## ENR 1.6 ATS SURVEILLANCE SERVICES AND PROCEDURES

### 1. ATS SURVEILLANCE SERVICES

### 1.1 General

1.1.1 Air traffic control radar is the predominant means of control at Bangkok Area Control Centre and Approach Control Units at Don Mueang, Suvarnabhumi, Chiang Mai, Hat Yai, Hua Hin, Krabi, Nakhon Si Thammarat, Phitsanulok, Phuket, Sukothai, Surat Thani, Samui, Ubon Ratchathani and U-Tapao Rayong Pattaya airports provided in accordance with ICAO Doc 4444 Air Traffic Management (PANS-ATM) Chapter 8.

1.1.2 Radio Communications procedures

| Stations | Service | Callsign |
|---|---|---|
| Bangkok Area Control Centre | Procedural and radar | Bangkok Control |
| Bangkok Approach Control Unit | Procedural and radar | Bangkok Approach |
| Chiang Mai Approach Control Unit | Procedural and radar | Chiang Mai Approach |
| Hat Yai Approach Control Unit | Procedural and radar | Hat Yai Approach |
| Hua Hin Approach Control Unit | Procedural and radar | Hua Hin Approach |
| Krabi Approach Control Unit | Procedural and radar | Krabi Approach |
| Nakhon Si Thammarat Approach Control Unit | Procedural and radar | Nakhon Si Thammarat Approach |
| Phitsanulok Approach Control Unit | Procedural and radar | Phitsanulok Approach |
| Phuket Approach Control Unit | Procedural and radar | Phuket Approach |
| Sukhothai Approach Control Unit | Procedural and radar | Sukhothai Approach |
| Surat Thani Approach Control Unit | Procedural and radar | Surat Thani Approach |
| Samui Approach Control Unit | Procedural and radar | Samui Approach |
| Ubon Ratchathani Approach Control Unit | Procedural and radar | Ubon Approach |
| U-Tapao Approach Control Unit | Procedural and radar | U-Tapao Approach |

### 1.2 Application of Radar Control Service

1.2.1 Radar identification is achieved according to the provisions specified by ICAO Doc 4444 Air Traffic Management (PANS-ATM) Chapter 8.

1.2.2 Radar control service is provided in controlled airspace to aircraft operating within Bangkok, Chiang Mai, Hat Yai, Hua Hin, Krabi, Nakhon Si Thammarat, Phitsanulok, Phuket, Sukhothai, Surat Thani, Samui, Ubon Ratchathani and U-Tapao TMAs/CTRs and along all airways.

1.2.3 Radar service in respect of unknown aircraft:

a) In controlled airspace, traffic information will be given when an identified controlled flight is observed to be on a conflicting path with an aircraft which ATC have no specific information deemed to constitute a collision hazard, a course of avoiding action will be suggested, if so requested by the pilot or if in the opinion of the radar controller the situation warrants.
b) When an identified IFR operating outside controlled airspace is observed to be on a conflicting path with another aircraft, the identified aircraft will be advised of the need for collision avoidance. If so requested by the pilot or if in the opinion of the radar controller the situation warrants, a course of avoiding action will be suggested.
c) In both cases mentioned in 1.2.3 a) and b) the decision as to whether or not to comply with the ATC suggestion rests solely with the pilot.
d) Whenever suggestion to assist the pilot for avoiding action is given, the consideration will be given if practicable to the rules of the air, but pilot are nevertheless reminded that they are ultimately responsible for the prevention of collision.

1.2.4 The minimum horizontal radar separation are:

a) 5 miles en-routes along airways, and
b) 5 miles in Bangkok, Chiang Mai, Hat Yai, Hua Hin, Krabi, Nakhon Si Thammarat, Phitsanulok, Phuket Sukhothai, Surat Thani, Samui, Ubon Ratchathani and U-Tapao TMAs/CTRs.

1.2.5 Level assigned by the radar controller to pilot will provide a minimum terrain clearance according to the phase of flight.

1.2.6 Radar approach procedures will be provided within Bangkok, Chiang Mai, Hat Yai, Hua Hin, Krabi, Nakhon Si Thammarat, Phitsanulok, Phuket, Sukhothai, Surat Thani, Samui, Ubon Ratchathani and U-Tapao TMAs/CTRs.

a) Inbound aircraft
Inbound on airway
Aircraft flying on the airways system will be cleared into the TMA/CTR without having to request a specific entry clearance.

b) Inbound other than on airways
Aircraft wishing to enter the TMAs/CTRs are required to obtain permission at least 10 minutes before reaching the zone boundary, when they will be advised of the route to be followed consistent with the current traffic situation.

c) Initial approach procedures with radar control

- When inbound traffic is being sequenced by radar, the initial and intermediate approach procedures will be flown under directions from the approach radar controller and will consist of the part of the approach between the zone boundary or the terminal holding fix and the final approach path. When holding procedures are not in use, radar sequencing may commence before the terminal holding fix.
- Pilots should plan their flight profile in such a manner as to be able to achieve the minimum holding level at the holding point if so required.
- When an aircraft is under approach radar control, changes of heading or flight level/altitude will be made only on instructions from the radar controller, except in the case of radio communication failure in the aircraft or at the radar unit.
- Heading and flight levels/altitudes at which to leave the zone boundary or holding areas will be passed by ATC. Radar vectors will be given and descent clearance will include an estimate of track distance to touchdown. Further distance information will be given between the initial descent clearance and intercept heading to the ILS.
- Speed control may be applied on a tactical basis to the extent determined necessary by the radar controller. Aircraft unable to conform to the speeds specified by the radar controller should inform ATC immediately and state what speeds will be used. In the interests of accurate spacing, pilots are requested to comply with speed adjustment as promptly as is feasible within their own operational constraints and should advise ATC if circumstances necessitate a change of speed for aircraft performance reasons.
- In the event of radar failure, new instructions will be issued to each aircraft under radar control and the procedures as defined for intermediate approach without radar control will be put into effect.

d) Initial approach procedures – without radar control
When inbound traffic is not being sequenced by radar, aircraft will be cleared from the TMA zone boundary to carry out an instrument approach procedure appropriate for the landing direction.

e) Outbound Aircraft

Routes from the airport
- Routes may be varied at ATC discretion according to the prevailing traffic conditions.
- Warning: Pilots are reminded to maintain adequate terrain clearance, except when being vectored under radar control, in which case the radar controller will ensure that adequate terrain clearance exists prior to issuing radar vectors.
- For ATC purposes, outbound aircraft will normally be required to cross a certain point at or above the altitude assigned. Pilots who cannot comply with the necessary climb profile must inform ATC in good time (i.e. before departure) so that an alternative routing can be coordinated.

