Microwave sustainability and upgrades for end of life, bandwidth expansions and Ethernet requirements:

- **Stratex DXR** end of life and support, links that need upgrade:
  a. STARC Amory to Knob Hill Helena area
  b. Wirth Ranch to Sunset to Stonewall
  c. Shane Ridge to Palisades (Red Lodge Mtn.)
  d. Butte 911 to Fleecer Mtn.

  (note; all radios will be upgraded to new Eclispe radios that will support all future needs and are currently under production with support)

- **Constellation** radios that are at end of life and support, links that need upgrade:
  a. Roosevelt County System that includes 5 links, Deadman Butte (Fort Peck), Windy Hill, Wolf Point Dispatch, Popular, Scout Hill and Culbertson

- **Truepoint 5000 Harris** links that are at end of life without new production, limited support and will need upgraded for Ethernet support:
  a. The Central Ring which includes 12 links, Sullivan, Teton Ridge, Belgium Hills, Santa Rita, Mount Royal, Hill County Sheriff, WAPA, Antoine Butte, Judith Peak, South Moccasin, Highwood Baldy, Pacific Steel, Sullivan
  b. Northern Tier east which includes 6 links, Antoine Butte, Saco, Hinsdale, Gideon, Deadman Butte, Culberson, Plentywood, Flaxville, and Scobey
  c. Last mile hops that include 8 links, Santa Rita, Divide, South Moccasin, Garneil, Cooney, Big Mtn., Flathead 911, Blacktail and Kalispell Water Tank.
  d. Last mile hops for Montana Dept. of Transportation which includes 8 links, Windy Hill, Wolf Point, Havre DOT, Hill County Sheriff, Big Mtn., Kalispell DOT, Great Falls DOT and Flying J
  e. Northern Tier west which includes 7 links, MacDonald Pass, Cominco, Miller Peak, Pat's Knob, Jette, Blacktail and Big Mtn.

- **Aviat Eclispe** radios that will need bandwidth upgrades and upgraded to Ethernet capabilities:
  a. Helena to Great Falls needing bandwidth upgrade as current links are 90 percent of capacity which includes 3 new links that will use current antennas on the unused pole, Hogback, Wirth Ranch and Sullivan
  b. MacDonald Pass to Highflat (Bozeman area) upgraded for bandwidth and Ethernet capabilities which includes 6 links, MacDonald pass, Lost Creek, XL Heights, Bull Mtn., Nixon Ridge and Highflat
  c. South Ring bandwidth upgraded which includes 8 links, Dillon EOC, Sierra, Virginia City Pass, Sawtell, Antelope Peak, Kona, Ellis and Mauer
  d. Ethernet upgrades to existing 11 links, (2ea.) STARC Armory to (2ea.) MacDonald Pass, STARC to LEC, STARC to Fort Harrison, Fort Harrison to Hogback

- **Aviat Eclispe radios that have received upgrades** to bandwidth and Ethernet;
  a. Gallatin ring in Bozeman area upgraded by Gallatin County,
  b. link Highflat to Bridger Ridge upgraded with needed Ethernet
  c. Lewis and Clark Ring Helena area upgraded by Lewis and Clark County
  d. Lewis and Clark 911 to Hogback installed by Lewis and Clark County
  e. Jefferson County Boulder to Belmont installed with needed Ethernet requirements
  f. PSIC microwave project from MacDonald Pass south through Bozeman, Billings, Miles City, Sidney to Culbertson installed with Ethernet capabilities

Microwave sustainability, maintenance and technical support:

Aviat maintenance agreement that includes extended warranty on all microwave links active components with repair and exchange of parts as needed. 24 hour Technical Support through Aviat for all system components provided through the same service agreement. The System Network Monitoring (Provision) support provided through contract.

Microwave System Users:

- 60 Trunking System radio sites across the state (see Statewide map) with circuits mapped to the two Zone Controllers in Lewis and Clark County LEC Helena and Richland County Law & Justice Building in Sidney
- Malstrom Air Force Base, 8 Trunking sites around missile range with redundant T1 circuits for dual dispatch
- Inter Zone connection (4ea.) T1 circuits to both Zone Controllers with redundant paths through Northern Tier and the southern route through Billings
- Primary Dispatch Communication Consoles connected to Zone Controllers (MC7500):
    a. Lewis and Clark County, City of Helena 911
    b. Montana Highway Patrol Statewide Dispatch
    c. Flathead County, City of Kalispell, City of Columbia Falls, City of Whitefish
    d. Gallatin County and City of Bozeman
    e. Hill County
    f. Blaine County
    g. Tri County Dispatch which includes Fergus County, Petroleum County,
    h. Judith Basin County and City of Lewistown
    i. Cascade County and City of Great Falls
    j. Butte Silverbow County
    k. Fergus County
    l. Richland County (secondary control to Zone Controller)
- Convention Radio users:
    a. Lewis and Clark County and City of Helena
    b. Gallatin County and City of Bozeman
    c. Jefferson County
    d. Montana Highway Patrol
    e. Montana Department of Transportation
    f. Richland County
    g. FBI at sites across the State
    h. Glacier National Park
    i. USAF Malstrom Air Base to Highwood Baldy
    j. Roosevelt County
    k. ICE Customs
- Montana National Guard redundant T1 circuits from Fort Harrison to armories:
    a. Great Falls
    b. Kalispell
    c. Lewistown

d. Belgrade
e. Culbertson
f. Dillon
g. Havre
h. Glasgow
i. Gore Hill
j. Helena Airport
h. Future; Butte, Billings, Missoula, Sidney, Miles City, Malta

Montana Public Safety Microwave Network Circuit Mapping:

Motorola Trunking sites ;(60 T1 Circuits) the system provides T1 circuits to 60 Motorola Trunking Sites located throughout the state. Currently the Zone controllers located in Helena (Law Enforcement Center) and Sidney (Richland County Law Enforcement Building) require a T1 circuit to each site for Trunking Wide area control. Please see the PSCS Trunking Status Map for site locations.

