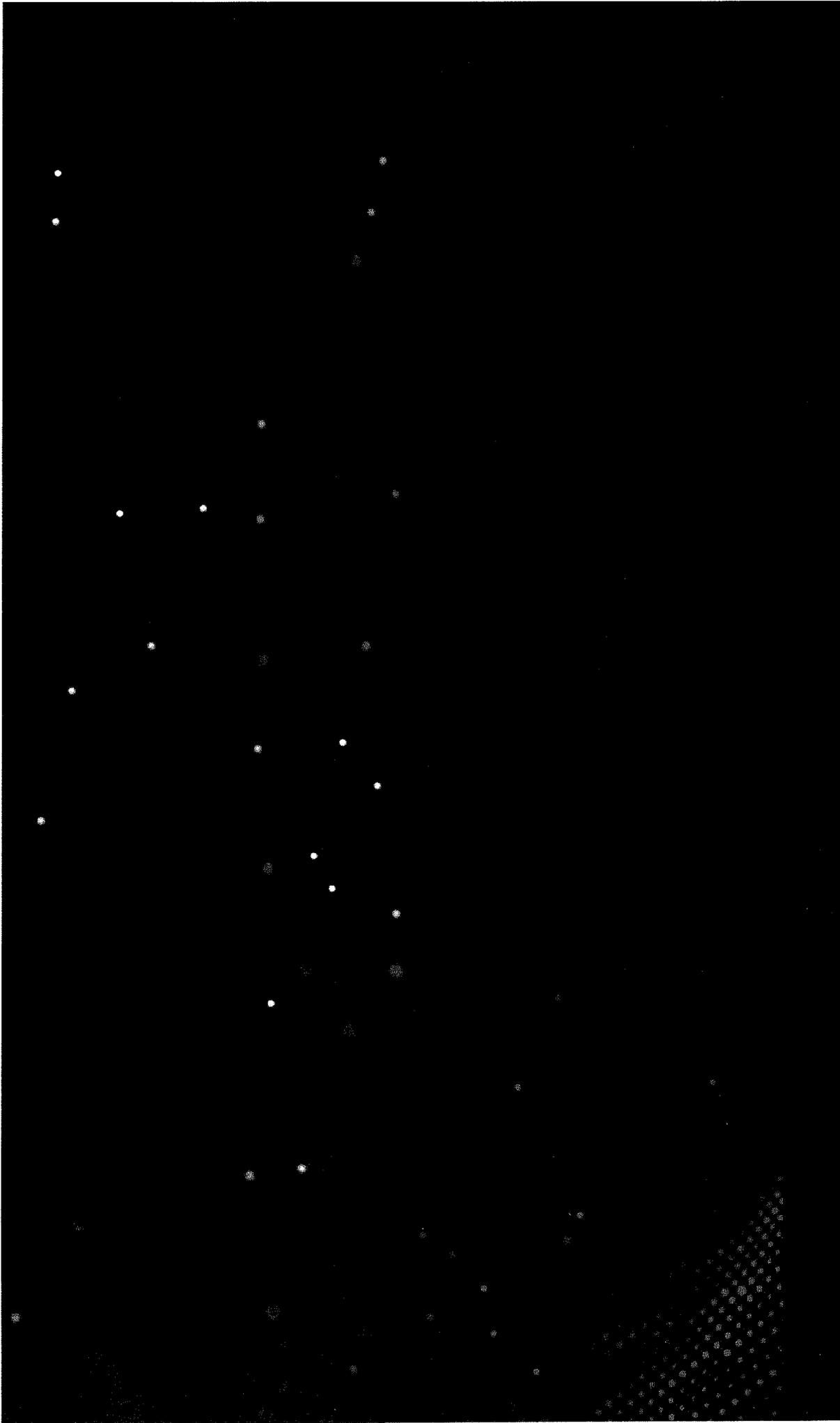
- HHCH available in black, yellow, red and green
- LCH available in black, yellow, and green

**Note:**

- 1 Requires GNSS Receiver to be fitted
- 2 Optional software feature

**PERSONALIZATION**





[www.taitcommunications.com](http://www.taitcommunications.com)

# KENWOOD

# NEXEDGE®

One Radio with Multi-Protocol Support

## NX-5200/5300/5400 NXDN™ P25 DMR Con2 Bluetooth® FleetSync®

microSD™ GPS

### VHF/UHF/700-800MHz MULTI-PROTOCOL DIGITAL & ANALOG PORTABLE RADIOS

The NX-5000 Series offers unsurpassed interoperability for a wide variety of users as it supports three digital CAIs — NXDN™, DMR (Tier 2 & 3) and P25 (Phase 1 & 2) — plus FM analog in a single radio. Best of all, a desired CAI can be selected at will, giving you the freedom to migrate at your own pace — whether you are intent on going fully digital, undecided about which digital system to pick, or just wanting to maintain both digital and analog for a while. A NX-5000 radio can simultaneously support two digital protocols plus analog, offering the following combinations: FM/DMR/NXDN, FM/NXDN/P25, and FM/DMR/P25.



Full-Keypad & Standard Models

### Features

- Multi-Digital operation in NXDN, DMR (Tier 2 & 3), and P25 (Phase 1 & 2)
- Any combination of two digital protocols may be selected from NXDN, DMR, and P25
- Mixed Digital & FM Analog Operation allows intelligent migration in mixed sites and easy migration with digital radios in other sites
- Large, Color 1.74" (240 x 180 pixels) Transflective TFT Display for better interface even in direct sunlight and with use of polarized sunglasses
- Easy to follow GUI for at-a-glance operational status and Multi-line Text to convey information
- 4-way Directional-pad (D-pad) and 2-Position Lever Switch for intuitive control
- Built-In GPS Receiver/Antenna for effective fleet and incident management
- Bluetooth® Module Built-in for hands-free and IoT applications operation
- Renowned KENWOOD Audio Quality achieved with Active Noise Reduction (ANR) that utilizes built-in DSP with two microphones for suppression of ambient noise
- Built-in 56-bit DES Encryption
- Optional 256-bit AES Encryption
- Built-in Motion Sensor for man down detection
- microSD/microSDHC Up to 2GB/32GB Memory Card Slot for increased memory capacity for "Voice & Data"
- IP67/68 and MIL-STD-810 C/D/E/F/G
- 6 W (136-174 MHz) Models
- 5 W (380-470, 450-520 MHz) Models
- 3 W (700/800 MHz) Models
- Full Key Models (w/numeric keypad) and Standard Key Models (w/o numeric keypad)
- Maximum of 1024 CH, 128 Zones (4000 Ch. Opt)
- 1 W Speaker Audio

### Digital – NXDN™ Mode

- |                             |                                 |
|-----------------------------|---------------------------------|
| NXDN Conventional           | Remote Stun/Kill                |
| NXDN Type-C & Gen2 Trunking | Remote Check                    |
| 6.25 & 12.5 kHz Channels    | Over-the-Air Alias (OAA)        |
| Paging Call                 | Over-the-Air Programming (OTAP) |
| Emergency Call              | Short & Long Data Messages      |
| All Group Call              | NXDN Digital Scrambler          |
| Status Messaging            | 2-Tone (Digital)                |

### Digital – DMR Mode

- |                                    |                          |
|------------------------------------|--------------------------|
| Two-slot TDMA in 12.5 kHz channels | Call Interruption        |
| DMR Tier 2 Conventional            | Dual-slot Direct Mode    |
| DMR Tier 3 Trunking                | Energy Efficient         |
| DMR Over-the-Air Programming       | Optional ARC4 encryption |

### Digital – P25 Mode

- |  |                                    |
|--|------------------------------------|
| P25 Phase 1 Conventional/Trunked Operation | Remote Monitor / Check / Inhibit   |
| P25 Phase 2 Trunked Operation              | Encryption Key Zeroize & Retention |
| Talk Group ID Lists                        | P25 Over-the-Air Re-keying         |
| Individual ID Lists                        | P25 Over-the-Air Programming       |
| Caller ID Display                          | Optional ARC4 encryption           |
| 2-Tone (Digital)                           |                                    |

### FM Modes – General

- |  |  |
|--|--|
| Conventional & LTR Zones   | MDC-1200: PTT ID ANI / Caller ID Display, Emergency, Radio Check / Inhibit |
| NPSPAC (USA only) Channels (±4.0 Modulation)   | QT / DQT & Two-Tone  |
| FleetSync®/I: PTT ID ANI / Caller ID Display, Selective Group Call, Emergency Status / Text Messages | Built-in Voice Inversion Scrambler   |

### Intelligent Battery System (option)

- |   |  |
|---|--|
| System consists of the Rapid Charger (KSC-Y32), and Battery Reader (KAS-12 software Up to 60 Rapid Chargers can be chain-connected to a PC installed with the KAS-12. | KAS-12 Battery Reader software can display and manage information including battery type, model name, voltage, temperature, discharge cycle, expected life, and remaining capacity Up to 5,000 batteries can be managed at a time. (Requires an additional option) |
|---|--|

## Accessories

All accessories may not be available in all markets. Contact an authorized KENWOOD dealer for details and complete list of all accessories.

<p><b>KNB-L1/L2/L3</b> Li-ion Battery Pack (IP67/68 Immersion)</p> 	<p><b>KSC-Y32</b> Rapid Charger</p> 	<p><b>KRA-22</b> VHF Helical Antenna (Low Profile)</p> 	<p><b>KRA-32</b> 700/800MHz Whip Antenna</p> 	<p><b>KMC-70M</b> Speaker Microphone (with dual-sided 2-mic for superior ANR, IP67)</p> 
<p><b>KNB-N4</b> Ni-MH Battery Pack (IP67/68 Immersion)</p> 	<p><b>KSC-32</b> Rapid Charger</p> 	<p><b>KRA-23</b> UHF Helical Antenna (Low Profile)</p> 	<p><b>KRA-41</b> UHF Stubby Antenna</p> 	<p><b>KBH-11</b> Belt Clip (2.5")</p> 
<p><b>KNB-LS5CU</b> Li-ion Battery (2,000mAh)</p> 	<p><b>KSC-326AK</b> Rapid Charger (6-unit Rapid Rate)</p> 	<p><b>KRA-26</b> VHF Helical Antenna (Standard Length)</p> 	<p><b>KRA-42</b> UHF Stubby Antenna</p> 	<p><b>KWD-AE30/AE31</b> Secure Cryptographic Module</p> 
<p><b>KNB-LS7M</b> Li-ion Battery (3,800mAh) CSA US Intrinsically Safe</p> 	<p><b>KAS-12/PRO</b> Battery Reader (PC Software)</p> 	<p><b>KRA-27</b> UHF Whip Antenna (Standard Length)</p> 	<p><b>KMC-72W</b> Speaker Microphone (IP67)</p> 	<p><b>KPG-180AP</b> OTAP Manager</p> 
<p><b>KBP-8</b> Alkaline Battery Case</p> 				

## Specifications

Model	TK-6200	TK-6200	TK-6200
Frequency Range	136-174 MHz	Type 1 450-520 MHz Type 2 380-470 MHz	RX 763-776, 851-870 MHz TX 763-776, 793-808, 806-825, 851-870 MHz
Max. Channels Per Radio	1024 (Up to 4000 CH with option)		
Number of Zones	128		
Max. Channels per Zone	512		
Channel Spacing	12.5/15/20/25/30* 1-Hz 6.25 kHz/12.5 kHz	12.5/25* kHz 6.25 kHz/12.5 kHz	12.5/25 kHz 12.5 kHz (6.25 1-Hz)
Power Supply	7.5V DC ± 20%		
Battery Life	(5-5-90/10-10-50 duty cycle)		
KNB-L1 (2,000 mAh)	10 hours / 6.5 hours		
KNB-L2 (2,830 mAh)	12.5 hours / 8.5 hours		
KNB-L3 (3,400 mAh)	17 hours / 11 hours		
KNB-N4 (2,500 mAh)	12 hours / 8.5 hours		
KBP-8 (w/AA x12)	High Power 11 hours / 8 hours / Low Power 26 hours / 18.5 hours		
Operating Temperature	-22°F to +140°F (-30°C to +60°C)		
Frequency Stability	± 0.5 ppm		
Dimensions/Weight Radio w/battery	(W x H x D) Projections Not included		
KNB-L1 (2,000 mAh)	2.28 x 5.47 x 1.44 in. (58.0 x 138.9 x 36.5 mm)		13.5 oz (382 g)
KNB-L2 (2,830 mAh)	2.28 x 5.47 x 1.56 in. (58.0 x 138.9 x 39.5 mm)		14.3 oz (406 g)
KNB-L3 (3,400 mAh)	2.28 x 5.47 x 1.77 in. (58.0 x 138.9 x 44.9 mm)		15.8 oz (449 g)
KNB-N4 (2,500 mAh)	2.28 x 6.55 x 1.78 in. (58.0 x 166.4 x 45.2 mm)		20.4 oz (579 g)
KBP-8	2.64 x 8.59 x 2.12 in. (67.0 x 216.2 x 53.9 mm)		51 oz (172 g)
FCC ID	Type 1 Type 2	K44431400 K44431501	ALH442000
IC Certification	Type 1 Type 2	282F-431400 282F-431501	282D-442000

\*25/30 kHz in VHF/UHF Bands (except T-Band) are not included in the models sold in the USA or US territories. Analog measurements made per TIA/E03. Specifications are measured according to applicable standards. P25 Digital measurements made per TIA 102CAA and specifications shown are typical. Specifications are subject to change without notice, due to advancements in technology.