Visual reporting points
- To facilitate the integration of VFR flights within the controlled airspace, pilots may be required to join/leave the airspace via the specified visual reporting points.
- For the benefit of pilots of VFR flight who prefer to determine their position by radio navigation aids rather than by visual pin-points, the visual reporting points are suitably defined in AIP-Thailand.

1.2.6.1 Missed approaches

a) As directed by ATC.
b) In the absence of instructions from ATC, the procedures are as in the published charts in AIP-Thailand.

1.2.6.2 Special VFR flight

a) Special VFR clearances for flights within the controlled airspace may be given whenever traffic conditions permit. These flights are subject to the general conditions laid down for special VFR flights.
b) Aircraft may be given a radar service whist within the zone if, due to the traffic situation, ATC considers it advisable. It will remain the responsibility of the pilot to remain at all times in flight conditions which will enable pilot to determine his flight path and to keep clear of obstacles, and to ensure that he is able to comply with the relevant low flying restrictions of the rules of the air. For the pilots of fixed-wing aircraft, the pilot must inform the radar controller if compliance with the above entails a change of heading or height.
c) Clearance for special VFR flight below minimum sector altitude cannot be given, unless at some specific radial or bearing which provides sufficient terrain clearance.

1.2.6.3 Holding point for radar service

Chiang Mai Terminal Control Area

| | |
|---|---|
| Name | : KARAE |
| Position | : 18 DME radial 210 CMA DVOR/DME (183009.07N 0984829.42E) |
| Lower Limit | : 8 000 feet QNH |
| Upper Limit | : 11 000 feet QNH |
| Holding Axis | : 030/210 (Inbound Track 030, Outbound Track 210) |
| Pattern | : 1 minute, left hand race-track pattern |

Phitsanulok Terminal Control Area

| | |
|---|---|
| Name | : UNITE |
| Position | : 20 DME radial 050 PSL DVOR/DME (165907.21N 1003327.88E) |
| Lower Limit | : 6 000 feet QNH |
| Upper Limit | : 11 000 feet QNH |

Holding Axis : 050/230 (Inbound Track 230, Outbound Track 050)
Pattern : 1 minute, right hand race-track pattern.

Hat Yai Terminal Control Area

Name : KOYAW (KYN)
Position : 20 DME radial 040 HTY DVOR/DME (0711.0N 10036.7E)
Lower Limit : 3 000 feet QNH
Upper Limit : 7 000 feet QNH
Holding Axis : 040/220 (Inbound Track 220, Outbound Track 040)
Pattern : 1 minute, right hand race-track pattern.

**1.3 In order to maximize use of ATS Surveillance Systems located at Don Mueang, Suvarnabhumi, Chiang Mai, Chiang Rai, Chumphon, Hat Yai, Hua Hin, Phuket, Phitsanulok, Roi Et, Surat Thani, Ubon Ratchathani and Udon Thani airport, where available, surveillance is used to maximum extent practicable in the provision of approach control services. Accordingly, when within surveillance cover, identified controlled flights may expect to be under radar control.**

ATC units providing approach radar control service within Bangkok, Chiang Mai, Hat Yai, Hua Hin, Krabi, Nakhon Si Thammarat, Phitsanulok, Phuket, Sukhothai, Surat Thani, Samui, Ubon Ratchathani and U-Tapao TMAs/CTRs use the word “Bangkok Approach”, “Chiang Mai Approach”, “Hat Yai Approach”, “Hua Hin Approach”, “Krabi Approach”, “Nakhon Si Thammarat Approach”, “Phitsanulok Approach”, “Phuket Approach”, “Sukhothai Approach”, “Surat Thani Approach”, “Samui Approach”, “Ubon Approach” and “U-Tapao Approach” in his/her callsign respectively.

In addition to the application of Radar Control Service and Procedures as mentioned above, the following procedures also be applied when Secondary Surveillance Radar (SSR) may be used alone in the provision of air traffic services, including in the provision of separation between aircraft provided:

1.3.1 Regardless of weather conditions, an ATC authorization is required prior to operate within the TMAs/CTRs.

1.3.2 Unless otherwise authorized by appropriate approach control units, each aircraft must be equipped as follow:

a) TWO-WAY radio capable of communications with approach control units on appropriate frequency.
b) Operable radar beacon transponder.
c) Request for deviation from the 4096 transponder equipment must be submitted to appropriate approach control units at least one hour before the proposed operation.
d) An operable VOR, ADF or TACAN receiver.

1.3.3 Pilot of arriving aircraft should contact the appropriate approach control units on the publicized frequency and give their position, altitude, radar beacon code and destination; radio contact should be initiated far enough from the TMA boundary to preclude entering the TMA before radio communication is established.

1.3.4 IFR operation: aircraft within the TMAs/CTRs are required to operate in accordance with current IFR procedures as prescribed in Annex 2. AIP-Thailand or NOTAM and Amendment thereto.

1.3.5 VFR operation: Arriving aircraft must obtain authorization prior to entering the TMAs/CTRs and must contact appropriate approach control units on appropriate frequency. Departing aircraft require a clearance to depart the TMA and should advise the appropriate Tower of their intended cruising altitude and route of flight. ATC will normally advise VFR aircraft when leaving the geographical limit of TMA. Radar service is not automatically terminate with this advisory unless specifically state by the controller.

1.3.6 VFR aircraft outside TMAs/CTRs are cautioned against operating to closely to TMA boundaries especially when the floor of that TMA is 3000 ft or less or when VFR cruise altitude are at or near the floor of higher level. Observance at this precaution will reduce the potential for encountering TMA aircraft operation at TMA floor altitude.

1.3.7 This programme is not to be interpreted as a relief to the pilot of their responsibilities to see and avoid other traffic operating in basic VFR weather conditions and to adjust their operating in basic VFR weather conditions and to adjust their operations and flight path as necessary to preclude serious wake encounters and to or better than VMC. The appropriate approach control units should be advised and a revised clearance or instruction obtained when compliance with an assigned route, heading, and or/altitude is likely to compromise pilot responsibilities with respect to terrain and obstruction clearance, VORTEX exposure, and weather minimum.