The Trunking system currently has six sites that use a combination Microwave system and leased circuits. Three sites in Lincoln County have connectivity through Burlington Northern Santa Fe microwave and the connection to the PSCS microwave at the Big Mountain site. Lincoln County has one site that will connect to the Internet back to the Flathead County EOC 911 in Kalispell and then connect to the PSCS system. Valley County leases a T1 circuit for the Opheim site from Scobey to Opheim and then connects to the PSCS system. Flathead County has one site that uses the Internet with connectivity back to the Flathead EOC 911 and then to the PSCS system.

Motorola Trunking Zone Controllers; The Zone controllers for the Motorola Trunking system, located in Richland County Law & Justice Building in Sidney and Helena at the Lewis & Clark County Law Enforcement Center, are connected to the Trunking sites and also the Motorola MCC7500 and Gold Elite Dispatch centers. The Motorola System also requires connectivity of the two Zone controllers with four T1 circuits for seamless statewide use of the Trunking system. A redundant path for the four T1 circuits required for the two Zone controllers will be complete with the completion of the Southern path of the PSCS Microwave system form Sidney to Helena.

Both Zone Controllers currently use T1 circuits from the Controllers to Motorola for monitoring of the Controllers 24/7. These T1's are leased circuits.

Lewis & Clark County and Helena 911; The MCC 7500 Motorola Dispatch Console has a T1 for connectivity to the Zone Controller. Redundant circuits are mapped for the Dispatch's use. This Dispatch equipment will use an Ethernet VLAN through the PSCS microwave system when upgrades are finished.

Montana Highway Patrol Dispatch; The Highway Patrol's Gold Elite Dispatch Console uses nine T1 circuits on the PSCS System to the Helena Zone Controller for Trunking System control.

Flathead County EOC and 911 Dispatch; Flathead County uses two T1 circuits on the PSCS System to the Helena Zone Controller.

Hill County Sheriff Dispatch; Hill County uses two T1 circuits on the PSCS microwave system to the Helena Zone Controller.

Blaine County Sheriff Dispatch; Blaine County uses one T1 circuit on the PSCS microwave system to the Helena Zone Controller.

Tri County – Lewistown 911 Dispatch; Tri County – Lewistown 911 uses two T1 circuits on the PSCS microwave system to the Helena Zone Controller.

Great Falls 911 Dispatch; Great Falls 911 Dispatch uses two T1 circuits on the PSCS microwave system to the Helena Zone Controller.

Gallatin County 911 Dispatch; Gallatin 911 Dispatch uses two T1 circuits on the PSCS microwave system and has two leased T1 circuits to the Helena Zone controller.

Butte Silverbow 911 Dispatch; Butte Silverbow 911 Dispatch uses two T1 circuits on the PSCS microwave system to the Helena Zone Controller.

Flathead County; Flathead County uses twelve T1 circuits on the PSCS microwave system for conventional Public Safety LMR (land mobile radio).

Gallatin County; Gallatin County uses twelve T1 circuits on the PSCS microwave system for conventional Public Safety LMR.

City of Bozeman; Bozeman uses a T1 circuit on the PSCS microwave system for conventional Public Safety LMR.

Roosevelt County; Roosevelt County uses 56 T1 circuits on the PSCS microwave system for conventional Public Safety LMR and County uses.

Richland County; Richland County uses four T1 circuits on the PSCS microwave system for conventional Public Safety LMR.

Butte Silverbow County; Butte Silverbow County uses a T1 circuit on the PSCS microwave system for conventional Public Safety LMR.

Beaverhead County; Beaverhead County has six T1 circuits mapped on the PSCS microwave system for future Public Safety LMR.

Lewis & Clark County; Lewis & Clark County uses and has mapped fifty six T1 circuits on the PSCS microwave system for Public Safety LMR and County requirements.

Mobile Data Radio; Mobile Data Radio uses six T1 circuits on the PSCS microwave system for Public Safety LMR.

Montana Highway Patrol; Montana Highway Patrol uses DSO circuits on ten T1 drop and insert circuits on the PSCS microwave system for Public Safety LMR.

Montana Department of Transportation; Montana Department of Transportation uses DSO circuits on Drop and insert and single T1 circuits (four T1 circuits) on the PSCS microwave system for Public Safety LMR.

Montana Air National Guard: Montana Air National Guard use two T1 circuits to Antoine Butte and Glasgow on the PSCS microwave system for LMR. Eight T1 circuits are used on the PSCS microwave system to Fort Harrison.

Montana National Guard; Montana National Guard uses sixteen T1 circuits on the PSCS microwave system from the Great Falls Armory to Fort Harrison. The Guard uses and has mapped twenty eight T1 circuits on the PSCS microwave system for use at Armories across the state.

Malstrom Air Force Base; Malstrom Air Force Base uses eighteen T1 circuits on the PSCS microwave system for the USAF Trunking System connectivity in Central Montana.

FBI; FBI uses DSO circuits on ten drop and insert and dedicated T1 circuits on the PSCS microwave system for Public Safety LMR.

ICE: ICE has three T1 circuits mapped on the PSCS microwave system for Public Safety LMR.