Receiver	TK-6200	TK-6200	TK-6200
Sensitivity	NXDN 6.25 kHz Digital (3% BER) NXDN 12.5 1-Hz Digital (3% BER) DMR Digital (5% BER) DMR Digital (1% BER) P25 Digital (5% BER) P25 Digital (1% BER) Analog (12dB SINAD)	0.20 µV 0.25 µV 0.25 µV 0.42 µV 0.25 µV 0.42 µV 0.25 µV	
Selectivity	Analog @ 12.5kHz Analog @ 25kHz	67 dB 73 dB	64 dB
Intermodulation		73 dB	75 dB
Spurious Rejection		80 dB	75 dB
Audio Distortion		3%	
Audio Output Power	500 mW/82.1 (2% Distortion) / 1000 mW/82.1 (5% Distortion)		
Transmitter	TK-6200	TK-6200	TK-6200
RF Power Output	6 W to 1 W	5 W to 1 W	3 W to 1 W
Spurious Emission	-70 dB		
FM Hum & Noise	Analog @ 12.5kHz Analog @ 25kHz	40 dB 45 dB	
Audio Distortion	Less than 2%		
Emission Designator	16K0F3E, 11K0F3E, 8K10F1E, 8K10F1D, 8K10F1W, 8K30F1E, 8K30F1D, 8K30F1W, 7K60F3E, 7K60F3D, 4K00F1E, 4K00F1D, 4K00F1W, 4K00F2D	16K0F3E, 14K0F3E, 11K0F3E, 8K10F1E, 8K10F1D, 8K10F1W, 8K30F1E, 8K30F1D, 8K30F1W, 7K60F3E, 7K60F3D, 4K00F1E, 4K00F1D, 4K00F1W, 4K00F2D	

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## MIL-STD & IP

MIL Standard	MIL 883C Mechanism Procedures	MIL 883D Mechanism Procedures	MIL 883F Mechanism Procedures	MIL 883F Mechanism Procedures	MIL 883G Mechanism Procedures
Low Pressure	500.1/Procedure I	500.2/Procedure I, II	500.3/Procedure I, II	500.4/Procedure I, II	500.5/Procedure I, II
High Temperature	501.1/Procedure I, II	501.2/Procedure I, II	501.3/Procedure I, II	501.4/Procedure I, II	501.5/Procedure I, II
Low Temperature	502.1/Procedure I	502.2/Procedure I, II	502.3/Procedure I, II	502.4/Procedure I, II	502.5/Procedure I, II
Temperature Shock	503.1/Procedure I	503.2/Procedure I	503.3/Procedure I	503.4/Procedure I, II	503.5/Procedure I
Solar Radiation	505.1/Procedure I	505.2/Procedure I	505.3/Procedure I	505.4/Procedure I	505.5/Procedure I
Rain	506.1/Procedure I, II	506.2/Procedure I, II	506.3/Procedure I, II	506.4/Procedure I, III	506.5/Procedure I, III
Humidity	507.1/Procedure I, II	507.2/Procedure I, III	507.3/Procedure I, III	507.4	507.5/Procedure II
Salt Fog	509.1/Procedure I	509.2/Procedure I	509.3/Procedure I	509.4	509.5
Dust	510.1/Procedure I	510.2/Procedure I	510.3/Procedure I	510.4/Procedure I, III	510.5/Procedure I
Vibration	514.2/Procedure VIII, X	514.3/Procedure I	514.4/Procedure I	514.5/Procedure I	514.6/Procedure I
Shock	516.2/Procedure I, II, V	516.3/Procedure I, IV	516.4/Procedure I, IV	516.5/Procedure I, IV	516.6/Procedure I, IV
Immersion				512.4/Procedure I	512.5/Procedure I
*Conditions: Portable radio immersed for 2 hours at a depth of 1 meter (IP68=1m/2H)					

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# KENWOOD

# NEXEDGE®

One Radio with Multi-Protocol Support

## NX-5700/5800/5900 NXDN® P25 DMR Gen2 Bluetooth® FleetSync™

microSD GPS

### VHF/UHF/700-800MHz MULTI-PROTOCOL DIGITAL & ANALOG MOBILE RADIOS

The NX-5000 Series offers unsurpassed interoperability for a wide variety of users as it supports three digital CAIs — NXDN, DMR (Tier 2 & 3) and P25 (Phase 1 & 2) — plus FM analog in a single radio. Best of all, a desired CAI can be selected at will, giving you the freedom to migrate at your own pace — whether you are intent on going fully digital, undecided about which digital system to pick, or just wanting to maintain both digital and analog for a while. A NX-5000 radio can simultaneously support two digital protocols plus analog, offering the following combinations: FM/DMR/NXDN, FM/NXDN/P25, and FM/DMR/P25.



### Features

- Multi-Digital operation in NXDN, DMR (Tier 2 & 3), and P25 (Phase 1 & 2) protocols
- Any combination of two digital protocols may be selected from NXDN, DMR, and P25
- Mixed Digital & FM Analog Operation allows intelligent migration in mixed sites and easy migration with digital radios in other sites
- Large, Color 2.55" (154 x 422 pixels) TFT Display for at-a-glance operational status
- Easy to follow GUI and Multi-line Text to convey information
- Dual Remote Control Head and Multi-Band (Multi RF Deck) Control Option providing scalable configurations for various operations and applications
- Built-In GPS Receiver for effective fleet and incident management
- Bluetooth® Module Built-in for hands-free and IoT applications operation
- Renowned KENWOOD Audio Quality achieved with Active Noise Reduction (ANR) that utilizes built-in DSP with two microphones for suppression of ambient noise
- Built-in 56-bit DES Encryption
- Optional 256-bit AES Encryption
- microSD/microSDHC Up to 2GB/32GB Memory Card Slot for increased memory capacity for "Voice & Data"
- 50 W to 5 W (136-174 MHz) Models
- 45 W to 5 W (380-470, 450-520 MHz) Models
- 30 W to 2 W (700 MHz) Model 35 W to 2 W (800 MHz) Model
- Maximum of 1024 CH/Zone, 128 Zones (4000 CH. Opt)
- DB-25 Accessory Connector
- AMBE+2™ Enhanced Vocoder
- 4 W Speaker Audio

### Digital – NXDN® Mode

- |                             |                                 |
|-----------------------------|---------------------------------|
| NXDN Conventional           | Remote Stun/Kill                |
| NXDN Type-C & Gen2 Trunking | Remote Check                    |
| 6.25 & 12.5 kHz Channels    | Over-the-Air Alias (OAA)        |
| Paging Call                 | Over-the-Air Programming (OTAP) |
| Emergency Call              | Short & Long Data Messages      |
| All Group Call              | NXDN Digital Scrambler          |
| Status Messaging            |                                 |

### Digital – DMR Mode

- |                                    |                          |
|------------------------------------|--------------------------|
| Two-slot TDMA in 12.5 kHz channels | Call Interruption        |
| DMR Tier 2 Conventional            | Dual-slot Direct Mode    |
| DMR Tier 3 Trunking                | Spectrum Efficient       |
| DMR Over-the-Air Programming       | Optional ARC4 encryption |

### Digital – P25 Mode

- |  |                                    |
|--|------------------------------------|
| P25 Phase 1 Conventional/Trunked Operation | Remote Monitor/Remote Check        |
| P25 Phase 2 Trunked Operation              | Radio Inhibit                      |
| Talk Group ID Lists                        | Encryption Key Zeroize & Retention |
| Individual ID Lists                        | P25 Over-the-Air Re-keying         |
| Caller ID Display                          | P25 Over-the-Air Programming       |

### FM Modes – General

- |  |   |
|--|---|
| Conventional & LTR Zones                 | MDC-1200: PTT ID ANI / Caller ID Display, |
| FleetSync®/II: PTT ID ANI / Caller ID    | Emergency, Radio Check / Inhibit          |
| Display, Selective Group Call, Emergency | QT / DQT & Two-Tone                       |
| Status / Text Messages                   | Built-in Voice Inversion Scrambler        |

### Multiple Configurations (Option)

The NX-5000 mobile series allows users to create a variety of configurations to suit different requirements by combining different options. Some of the standard configurations are:

- Single Remote Control Head x Single RF Deck
  - Dual Remote Control Heads x Single RF Deck
  - Dual Remote Control Heads x Multi RF Decks
- Other combinations are available. Consult your local KENWOOD dealer for more.

## Accessories

All accessories may not be available in all markets. Contact an authorized Kenwood dealer for details and complete list of all accessories.