1.3.8 ATC clearance and separation, an ATC authorization is required to enter and operate within the TMAs/CTRs for the following services:

a) Sequencing of all arriving radar controlled aircraft.
b) 5 NM radar separation between IFR aircraft.
c) 5 NM radar separation between IFR and VFR or Special VFR aircraft.
d) Between VFR aircraft – Traffic advisories and as appropriate safety alert, and also information to enable them to fit into the landing sequence.

1.3.9 SSR radar approach control service to aircraft proceeding to the airports in this programme will be terminated at a sufficient distance

to allow time to change to the appropriate tower frequency.

**1.4 Radio Communication Failure**

1.4.1 If two-way communication is lost with an aircraft, the radar controller should first determine whether or not the aircraft's receiver is functioning by instructing the aircraft on frequency so far used to acknowledge by making a specified manoeuvre and by observing the aircraft's track or by instructing the aircraft to operate the Special Position Identification (SPI) feature or to make the code changes. Where it has been established by the action mentioned above that the aircraft's radio receiver is functioning, the radar controller will continue to provide radar services to the aircraft.

1.4.2 If the aircraft's radio is completely unserviceable, the pilot should carry out the procedures for radio failure in accordance with ICAO provisions. If radar identification has already been established, the radar controller will vector other identified aircraft clear of its track until such time as the aircraft leaves radar cover.

**1.5 Radar Failure**

1.5.1 In the event of radar failure or loss of radar identification, instructions will be issued to restore standard non-radar separation.

1.5.2 The use of fight levels separated by 500 feet below FL290 or 1 000 feet at or above FL290 may be resorted to temporarily if standard non-radar separation cannot be provided immediately.

1.5.3 Radar controller shall continue to control the traffic by using non-radar separation.

**2. PRIMARY SURVEILLANCE RADAR**

**2.1 Area of Radar Coverage**

2.1.1 PSRs are located at position with maximum range in accordance with the following table:

| Primary Surveillance Radar Station | Latitude | Longitude | Range |
|---|---|---|---|
| Suvarnabhumi International Airport | 134122.63N | 1004613.05E | 80 NM |
| Hua Hin Airport | 123728.55N | 0995655.43E | 60 NM |

2.1.2 Hours of operation will be 24 hours except for notice for maintenance by NOTAM.

**3. SECONDARY SURVEILLANCE RADAR**

**3.1 Area of Radar Coverage**

3.1.1 SSRs are located at position with maximum range in accordance with the following table:

| Secondary Surveillance Radar Stations | Latitude | Longitude | Range |
|---|---|---|---|
| Don Mueang International Airport | 135532.82N | 1003620.14E | 256 NM |
| Suvarnabhumi International Airport | 134149.90N | 1004615.44E | 256 NM |
| Chiang Mai International Airport | 184534.76N | 0985801.44E | 256 NM |
| Mae Fah Luang-Chiang Rai International Airport | 195734.62N | 0995257.56E | 256 NM |
| Chumphon Airport | 104304.39N | 0992156.76E | 256 NM |
| Phitsanulok Airport | 164559.34N | 1001642.26E | 256 NM |
| Roi Et Airport | 160639.74N | 1034639.87E | 256 NM |
| Surat Thani Airport | 090800.77N | 0990843.50E | 256 NM |
| Ubon Ratchathani Airport | 151441.65N | 1045204.87E | 256 NM |
| Udon Thani Airport | 172315.59N | 1024611.72E | 256 NM |
| Hai Yai International Airport | 065608.15N | 1002300.20E | 256 NM |
| Bang Duk Hill, Phuket | 080801.67N | 0981946.52E | 256 NM |

3.1.2 Hours of operation will be 24 hours except for notice for maintenance by NOTAM.

3.1.3 Graphic portrayal of area of theoretical SSR coverage as shown in Figure ENR 1.6-A to Figure ENR 1.6-O.

**3.2 Emergency Procedures**

3.2.1 If the pilot of an aircraft encountering a state of emergency has previously been directed by ATC to operate the transponder on a specific code, this code setting shall be maintain until otherwise advised. In all other circumstances. The transponder shall be set to mode A/3 code 7700.

3.2.2 Notwithstanding the procedure in 3.2.1 above, a pilot may select mode A/3 code 7700 whenever the nature of the emergency is such

that this appears to him to be the most suitable course of action.

**3.3 Radio Communication Failure Procedures**

3.3.1 In the event of an aircraft radio receiver failure, a pilot shall select mode A/3 code 7600 and follow established procedures; subsequent control of the aircraft will be based on those procedures.

**3.4 Unlawful Interference**

3.4.1 Should an aircraft in flight be subjected to unlawful interference, the pilot shall endeavour to set the transponder to mode A/3 code 7500 to give indication of the situation unless circumstances warrant the use of mode A/3 code 7700.

3.4.2 When a pilot has selected mode A/3 code 7500 and subsequently requested to confirm his code by ATC, he shall, according to circumstances either confirm this or not reply at all.

***Note:*** *The absence of a reply from the pilot will be taken by ATC as an indication that the use of mode A/3 code 7500 is not due to an inadvertent false code selection.*

**3.5 Operating Procedures**

3.5.1 All aircraft flying within Bangkok FIR are required to operate their transponders in accordance with ATC instructions. They should maintain the setting of SSR codes until otherwise instructed except as provided for in 3.6.2 and 3.6.3 below.

3.5.2 Pilots of aircraft equipped with Mode S having an aircraft identification feature shall set the aircraft identification in the transponder. This setting shall correspond to the aircraft identification specified in item 7 of the ICAO flight plan, or, if no flight plan has been filed, the aircraft registration.

**3.6 Code Assignment Method**

3.6.1 All IFR aircraft flying within controlled airspace in Bangkok FIR shall be assigned transponder code as follows.

| Flight Status | SSR codes |
|---|---|
| International flight | 0700-0777, 6100-6177 |
| Domestic flight | 1260-1277, 3301-3377, 4200-4277,<br>4400-4477, 4500-4577, 7200-7277 |

3.6.2 Pilots of aircraft about to enter Bangkok FIR who have not received specific instructions from ATC concerning the setting of the transponder shall operate the transponder on mode A/3 code 3300 before entry and maintain that code setting until otherwise instructed.

3.6.3 VFR Operation

3.6.3.1 VFR flight operating in Bangkok FIR may be assigned SSR codes by ATS unit concerned.

3.6.3.2 VFR flight departing from an aerodrome without SSR code being assigned shall use mode A/3 code 2000 until a specific code is assigned by an ATS unit.