**NX-5700B/5800B/5900B**  
RF Deck



**KRK-14H**  
Control Head Interface Kit  
(Adapter for the Head)



**KMC-65M**  
Microphone



**KCT-46**  
Ignition Sense Cable



**KRA-40G**  
GPS Active Antenna



**KCH-19**  
Basic Control  
Head Kit



**KRK-15B**  
Control Head Remote Kit  
(Adapter for the RF Deck)



**KMC-66M**  
Keypad  
Microphone



**KLF-2**  
Line Filter



**KMB-34**  
Mounting Case  
for KPS-15



**KCH-20R**  
Featured Control  
Head



**KCT-71**  
Remote Control Cable  
(available in 3 lengths of  
17ft (5.2m), 25ft (7.6m),  
16ft (0.5m))



**KES-5A**  
External Speaker  
(40 W max input,  
requires KAP-2)



**KMB-10**  
Key Lock Adapter



**KPS-15**  
DC Power Supply  
(23A max)



**KWD-AE30/AE31**  
Secure Cryptographic Module

**KCH-21RM**  
Handheld Control Head



**KCT-72**  
External Accessory  
Connection Cable  
for the KCH-19/20R



**KCT-23**  
DC Power Cable  
(for High Power)  
M2: [10 ft/3 m] /  
M4: [23 ft/7 m]



**KAP-2**  
Horn Alert/PA  
Relay Unit



**KPG-180AP**  
OTAP Manager

## Specifications

Parameter	NX-5700B	NX-5800B	NX-5900B
Frequency Range	136-174 MHz	Type 1 450-520 MHz Type 2 400-470 MHz	RX: 763-776, 851-870 MHz TX: 763-776, 793-805 808-825, 851-870 MHz
Max. Channels Per Radio	1024 (Up to 4,000 CH with option)		
Max. # of P25 Trunked Group IDs	512		
Number of Zones	128		
Channel Spacing	Analog 12.5/15/25/30* kHz Digital 6.25/12.5 kHz	12.5/25* kHz 6.25/12.5 kHz	12.5/25 kHz 6.25/12.5 kHz
Power Supply	13.6 V DC ±15%		
Current Drain			
Standby	0.45 A		
Rx	2.3 A		
Tx	13 A		
Operating Temperature	-22°F to +140°F (-30°C to +60°C)		
Frequency Stability	± 0.5 ppm		
Dimensions	(W x H x D) Projections Not Included		
Radio with Control Head	6.69 x 1.89 x 6.93 in. (170 x 48.0 x 176 mm)		6.73 x 1.89 x 7.72 in. (171 x 48 x 196 mm)
Weight Radio	3.53 lbs (1.6 kg)		
Radio with Control Head	3.53 lbs (1.6 kg)		
FCC ID			
Type 1	K44471100	K44471200	K44478500
Type 2		K44471201	
IC Certification			
Type 1	282F-471100		282F-478500
Type 2		282F-471201	

\*25/30 kHz in VHF/UHF Bands (except T-Band) are not included in the models sold in the USA or US territories.  
\*\*HX-5930 model only.  
Analog measurements made per TIA603. Specifications are measured according to applicable standards.  
P25 Digital measurements made per TIA 102CAAA and specifications shown are typical.  
Specifications shown are typical and subject to change without notice, due to advancements in technology.

Parameter	NX-5700B	NX-5800B	NX-5900B
Sensitivity	NXDN* 6.25 kHz Digital (3% BER) 0.20 µV NXDN* 12.5 kHz Digital (3% BER) 0.25 µV DMR Digital (5% BER) 0.26 µV DMR Digital (1% BER) 0.42 µV P25 Digital (5% BER) 0.25 µV P25 Digital (1% BER) 0.47 µV Analog (12dB SINAD) 0.25 µV		
Selectivity	Analog @ 12.5kHz 71 dB Analog @ 25kHz 81 dB		70 dB 78 dB
Intermodulation	80 dB		
Spurious Rejection	85 dB		
Audio Distortion	2%		
Audio Output Power	4 W/4 Q (Remote Control Head); 3 W/4 Q		
Transmitter	NX-5700B	NX-5800B	NX-5900B
RF Power Output	50 W to 5 W	45 W to 5 W	30 W to 2 W (700 MHz) 35 W to 2 W (800 MHz)
Spurious Emission	-73 dB	-75 dB	-80 dB
FM Hum & Noise	Analog @ 12.5kHz 45 dB Analog @ 25kHz 50 dB		40 dB 45 dB
Audio Distortion	2%		
Emission Designator	1BKF3E, 1AK0F3E**, 1IK0F3E, 8K10F1E, 8K10F1D, 8K10F1W, 8K30F1E, 8K30F1D, 8K30F1W, 7K60F1E, 7K60F1D, 4K00F1E, 4K00F1D, 4K00F1W, 4K00F1D		

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## MIL-STD & IP

MIL Standard	MIL-STD-883C Methods/Procedures	MIL-STD-883D Methods/Procedures	MIL-STD-883E Methods/Procedures	MIL-STD-883F Methods/Procedures	MIL-STD-883G Methods/Procedures
Low Pressure	500.1/Procedure I	500.2/Procedure I, II	500.3/Procedure I, II	500.4/Procedure I, II	500.5/Procedure I, II
High Temperature	501.1/Procedure I, II	501.2/Procedure I, II	501.3/Procedure I, II	501.4/Procedure I, II	501.5/Procedure I, II
Low Temperature	502.1/Procedure I	502.2/Procedure I, II	502.3/Procedure I, II	502.4/Procedure I, II	502.5/Procedure I, II
Temperature Shock	503.1/Procedure I	503.2/Procedure I	503.3/Procedure I	503.4/Procedure I, II	503.5/Procedure I
Solar Radiation	505.1/Procedure I	505.2/Procedure I	505.3/Procedure I	505.4/Procedure I	505.5/Procedure I
Rain	506.1/Procedure I, II	506.2/Procedure I, II	506.3/Procedure I, II	506.4/Procedure I, III	506.5/Procedure I, III
Humidity	507.1/Procedure I, II	507.2/Procedure I, III	507.3/Procedure I, III	507.4	507.5/Procedure II
Salt Fog	509.1/Procedure I	509.2/Procedure I	509.3/Procedure I	509.4	509.5
Dust	510.1/Procedure I	510.2/Procedure I	510.3/Procedure I	510.4/Procedure I, III	510.5/Procedure I
Vibration	514.2/Procedure VII, X	514.3/Procedure I	514.4/Procedure I	514.5/Procedure I	514.6/Procedure I
Shock	516.2/Procedure I, IV	516.3/Procedure I, IV, V	516.4/Procedure I, IV, V	516.5/Procedure I, IV, V	516.6/Procedure I, IV, V

### International Protection Standard

Dust & Water Protection\*

IP54, IP55\*\*

\*Applicable microphone must be connected to the radio, and all accessory connectors must be covered. \*\*IP54: RF Deck; IP55: Remote Control Head.

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# Model 284 Multi-Line Tone Remote

## Spec Sheet



### INTRODUCTION

The Zetron Model 284 Multi-line Tone Remote is a four-line, multifunction, EIA compatible, tone remote radio controller for multiple base station control. It features an available built-in paging encoder for selective calling of tone-only pagers, tone+voice pagers and mobiles. Selective calling supports 2-tone, 5-tone, DTMF, 2805/1500 pulse, stack page, and a 50 user page-by-name database. A PTT handset, built-in microphone and speaker are included. Line select keys include VOX, Transmit, and Select indicators. Audio from the unselected lines is summed at a user adjustable level. For applications with less than 4 lines, unselect audio may be routed to an external amplified speaker.

The unit is fully configurable via PC by the dealer. It includes nine programmable keys that may be assigned selected functions. The available selections include; Single frequency select (F1-F8), Double frequency select (F1/F2), Coded/Clear, Intercom, Privacy, Repeat on/off, Rx2 Mute on/off, PL1, PL2, PL3, PL4, Wild I, Wild II, Supervisor takeover, Mute, Unselect mute, 5-beep alert, High/lo alert, Siren alert, Fast siren alert, Steady alert, Off-Hook Speaker Mute, Hook Disable, Call Decoder Mute, Monitor, and Transmit.

### BASE STATION CONTROL

- Tone remote control of up to four base stations
- Up to 8 frequency control (F1-F8) plus monitor and other functions
- Audio from each unselected line is summed at an adjustable level
- Separate unselect audio may be routed to an external powered speaker when using 3 or less base stations
- 2-wire line interface for up to four base stations
- 4-wire line interface
- Supervisor control output

### PARALLEL OPERATION

- Sets the industry standard for parallel remote capacity
- Parallel status feature enables each remote to display the actual radio mode for all base stations
- Line operated transmit light (LOTL) shows actual transmit status of each base station
- Audio may be muted during parallel transmit for selected units to prevent acoustic feedback
- Intercom capability between remotes
- "Privacy" mode may be engaged to mute and lockout other Zetron Model 284 remotes for sensitive conversations
- Call Decoder feature allows calls to be routed to individual remotes when used in conjunction with a Zetron H.E.A.R. Decoder

#### Available Functions

Frequency select F1-F8  
PL1  
Wildcard #1  
Alert (warble)  
Mute (or partial mute)  
Off-Hook Speaker Mute

Coded/Clear  
PL2  
Wildcard #2  
Alert (slow siren)  
Unselect mute  
Hook Disable

Repeater on/off  
PL3  
Supervisor takeover  
Alert (fast siren)  
Intercom  
Call Decoder Mute

2nd receiver mute  
PL4  
Alert (beep)  
Alert (steady tone)  
Privacy

## USER INTERFACE

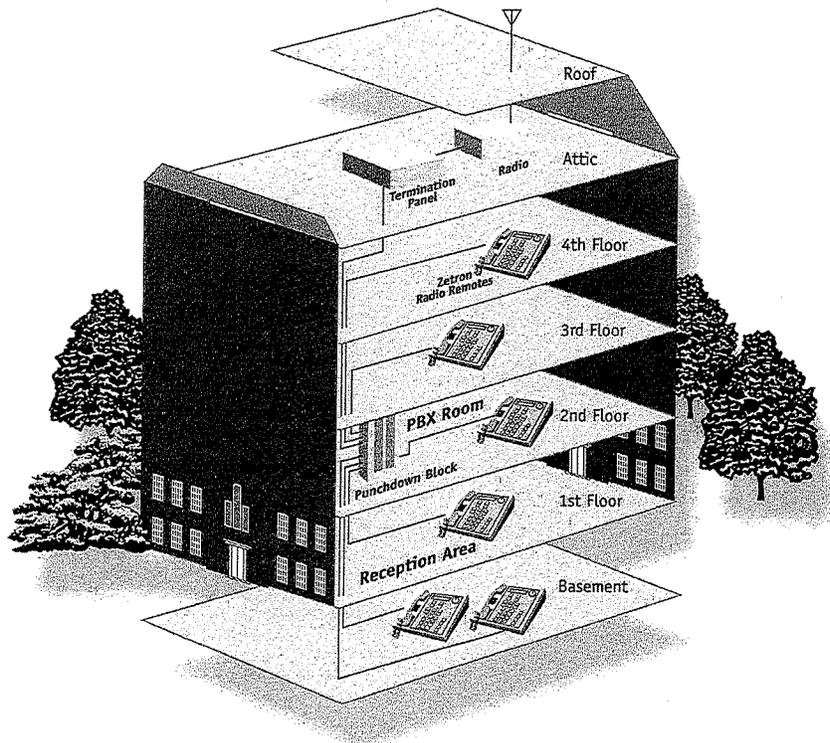
- Compact desktop or wall mount unit
- Up to 82 text aliases eliminate operator confusion and simplify training. Each frequency of every line, as well as 50 pagers, may be assigned an alphanumeric name to allow positive confirmation of selection.
- Nine PC programmable keys allow the installer to tailor the unit to the application
- 12/24 hour battery backed clock
- VU meter shows transmit and receive audio levels
- Line select/unselect keys for each base station with LED indicators
- VOX indicators show audio activity for each base station
- Unselect line volume is adjustable per base station
- Unselect mute allows operator to disable nonessential audio
- Handset hookswitch may send function tones when lifted or hung up

## HIGH QUALITY AUDIO

- Digital audio processing lets the user begin speaking immediately, even while the function tones are being sent (InstanTalk™ circuit)
- Built-in front panel microphone, and speaker
- PTT handset included for semiprivate conversations
- Accessory audio interface port accommodates external desk mic, PTT footswitch, headset, auxiliary transmit audio, and external powered speakers
- Parallel function tone muting removes annoying chirps from other remotes
- Automatic audio leveling, 600/6000 ohm transformer coupled two or four wire interface

## PAGING ENCODER

- Multi-format paging encoder supports Two-tone, DTMF, Five-tone, and Pulse dial selective calling
- Page-by-name database lets the operator scroll through a list of users to initiate paging
- Automatic frequency select when paging from database, uses the selected frequency or a specific frequency to prevent missed calls
- Programmable equalization curves and level per format ensure proper operation on the radio channel
- Selectable alert tones and talk time per format
- Stack page for up to 10 lists of 10 pagers expedite selective calling for critical applications



*Multiple remotes can utilize a single base station.*

## PROGRAMMABLE ITEMS *(not all items shown)*

---

Guard tone frequency:	2100, 2175, 2325, 2600, 2800, or 2970 Hz. Guard tone notch will follow.
High level guard tone:	120 mSec default, selectable 0 to 900 mS. Tx audio delay will follow.
Low level guard tone:	Continuous during transmit.
Function tone duration:	40 mSec default, selectable 0 to 250 mSec. Tx audio delay will follow.
Clock display:	On / off, 12/24 hour format, time set. Displays Hours:Minutes
VU meter display:	On / off. Two selectable bar graph styles.
Function frequencies:	650, 750, 850, 950, 1050, 1150, 1250, 1350, 1450, 1550, 1650, 1750, 1850, 1950, or 2050 Hz.
Monitor frequency:	Any function frequency.
PL strip frequency:	Any function frequency.
Rx audio delay:	On/off. Mutes parallel remote function tones
Tx audio delay:	On/off. Allows user to begin speaking while function tones are sent.
Text Aliases:	16 character names for each frequency select (F1-F8) on each line and for each of up to 50 pager capcodes in database.

## PAGING

Database:	50 entries maximum, 10 digit capcodes, 16 character display labels. Each entry may be any valid capcode and be preset to a specific frequency (F1-F8) or use the selected transmit frequency. Up/Down keys allow operator to scroll through entries.
Stack page:	Up to 10 stacks of up to 10 capcodes each
Formats:	2-tone 100 call, 2-tone 1000 call, 1 to 8 digit DTMF, 5/6 tone sequential, and pulse dial format
Tone+Voice talk time:	5 second default, selectable 1 to 60 seconds. May be extended by holding "transmit" during talk interval, or canceled by pressing "transmit" during talk interval
Keyup delay:	750mS default, selectable 250 to 2000 mS
Stack page gap:	500mS default, selectable 250 to 2000 mS.
Paging tones:	Selectable gain and equalization curves for each format.

## FUNCTION KEYS

---

Nine programmable keys may be assigned a specific function. The top row of four keys include red and green LEDs to indicate selected status. They would typically be used when more than 4 frequencies (F1-F4) are required. The second row of four programmable keys include a single red led to indicate status. Different function tones may be sent for "toggle" keys such as coded/clear; the LED will show the current selected function. The additional pro-

grammable key is typically used for Monitor. The nine programmable key functions are as follows; Single frequency select (F1), double frequency select (F1/F2), Coded/Clear, Intercom, Privacy, Repeat on/off, Rx2 Mute on/off, PL1, PL2, PL3, PL4, Wild I, Wild II, Supervisor takeover, Mute, Unselect mute, 5-beep alert, High/lo alert, Siren alert, Fast siren alert, Steady alert, Off-Hook Speaker Mute, Hook Disable, Call Decoder Mute, Monitor, or Instant Call.

## SPECIFICATIONS

Power:	8.5-11 VAC or 11-15 VDC, 650mA maximum, 300mA nominal. Optional wall transformer.	Parallel status:	Decodes parallel remote encoded functions and displays current station status of selected line. Unselected line status is monitored in background and updates when the line is selected.
DC Standby Power:	Connection for standby power, 11 - 15 VDC, 650mA maximum	Selective calling formats:	2-tone, DTMF, Pulse dial, and 5/6-tone. Includes leading digit multi-format selection, strapped digits, alert tones, tone-only or tone+voice per format. Selectable gain and equalization curves per format.
Connections:	Power supply, standby power, line interface (2 or 4-wire), PTT open drain output, supervisor open drain output, external PTT input, external audio input, external speaker output, ground. Screw terminal connectors.	Filters:	Tx notch filter removes guard tone components from microphone audio, Rx notch filter removes guard tone from speaker and handset audio. Filters and intelligent audio processing may be enabled so that parallel remote function tones are not heard.
Operating Temp.:	0° to +60° Celsius. 95% relative humidity @ +50°C (non-condensing)	Tx audio delay:	Selectable on/off. When enabled, delays microphone audio during guard and function tone transmission.
Size / weight:	8.3"W x 4.4"H x 9.5"D. 4 pounds	Rx audio delay:	Selectable on/off. When enabled, delays speaker and earpiece audio so that parallel remote function tones may be detected and muted.
Adjustments:	Transmit level trim for each line	Line type:	2-wire or 4-wire leased line voice grade audio circuit, or copper connection
Indicators:	2 line by 16 character LCD indicates station status, real time clock, transmit and receive VU, paging capcode entries, and operating prompts (paging, talk, etc.). Text aliases (names) up to 16 digits may be assigned to each frequency of each line (F1-F8 on up to 4 lines, 32 labels). VOX, Select, Transmit and LOTL indications for each line. Master Transmit LED, Monitor LED, program mable LEDs per switch function	Line connector:	Screw terminals
Controls:	Volume, transmit, monitor, 16 digit keypad for paging, clear, 9 assignable keys	Audio input:	600 ohm or 6000 ohm impedance, accommodates line losses up to 20 dB
Microphone/speaker:	Built-in electret mic for use with front panel transmit and intercom, front panel speaker active while handset is on-hook. Telephone style handset with PTT switch included for semi-private conversations. Handset sidetone generated during transmit. Includes automatic gain controls for improved audio levels.	Audio output:	Adjustable up to +12 dBm into 600 ohm.
Configuration	Via PC with programming adapter, cable, and software (optional)	Distortion:	< 2% at full output. Signal-to-Noise > 90 dB. Hum, Cross-Talk all -50 dB at full output
Data retention:	Nonvolatile EEPROM	Frequency response:	-3 to +1dB from 250 to 3000 Hz (except guard tone notch)
Functions:	Assignable function tone frequencies from 650 to 2050 Hz; Single frequency select (F1-F8), Double frequency select (F1/F2), Coded/Clear, Intercom, Privacy, Repeat on/off, Rx2 Mute on/off, PL1, PL2, PL3, PL4, Wild I, Wild II, Supervisor takeover, Mute, Unselect mute, 5-beep alert, High/lo alert, Siren alert, Fast siren alert, Steady alert, Off-Hook Speaker Mute, Hook Disable, Call Decoder Mute, Monitor, and Transmit	Compression:	Input level increase of 30 dB above the knee of compression causes < 3 dB output increase
		<b>TONE LEVELS</b>	
		High level Guard:	+3 dB relative to maximum audio level (typically 10 dBm)
		Low level Guard:	-30 dB relative to high level guard tone (typically -20 dBm)
		Guard tone Notch:	-50 dB, removes guard tone from transmit audio
		Function tones:	10 dB below high level guard tone (typically 0 dBm)
		Tone accuracy:	0.5 Hz

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27-29 Campbell Court, Bramley, Hampshire RG26 5EG, United Kingdom

(P) +44 1256 880663

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PO Box 3045, Stafford Mail Centre, Stafford QLD 4053, Australia

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See Zetron price list for option pricing. Specifications subject to change without notice.

[www.zetron.com](http://www.zetron.com)

# SVR-350 GUARDIAN The Scalable Vehicular Repeater

SIMPLEX COVERAGE

2 WATT COVERAGE

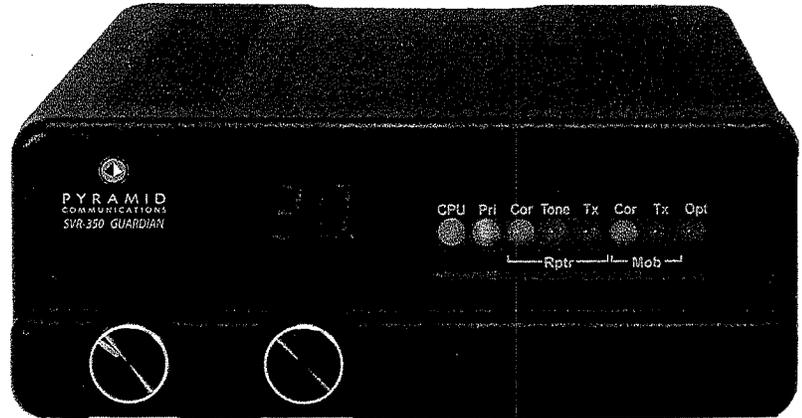
ESP™ PRIORITY STRUCTURE

P25 SMART TRUNKING™ / EVRS

ANALOG & P25 EMERGENCY

P25 PHASE 1 COMPLIANT

AES/DES ENCRYPTION OPTIONS



- ▲ SVR-200 and SVR-250 Compatible
- ▲ P25 Upgradeable In The Field
- ▲ SVR-P250 and SVR-P255 Compatible with P25 Option
- ▲ Software Configured Audio Levels and Jumpers
- ▲ **ESP™** Multi-Vehicle Format
- ▲ Available in VHF, UHF, 700 & 800 Mhz Models
- ▲ Seamless Trunking Handshake with **EVRS** Option
- ▲ Factory Interface Cables for Most Popular Public Safety Radios



## SVR-350™ Guardian™ Analog and P25 Vehicular Repeater

The SVR-350™ Guardian™ is the latest and most advanced simplex vehicular repeater from Pyramid Communications. This is the first vehicular repeater offered by Pyramid that is scalable from a full featured analog unit to a digital P25 unit later. Optional **Software Feature Keys (SFK)** can add capabilities like P25 digital operation, AES/DES Encryption, EVRS and more!

In analog mode, the unit is fully backwards compatible with SVR-200™ and SVR-250™ analog systems. Users can enjoy a budget friendly entry to the SVR product line with the option to add **APCO Project 25** Phase 1 digital, and enjoy clear and secure communications in P25. In P25 mode, the SVR-350™ Guardian is backwards compatible with SVR-P250™ and SVR-P255™ products.

Optionally, the unit supports Pyramid's **P25 SmartTrunking** feature and works with mobile radios using the **EVRS** trunking protocol, to create a seamless trunking handshake between the mobile

radio network and SVR-350™ user. This ensures that portable radio users outside the vehicle get quick and accurate notifications of all transmissions to the P25 network. Users will get indications of **Channel Grant, Busy, Denial, Out of Range** just as if they were on a trunked channel of the digital network.

In addition, when in P25 operation, the SVR-350™ offers optional **AES and DES encryption**, and enhanced P25 **emergency signaling** from portable to dispatch through the SVR-350™. This allows the SVR to relay an emergency with **Hot Mic** from the portable radio user.

The SVR-350™ also utilizes Pyramid's latest **ESP™ and ESP2™** priority structures that resolve priority conflicts during repeater idle time rather than at the critical start of a conversation.