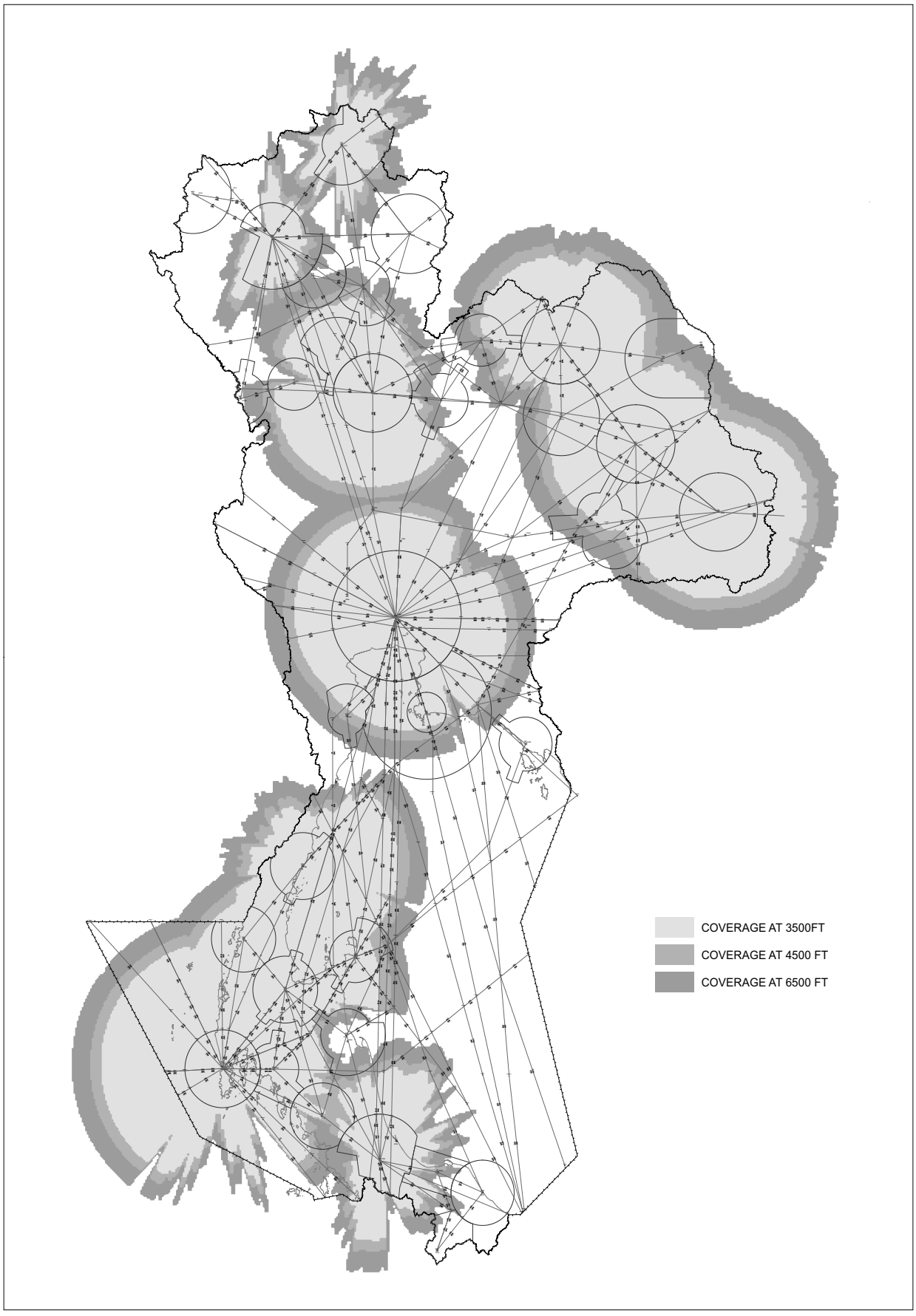
**4. AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST ADS-B**

NIL

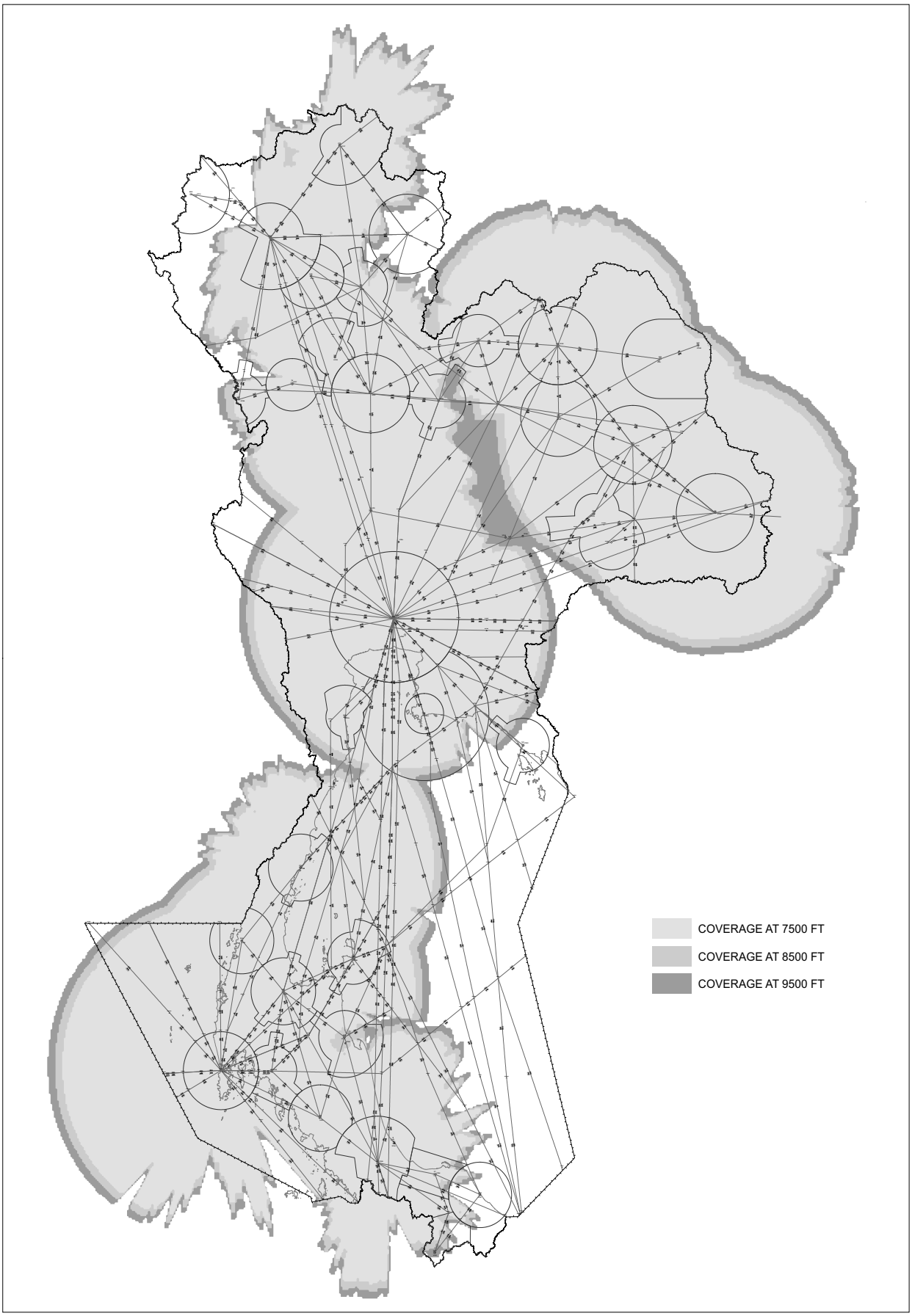
**5. OTHER RELEVANT INFORMATION AND PROCEDURES**