714-901-5462  
www.pyramidcomm.com

PYRAMID  
COMMUNICATIONS  
Since 1990



# Specifications SVR-350



## TRANSMITTER

**Frequency Range**  
**RF Power Out**  
**Spurious Emissions**  
**Frequency Stability -30°~+60°C**  
**Modulation**

### VHF

**136-174 MHz**  
0.5 - 2W  
-70dBc  
±1.5PPM  
10K0F1D, 10K0F1E,  
10K0F7D, 10K0F7E,  
11K0F3E, 12K3F1D,  
16K0F3E, 4K80F2D,  
7K60F1D, 8K10F1D,  
8K10F1E, 8K10F7D,  
8K10F7E, 8K40F2D

### UHF

**380-470 MHz**  
0.5 - 2W  
-70dBc  
±1.5PPM  
10K0F1D, 10K0F1E,  
10K0F7D, 10K0F7E,  
11K0F3E, 12K3F1D,  
16K0F3E, 4K80F2D,  
7K60F1D, 8K10F1D,  
8K10F1E, 8K10F7D,  
8K10F7E, 8K40F2D

### 764-870

**764-776 MHz + 850-870 MHz**  
0.25 - 1W  
-70dBc  
±1.5PPM  
10K0F1D, 10K0F1E,  
10K0F7D, 10K0F7E,  
11K0F3E, 12K3F1D,  
16K0F3E, 4K80F2D,  
7K60F1D, 8K10F1D,  
8K10F1E, 8K10F7D,  
8K10F7E, 8K40F2D

### Hum and Noise

25/30kHz  
12.5kHz  
**Audio Response (300-3kHz)**  
**Audio Distortion**  
**Local Mic Sensitivity**  
**FCC Type Acceptance**  
**Industry Canada Approval**

-43dB  
-38dB  
Flat or -6dB/octave  
<3% @ 1kHz 60% deviation  
300mV - 5VPP  
LRUSVR-P250VA  
2390A-SVRP250VA

-43dB  
-38dB  
Flat or -6dB/octave  
<3% @ 1kHz 60% deviation  
300mV - 5VPP  
LRUSVR-P250UA  
2390A-SVRP250UA

-40dB  
-33dB  
Flat or -6dB/octave  
<3% @ 1kHz 60% deviation  
300mV - 5VPP  
LRUSVR-P250MB  
2390A-SVRP250MB

## RECEIVER

**Frequency Range**  
**Analog Sensitivity**  
**Digital Sensitivity (5% BER)**  
**Squelch Sensitivity**  
**Selectivity**  
25/30kHz channel  
12.5kHz channel  
**Spurious/Image Rejection**  
**IMD Response**  
**Frequency Stability**  
**Audio Response (300-3kHz)**  
**Audio Output**

### VHF

**136-174 MHz**  
0.28uV  
0.20uV  
.2uV to 2uV adjustable  
75dB  
65dB  
75dB  
75dB  
±1.5PPM  
Flat or +6dB/octave  
0-5VPP AC coupled  
600/2.2K  
400 mW 8 Ohms@  
<5% distortion

### UHF

**380-470 MHz**  
0.28uV  
0.20uV  
.2uV to 2uV adjustable  
75dB  
65dB  
75dB  
75dB  
±1.5PPM  
Flat or +6dB/octave  
0-5VPP AC coupled  
600/2.2K  
400 mW 8 Ohms@  
<5% distortion

### 764-870

**764-776 MHz + 850-870 MHz**  
0.28uV  
0.20uV  
.2uV to 2uV adjustable  
75dB  
65dB  
75dB  
75dB  
±1.5PPM  
Flat or +6dB/octave  
0-5VPP AC coupled  
600/2.2K  
400 mW 8 Ohms@  
<5% distortion

### Local Rx Audio



## Power Requirements

**DC Supply** 13.6VDC negative ground ± 25%  
**Standby** 250mA  
**Receive** 500mA @ 400mW Rx audio  
**Transmit** <3A @ rated output

### Physical

**Dimensions** 5.75"W x 10"L x 2.25"H  
**Weight** 38 ounces  
**Case** One-piece extruded aluminium

### Mil-Std-810H Ratings

501.5 Procedure II High Temp +60°C  
502.5 Procedure II Low Temp -30°C  
507.4 Procedure II Humidity  
514.5 Procedure I Category 8  
Vibration, Ground Vehicle  
516.5 Procedure I Shock



EDX@ SignalProc: 50-xxxx VHF ASIP Waihiakum Co WA VZEDX  
 Prop. model 1: Anderson-2D v1.00  
 Time: 50.0% Loc: 50.0%  
 Prediction Confidence Margin: 10.8dB  
 Climate: Continental Temperature  
 Land use (clutter): EDX\_GCV format  
 Atmospheric Abs.: none  
 K Factor: 1.333

**Sites**  
 Site: Cathlamet HS  
 lat=46.201708 long=-123.381228 150.9 ft  
 Cathlamet Tx:HLA: 70.0 ft Total ERP: 87.33 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

Site: Clatskanie Hill  
 lat=46.066167 long=-123.282528 2089.5 ft  
 Clatskan Tx:HLA: 60.0 ft Total ERP: 93.70 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

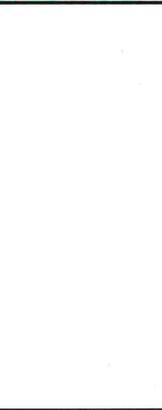
Site: KM  
 lat=46.343744 long=-123.511244 899.0 ft  
 KM Tx:HLA: 70.0 ft Total ERP: 80.42 W  
 Model: 1 Use file-vertical/260.0° 155.5500 MHz

Site: Radar  
 lat=46.421667 long=-123.796083 1866.5 ft  
 Radar Tx:HLA: 50.0 ft Total ERP: 86.00 W  
 Model: 1 Use file-vertical/135.0° 155.5500 MHz

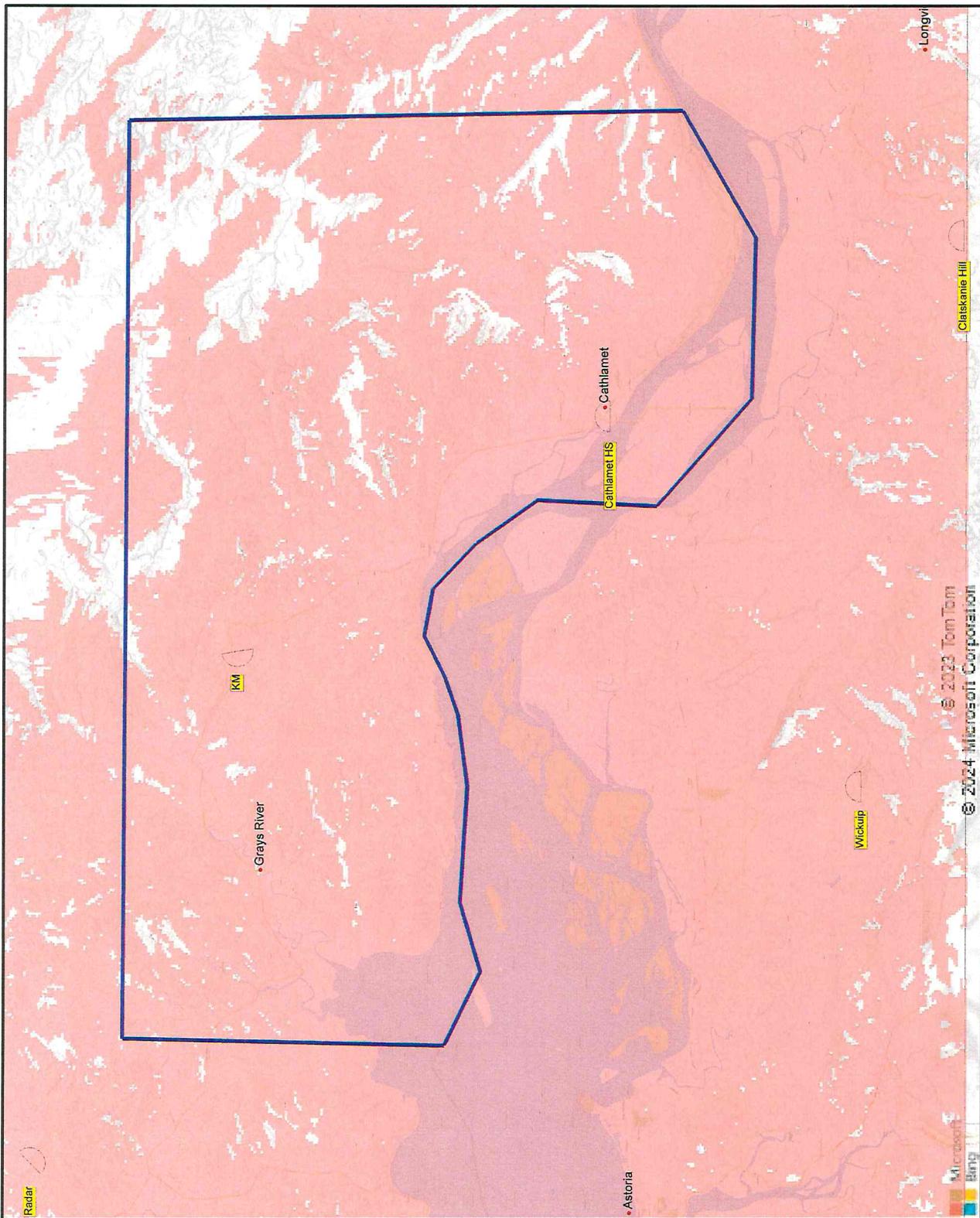
Site: Wickup  
 lat=46.105389 long=-123.585972 2709.0 ft  
 Wickup Tx:HLA: 60.0 ft Total ERP: 190.51 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

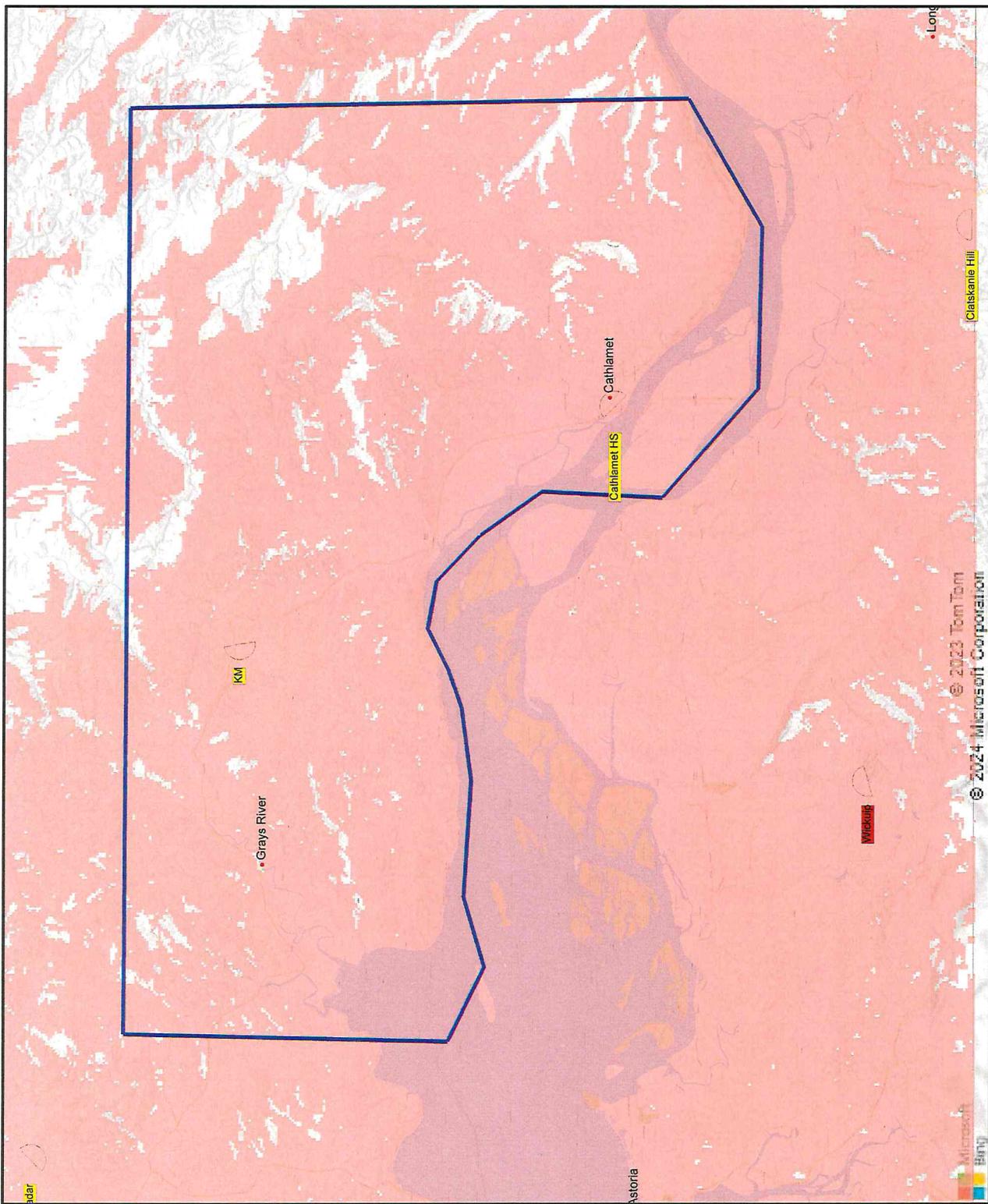
**Notes**  
 12.7dBd 8-Dipole Ant - 3/8 W/L Spacing from Mast/Tower  
 12.2dBd 8-Dipole Ant - 1/4 W/L Spacing from Mast/Tower

Waihiakum Co Line  
 FM Analog Mobile Talk In  
 >= -92.2 dBmW  
 < -92.2 dBmW  
 Display threshold level: -120.0 dBmW  
 RX Antenna - Type: ISOTROPIC  
 Height: 6.6 ft AGL + Structure Gain: -1.00 dBd



VHF ASIP  
 Waihiakum Co, WA  
 Fri Feb 02 16:45:32 2024





EDX@ SignalPro®: 50-xxxx VHF ASIP, Wahkiakum Co, WA, YZEDX

Prop. model: 1: Anderson-2D v1.00  
 Time: 50.0% Loc.: 50.0%  
 Prediction Confidence Margin: 10.8dB  
 Climate: Continental Temperature  
 Land use (clutter): EDX, GCV format  
 Atmospheric Abs.: none  
 K Factor: 1.333

**Sites**

Site: Cathlamet HS  
 lat=46.201703 long=-123.381228 150.9 ft  
 Cathlamet Tx: Ht: AGL: 70.0 ft Total ERPd: 67.33 W  
 Model: 1 Use file-vertical/45.0° 155.5500 MHz

Site: Clatskanie Hill  
 lat=46.066167 long=-123.282528 2089.5 ft  
 Clatskan Tx: Ht: AGL: 60.0 ft Total ERPd: 93.70 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

Site: KM  
 lat=46.343744 long=-123.511244 899.0 ft  
 KM Tx: Ht: AGL: 70.0 ft Total ERPd: 80.42 W  
 Model: 1 Use file-vertical/260.0° 155.5500 MHz

Site: Radar  
 lat=46.421657 long=-123.796093 1886.5 ft  
 Radar: Tx: Ht: AGL: 50.0 ft Total ERPd: 60.00 W  
 Model: 1 Use file-vertical/135.0° 155.5500 MHz

Site: Wickup  
 lat=46.105389 long=-123.585972 2709.0 ft  
 Wickup Tx: Ht: AGL: 60.0 ft Total ERPd: 190.51 W  
 Model: 1 Use file-vertical/345.0° 155.5500 MHz

Wahkiakum Co Line  
 FM Analog Mobile Talk In

>= -92.2 dBmW  
 < -92.2 dBmW

Display threshold level: -120.0 dBmW  
 RX Antenna - Type: ISOTROPIC  
 Height: 6.6 ft AGL + Structure Gain: -1.00 dbd

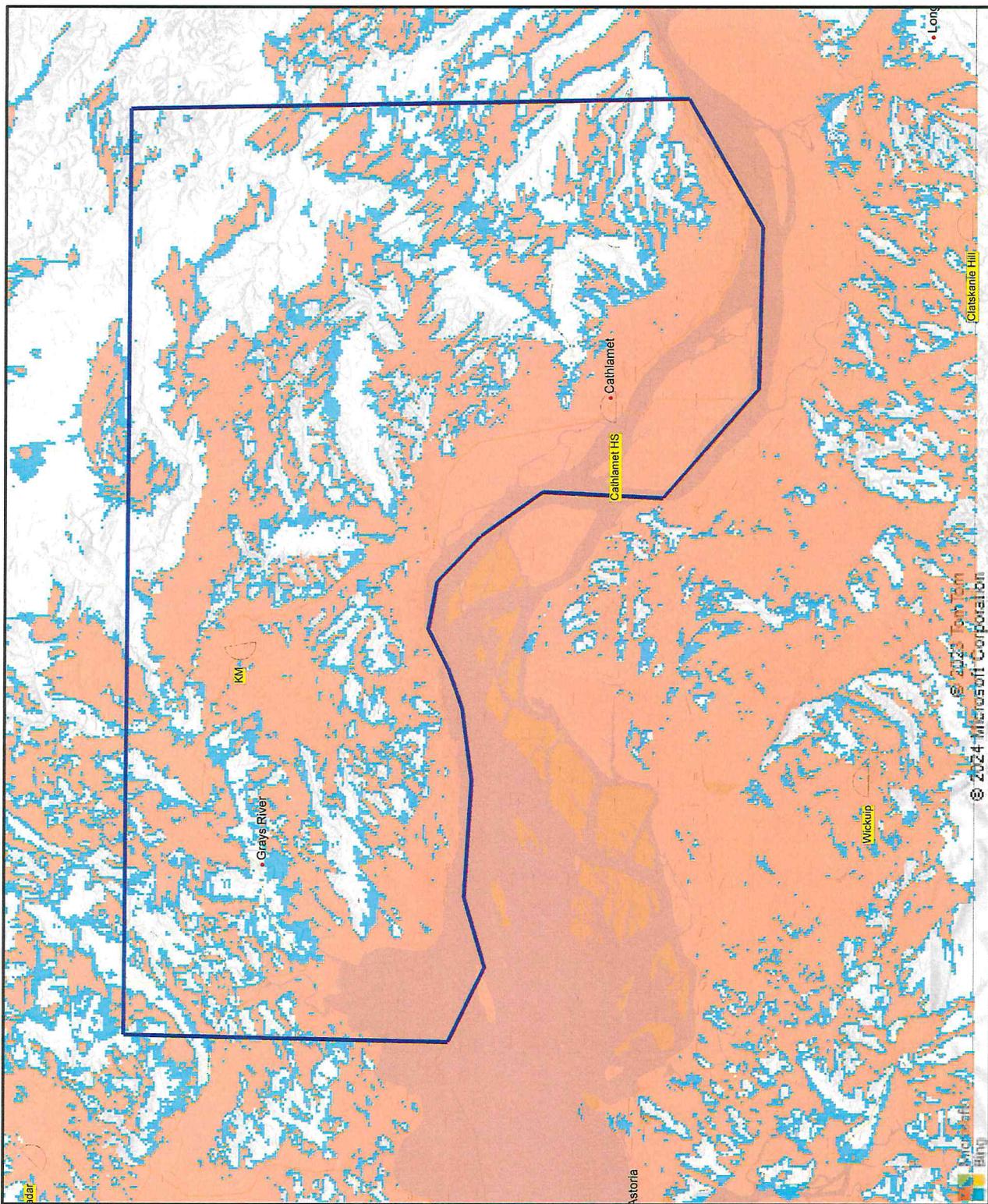
**Notes**

12.7dBd 8-Dipole Ant - 3/8 W/L Spacing from Mast/Tower  
 12.2dBd 8-Dipole Ant - 1/4 W/L Spacing from Mast/Tower



VHF ASIP  
 Wahkiakum Co, WA  
 Fri Feb 02 17:08:04 2024

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 Bing  
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EDX@ SignalPro®: 50-xxxxx VHF ASIP Wahkiakum Co WA VZEDX  
 Prop. model 1: Anderson-2D v1.00  
 Time: 50.0% Loc.: 50.0%  
 Prediction Confidence Margin: 10.8dB  
 Climate: Continental Temperature  
 Land use (clutter): EDX .GCV format  
 KtFading: none  
 KtFactor: 1.333

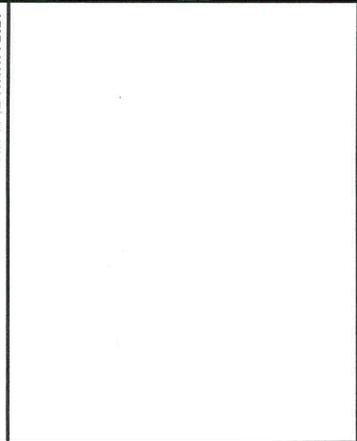
**Sites**  
 Site: Cathlamet HS  
 lat=46.201703 long=-123.381228 150.9 ft  
 Cathlamet Tx.Ht.AGL: 70.0 ft Total ERP: 67.33 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz  
 Site: Clatskanie Hill  
 lat=46.066167 long=-123.282528 2089.5 ft  
 Clatskanie Tx.Ht.AGL: 60.0 ft Total ERP: 93.70 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz  
 Site: KM  
 lat=46.343744 long=-123.511244 899.0 ft  
 KM Tx.Ht.AGL: 70.0 ft Total ERP: 80.42 W  
 Model: 1 Use file-vertical/260.0° 155.5500 MHz

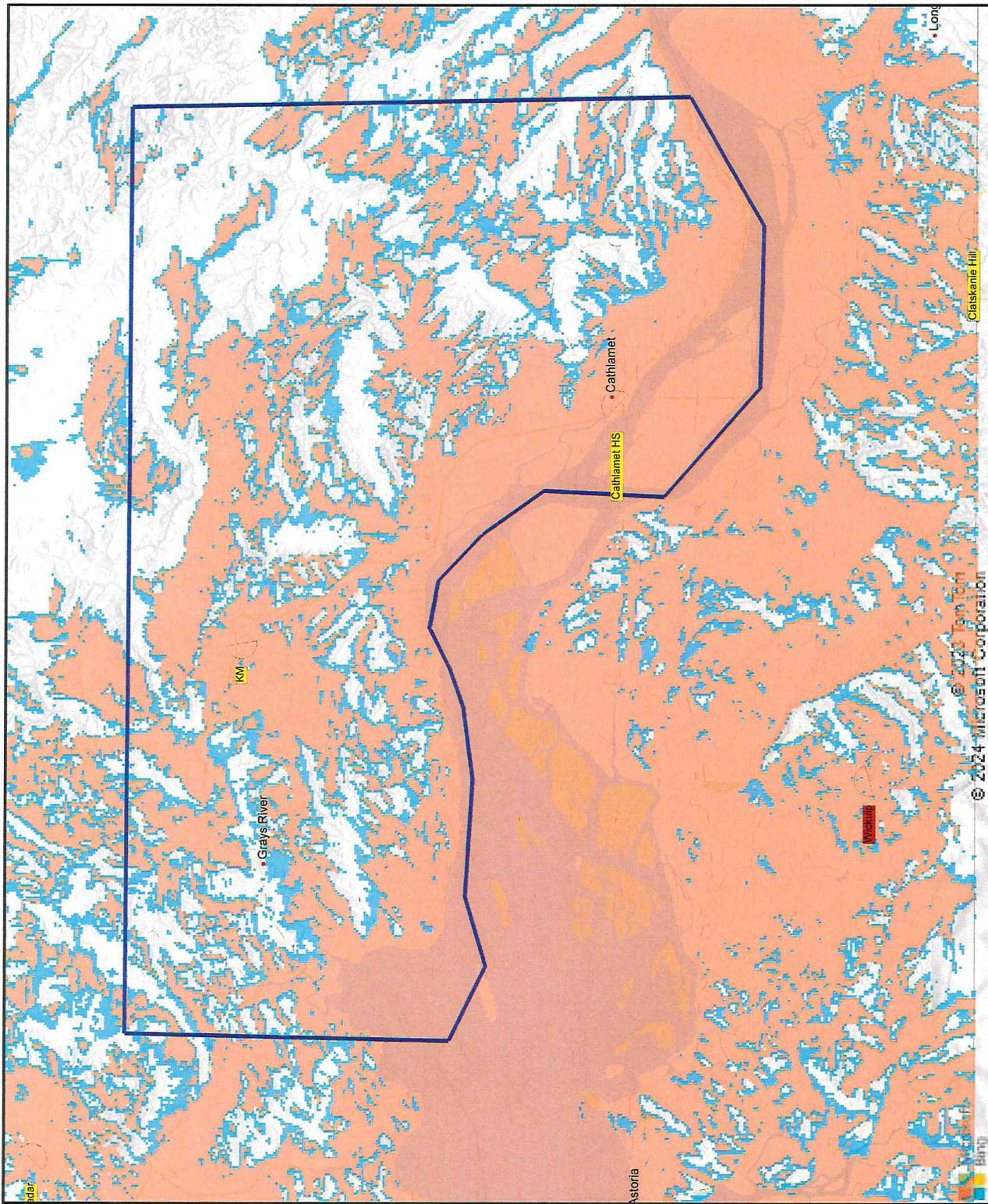
**Site: Radar**  
 lat=46.421667 long=-123.796083 1866.5 ft  
 Radar Tx.Ht.AGL: 50.0 ft Total ERP: 0.00 W  
 Model: 1 Use file-vertical/135.0° 155.5500 MHz  
 Site: Wickiup  
 lat=46.105389 long=-123.585972 2709.0 ft  
 Wickiup Tx.Ht.AGL: 60.0 ft Total ERP: 190.51 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