NIL

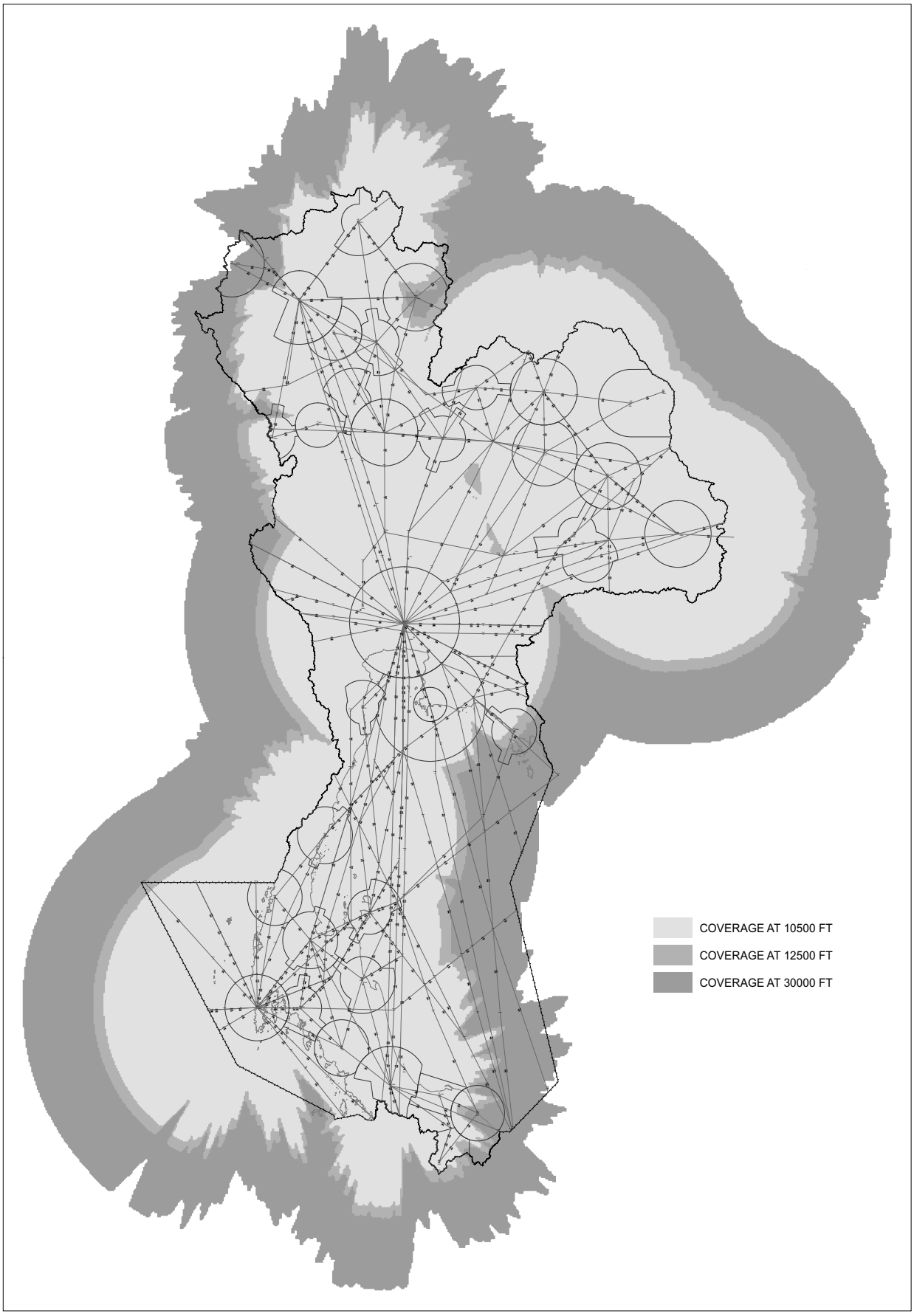
**Area of Theoretical SSR Coverage**
**Figure ENR 1.6-A - Coverage at 3500 FT 4500 FT and 6500 FT**