**Wahkiakum Co Line**  
 FM Analog Portable Talk In  
 >= -92.2 dBmW 92.2 dBmW DAG3.4 Reliability 95% or higher  
 -100.2 dBmW -100.2 dBmW DAG3.4 Reliability 50% to 94.9%  
 < -100.2 dBmW -100.2 dBmW Portable Talk In  
 Display threshold level: -120.0 dBmW  
 RX Antenna - Type: ISOTROPIC  
 Height: 3.3 ft AGL + Structure Gain: -17.00 dBd

**Notes**  
 12.7dB 8-Dipole Ant - 3/8 WL Spacing from Mast/Tower  
 12.2dBd 8-Dipole Ant - 1/4 WL Spacing from Mast/Tower

VHF ASIP  
 Wahkiakum Co, WA  
 Fri Feb 02 16:47:34 2024





EDX® SignalPro®: 50-xxxxx VHF ASIP Wahkiakum Co WA VZEDX  
 Prop. model 1: Anderson-2D v1.00  
 Time: 50.0% Loc.: 50.0%  
 Prediction Confidence Margin: 10.8dB  
 Climate: Continental Temperate  
 Land use (clutter): EDX, GCV format  
 Atmospheric Abs.: none  
 K Factor: 1.333

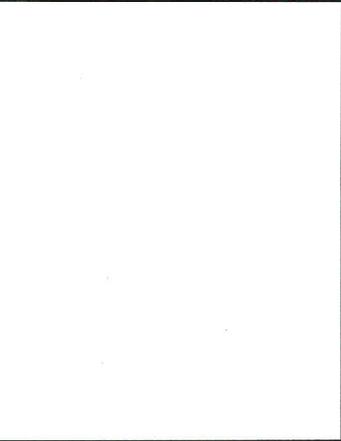
**Sites**  
 Site: Cathlamet HS  
 lat=46.201707 long=-123.381228 150.9 ft  
 Cathlamet Tx: Ht: 70.0 ft Total ERP: 67.33 W  
 Model: 1 Use file-vertical/945.0° 155.5500 MHz  
 Site: Clatskanie Hill  
 lat=46.086167 long=-123.282528 2089.5 ft  
 Clatskanie Tx: Ht: 80.0 ft Total ERP: 93.70 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

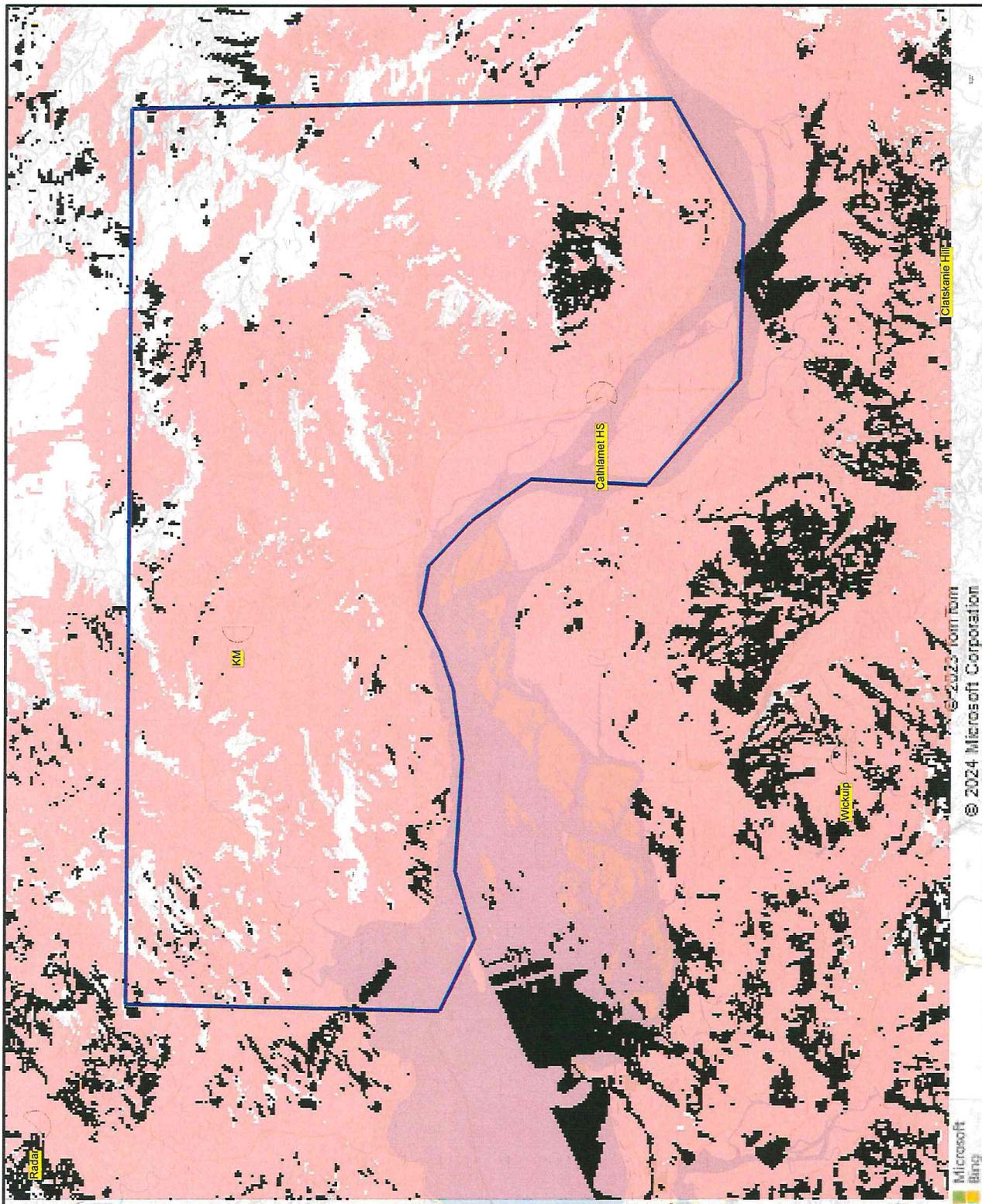
Site: KM  
 lat=46.343744 long=-123.511244 899.0 ft  
 KM Tx: Ht: 70.0 ft Total ERP: 80.42 W  
 Model: 1 Use file-vertical/260.0° 155.5500 MHz  
 Site: Radar  
 lat=46.421667 long=-123.796083 1866.5 ft  
 Radar Tx: Ht: 50.0 ft Total ERP: 80.00 W  
 Model: 1 Use file-vertical/135.0° 155.5500 MHz  
 Site: Wickup  
 lat=46.105389 long=-123.585972 2709.0 ft  
 Wickup Tx: Ht: 80.0 ft Total ERP: 190.51 W  
 Model: 1 Use file-vertical/945.0° 155.5500 MHz

Wahkiakum Co Line  
 FM Analog Portable Talk In  
 >= -92.2 dBmW DAQ3.4 Reliability 95% or higher  
 -100.2 to -92.2 dBmW DAQ3.4 Reliability 50% to 94.9%  
 < -100.2 dBmW Portable Talk In  
 Display threshold level: -120.0 dBmW  
 RX Antenna - Type: ISOTROPIC  
 Height: 3.3 ft AGL + Structure Gain: -17.00 dBd

Notes  
 12.7dBd 8-Dipole Ant - 3/8 W/L Spacing from Mast/Tower  
 12.2dBd 6-Dipole Ant - 1/4 W/L Spacing from Mast/Tower

VHF ASIP  
 Wahkiakum Co, WA  
 Fri Feb 02 17:05:41 2024

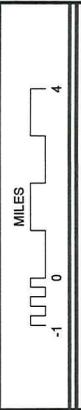




EDX@SignalProc@: 50-xxxxx VHF ASIP, Wahkiakum Co, WA, YZEDX  
 Prop. model: 1: Anderson-2D V1.00  
 Time: 50.0% Loc.: 50.0%  
 Prediction Confidence Margin: 10.8dB  
 Climate: Continental Temperate  
 Land use (clutter): EDX, GCV format  
 Atmospheric Abs.: none  
 K Factor: 1.333

**Sites**  
 Site: Cathlamet HS  
 lat=46.201703 long=-123.381228 150.0 ft  
 Cathlamet Tx-Ht:AGL: 70.0 ft Total ERPd: 852.441 W  
 Model: 1 Use file-vertical/90.0° 155.5500 MHz  
 Site: Clatskanie Hill  
 lat=46.089167 long=-123.282528 2089.5 ft  
 Clatskan Tx-Ht:AGL: 60.0 ft Total ERPd: 193.70 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz  
 Site: KM  
 lat=46.343744 long=-123.511244 899.0 ft  
 KM Tx-Ht:AGL: 70.0 ft Total ERPd: 82.36 W  
 Model: 1 Use file-vertical/270.0° 155.5500 MHz  
 Site: Radar  
 lat=46.421667 long=-123.796083 1866.5 ft  
 Radar Tx-Ht:AGL: 50.0 ft Total ERPd: 382.53 W  
 Model: 1 Use file-vertical/135.0° 155.5500 MHz  
 Site: Wickiup  
 lat=46.105389 long=-123.585972 2709.0 ft  
 Wickiup Tx-Ht:AGL: 60.0 ft Total ERPd: 193.70 W  
 Model: 1 Use file-vertical/0.0° 155.5500 MHz

Wahkiakum Co Line  
 ASIP Mobile Talk Out TDI  
 >= 50.000 uSec Delay Spread  
 < 50.000 uSec Mobile Talk Out  
 Display threshold level: -120.0 dBmW  
 RX Antenna - Type: ISOTROPIC  
 Height: 6.6 ft AGL Gain: -1.00 dbd  
 FM Analog Mobile Talk Out  
 >= -95.2 dBmW Mobile Talk Out  
 < -95.2 dBmW  
 Display threshold level: -120.0 dBmW  
 RX Antenna - Type: ISOTROPIC  
 Height: 6.6 ft AGL Gain: -1.00 dbd



VHF ASIP  
 Wahkiakum Co, WA  
 Tue Jan 30 15:20:35 2024

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EDX@ SignalProbe: 50-xxxxx VHF ASIP Waihiakum Co WA YZEDX

Prop. model 1: Anderson-2D V1.00  
Time: 50.0% Loc: 50.0%  
Prediction Confidence Margin: 10.8dB  
Climate: Continental Temperate  
Land use (clutter): EDX\_GCV format  
Atmospheric Abs.: none  
K Factor: 1.333

**Sites**  
Site: Cathlamet HS  
lat=46.201703 long=-123.381228 150.0 ft  
Cathlamet Tx-Ht:AGL: 70.0 ft Total ERPd: 862.44 W  
Model: 1 Use file-vertical/90.0° 155.5500 MHz

Site: Clatskanie Hill  
lat=46.089167 long=-123.282528 2089.5 ft  
Clatskan Tx-Ht:AGL: 60.0 ft Total ERPd: 193.70 W  
Model: 1 Use file-vertical/0.0° 155.5500 MHz

Site: KM  
lat=46.343744 long=-123.511244 899.0 ft  
KM Tx-Ht:AGL: 70.0 ft Total ERPd: 82.36 W  
Model: 1 Use file-vertical/270.0° 155.5500 MHz

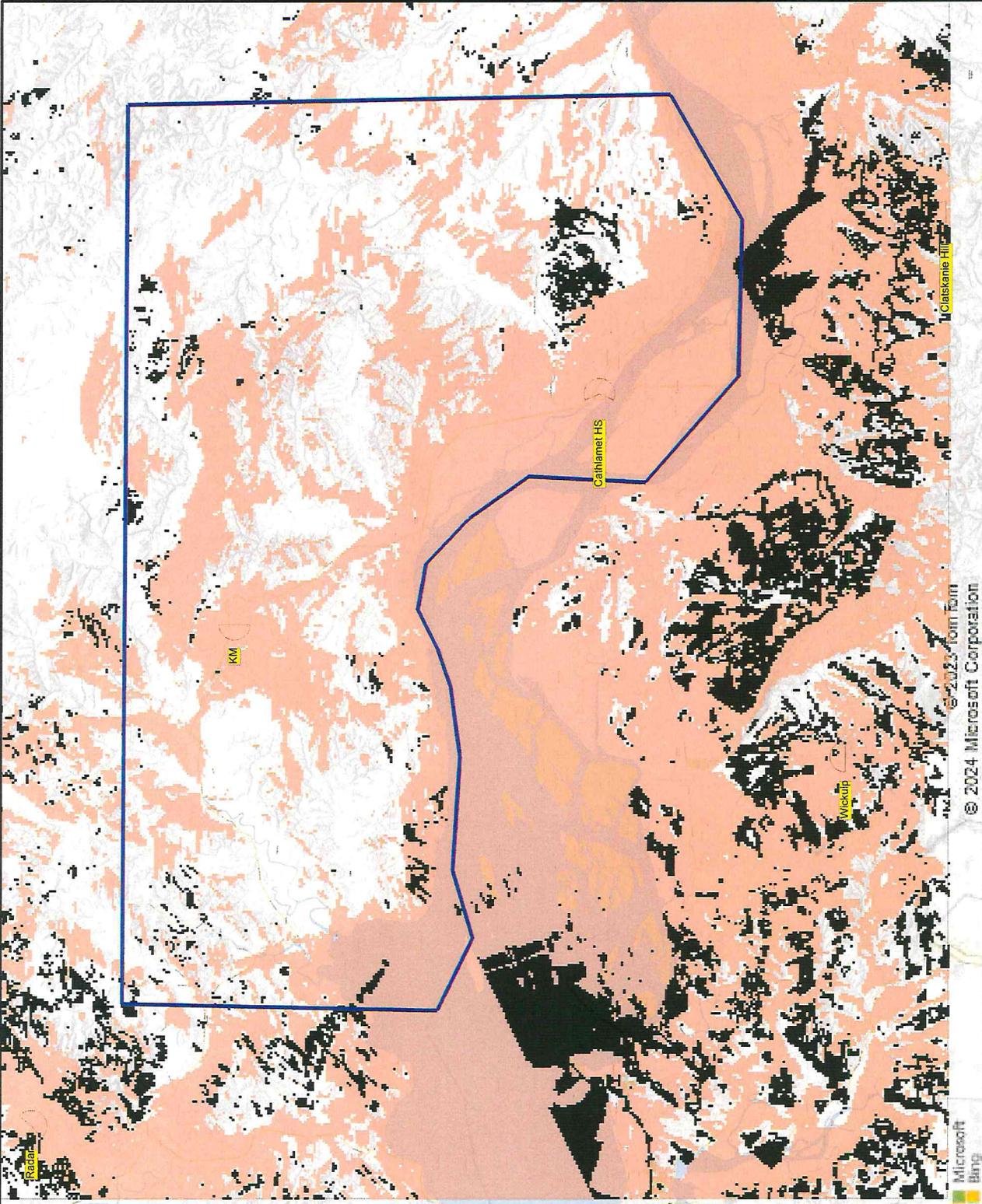
Site: Radar  
lat=46.421667 long=-123.796083 1866.5 ft  
Radar Tx-Ht:AGL: 50.0 ft Total ERPd: 382.53 W  
Model: 1 Use file-vertical/135.0° 155.5500 MHz

Site: Wickiup  
lat=46.105389 long=-123.585972 2709.0 ft  
Wickiup Tx-Ht:AGL: 60.0 ft Total ERPd: 193.70 W  
Model: 1 Use file-vertical/0.0° 155.5500 MHz

**Waihiakum Co Line**  
ASIP Portable Talk Out TDI  
Delay Spread  
>= 50.000 uSec Portable Talk Out  
< 50.000 uSec  
Display threshold level: -120.0 dBmW  
RX Antenna - Type: ISOTROPIC  
Height: 3.3 ft AGL Gain: -17.00 dBd  
FM Analog Portable Talk Out  
>= -95.2 dBmW  
< -95.2 dBmW  
Display threshold level: -120.0 dBmW  
RX Antenna - Type: ISOTROPIC  
Height: 3.3 ft AGL Gain: -17.00 dBd



**VHF ASIP**  
Waihiakum Co, WA  
Tue Jan 30 15:22:56 2024



Microsoft  
Bing

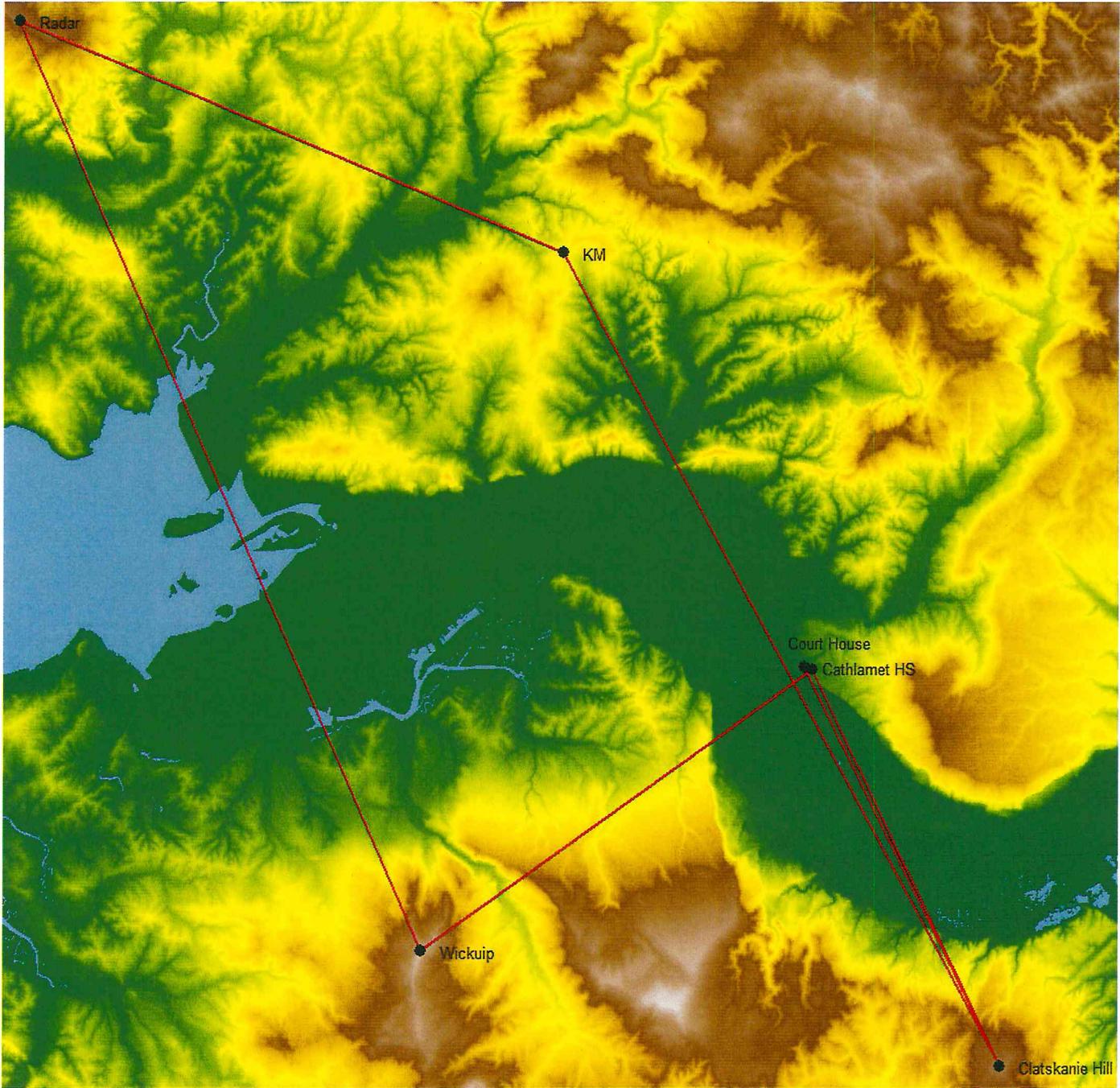
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© 2023 TomTom

Clatskanie Hill

Cathlamet HS

Wickiup

KM





Proposed Payment Schedule:

Communications Northwest will submit invoices for hardware as it is received at Contractors Oregon City, Oregon facility. (not to exceed once every two weeks).

Upon commencement of this Agreement Communications Northwest will invoice for thirty percent (30%) of labor charges, with an additional forty percent (40%) of labor invoiced upon mobilization of materials to County.

All remaining balances to be invoiced upon completion and system acceptance. County shall pay Communications Northwest within thirty (30) days following the date an invoice is received, reviewed, and approved by County. Approval of all invoices provided to County by Communications Northwest hereunder shall be reviewed within ten (10) days of receipt by County. If the invoice is approved in full, County shall remit payment to Communications Northwest within ten (10) days of invoice approval. If County disputes any portion of an invoice, County shall remit that portion of the invoice that is approved to Communications Northwest as provided in this paragraph and shall withhold payment of the portion of the invoice that it disputes.\

The parties shall work together to resolve all invoice disputes.

624 McLoughlin Blvd  
Oregon City, OR 97045  
(503) 232-9031  
Fax (503) 232-7384  
(800) 283-COMM





February 12<sup>th</sup>, 2024

Wahkiakum County Sherrif's Office  
PO Box 65  
64 Main Street  
Cathlamet, WA 98612  
Attn: Beau Renfro

Thank you for the opportunity to present Communications Northwest's solutions to meet the needs of Wahkiakum County.

Our team at Communications Northwest, and our partners, are eager to move forward with this project, and look forward to the partnership.

Respectfully,

A handwritten signature in blue ink, appearing to read "Pualani", with a long horizontal flourish extending to the right.

Pualani Pond  
Acting CEO /Vice President of Account

624 McLoughlin Blvd  
Oregon City, OR 97045  
(503) 232-9031  
Fax (503) 232-7384  
(800) 283-COMM



## John Clark

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**From:** Scott Reilly  
**Sent:** Monday, February 12, 2024 8:00 AM  
**To:** All Users  
**Subject:** Acting CEO

Team,

As discussed on our Monday meeting, our VP Pualani Pond will be responsible for the operations of the company in my absence. She has been delegated as Acting CEO. I hope you will support her and each other for the next 13 days. I will check email as time allows.

If you have any questions, please contact P.

See you all soon!

Respectfully,

Scott A. Reilly  
President/CEO



624 McLoughlin Blvd  
Oregon City, OR 97045  
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