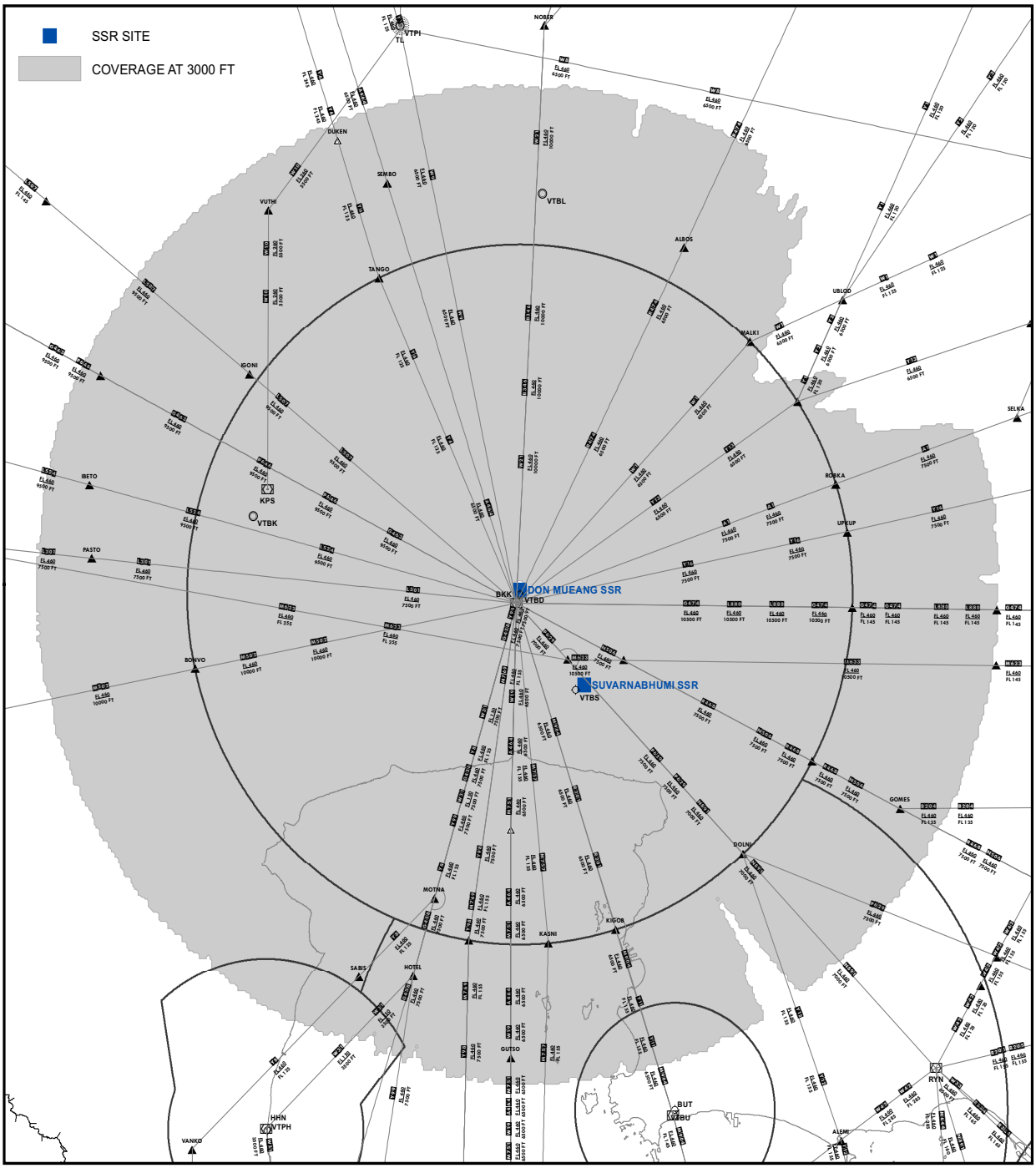
## Area of Theoretical SSR Coverage
## Figure ENR 1.6-B - Coverage at 7500 FT 8500 FT and 9500 FT



## Area of Theoretical SSR Coverage
## Figure ENR 1.6-C - Coverage at 10500 FT 12500 FT and 30000 FT

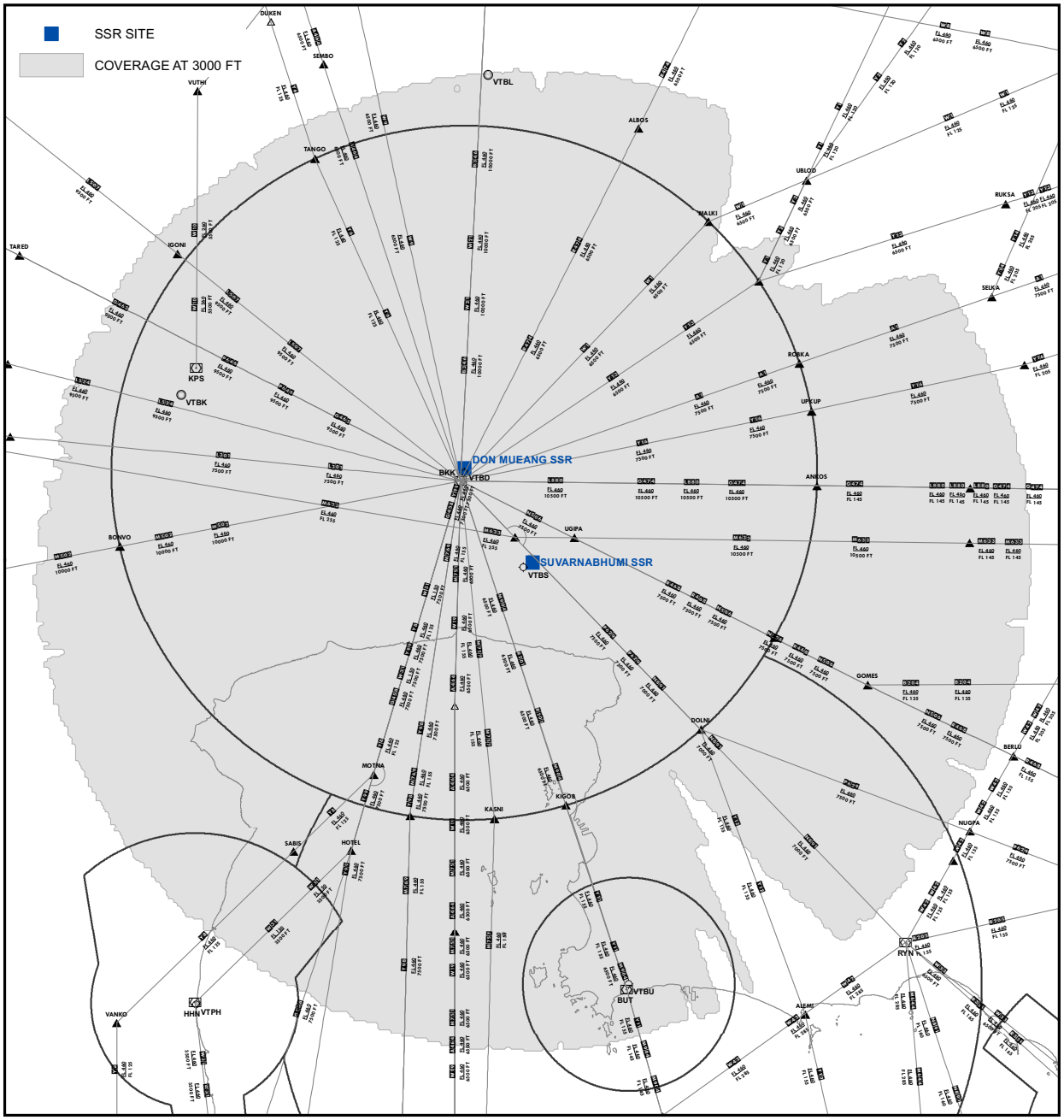


# Area of Theoretical SSR Coverage
# Figure ENR 1.6-D - Don Mueang SSR Station Coverage at 3000 FT



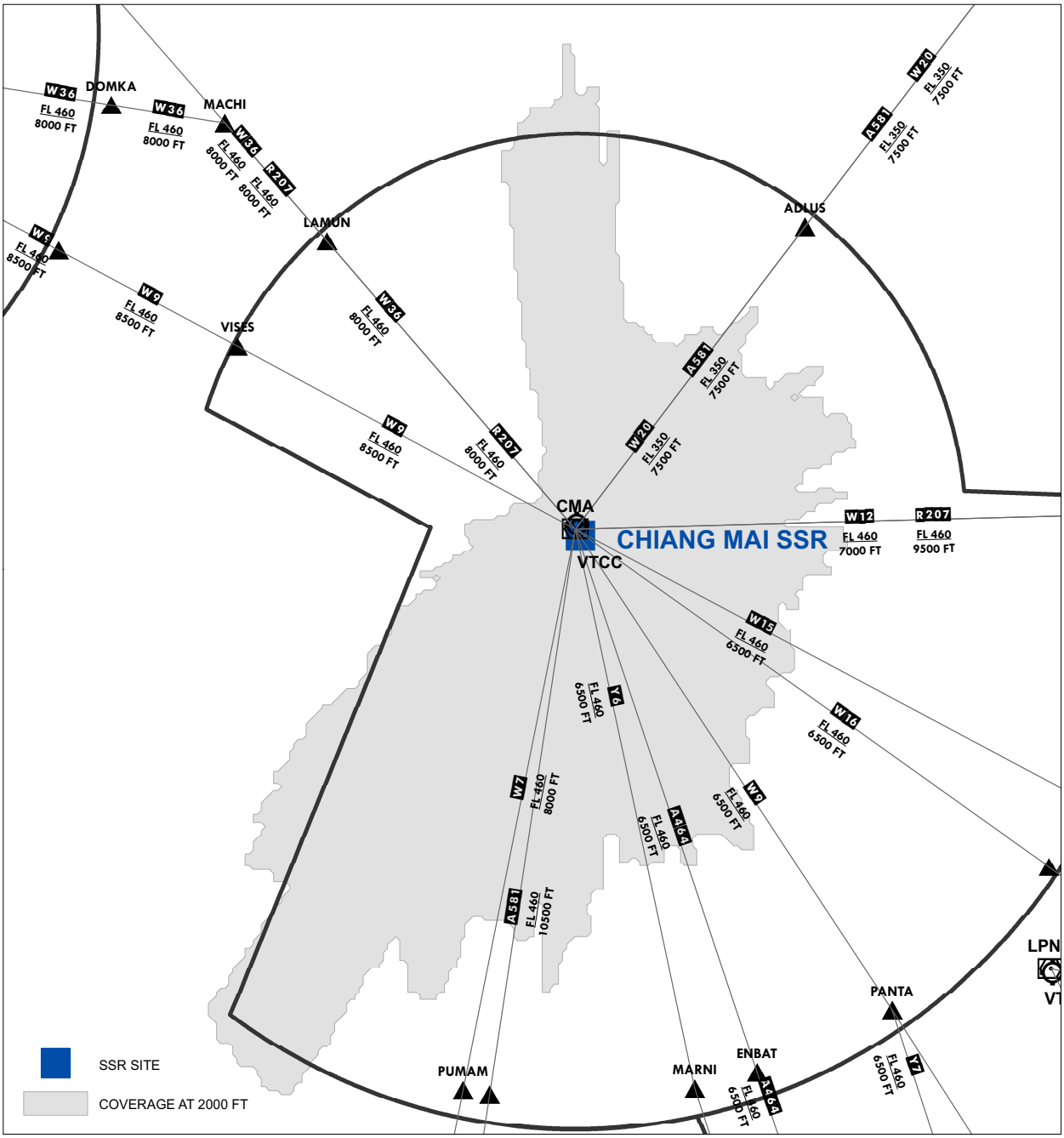
# Area of Theoretical SSR Coverage

## Figure ENR 1.6-E - Suvarnabhumi SSR Station Coverage at 3000 FT

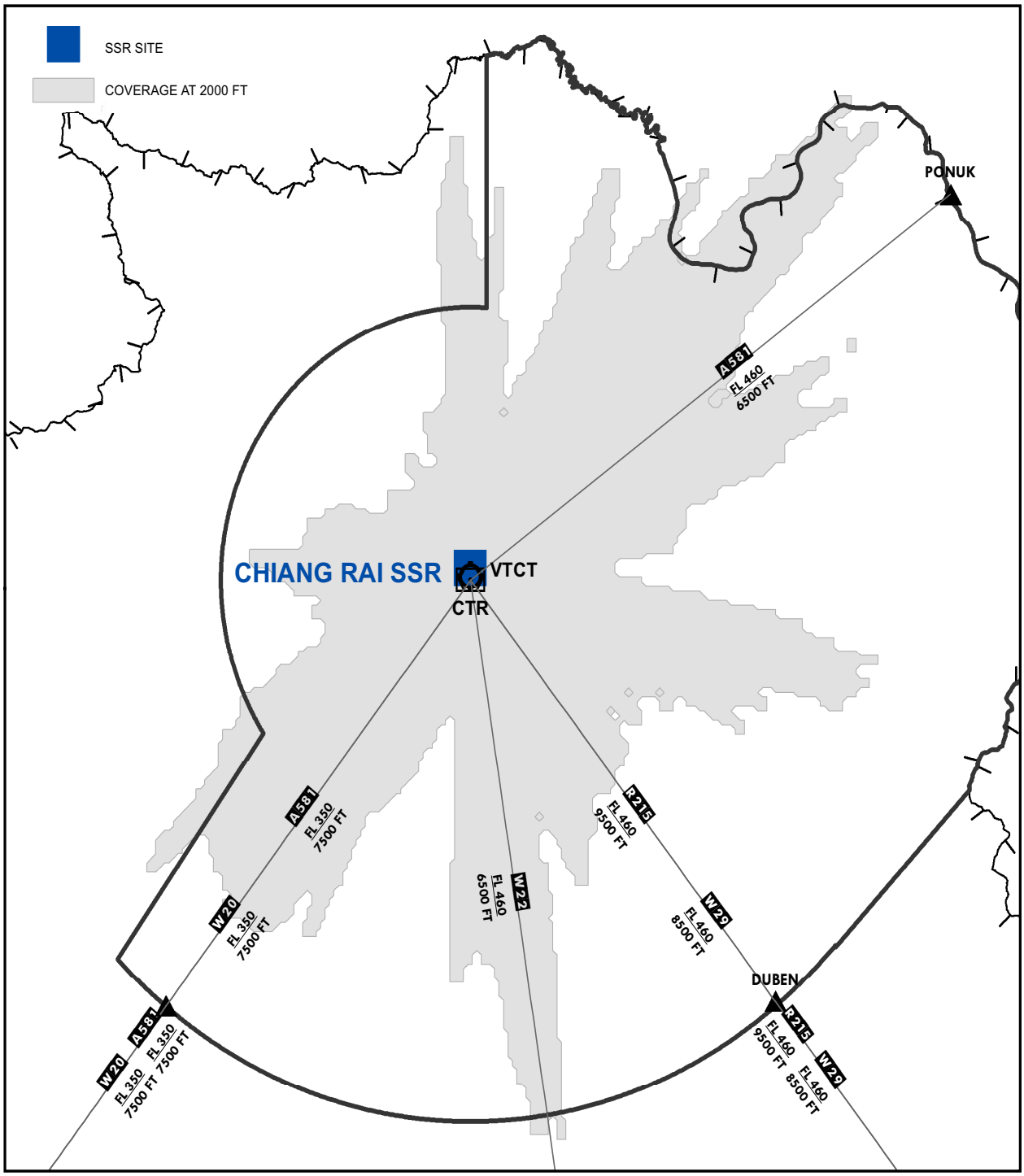


## Area of Theoretical SSR Coverage

## Figure ENR 1.6-F - Chiang Mai SSR Station Coverage at 2000 FT

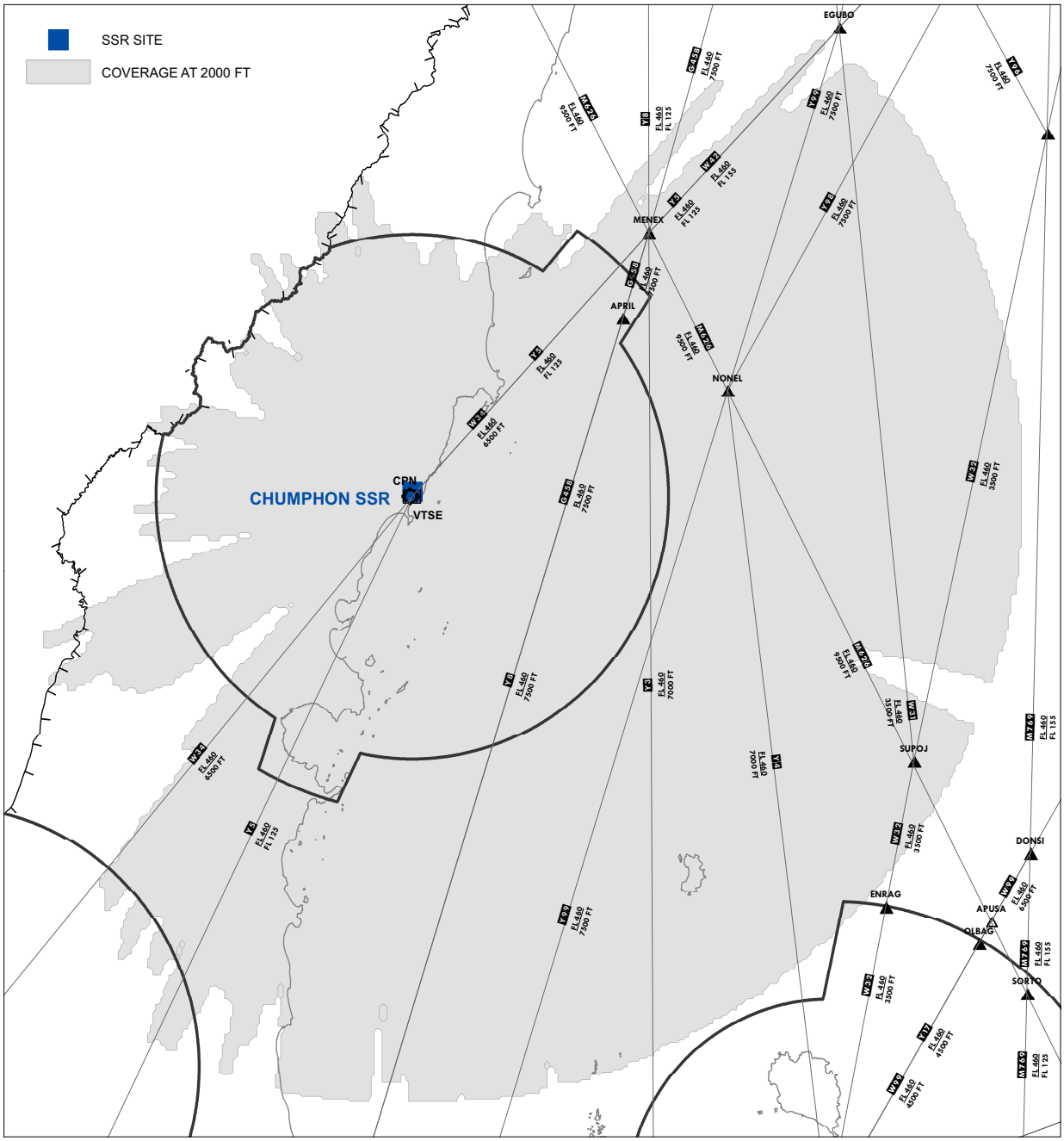


# Area of Theoretical SSR Coverage
## Figure ENR 1.6-G - Chiang Rai SSR Station Coverage at 2000 FT

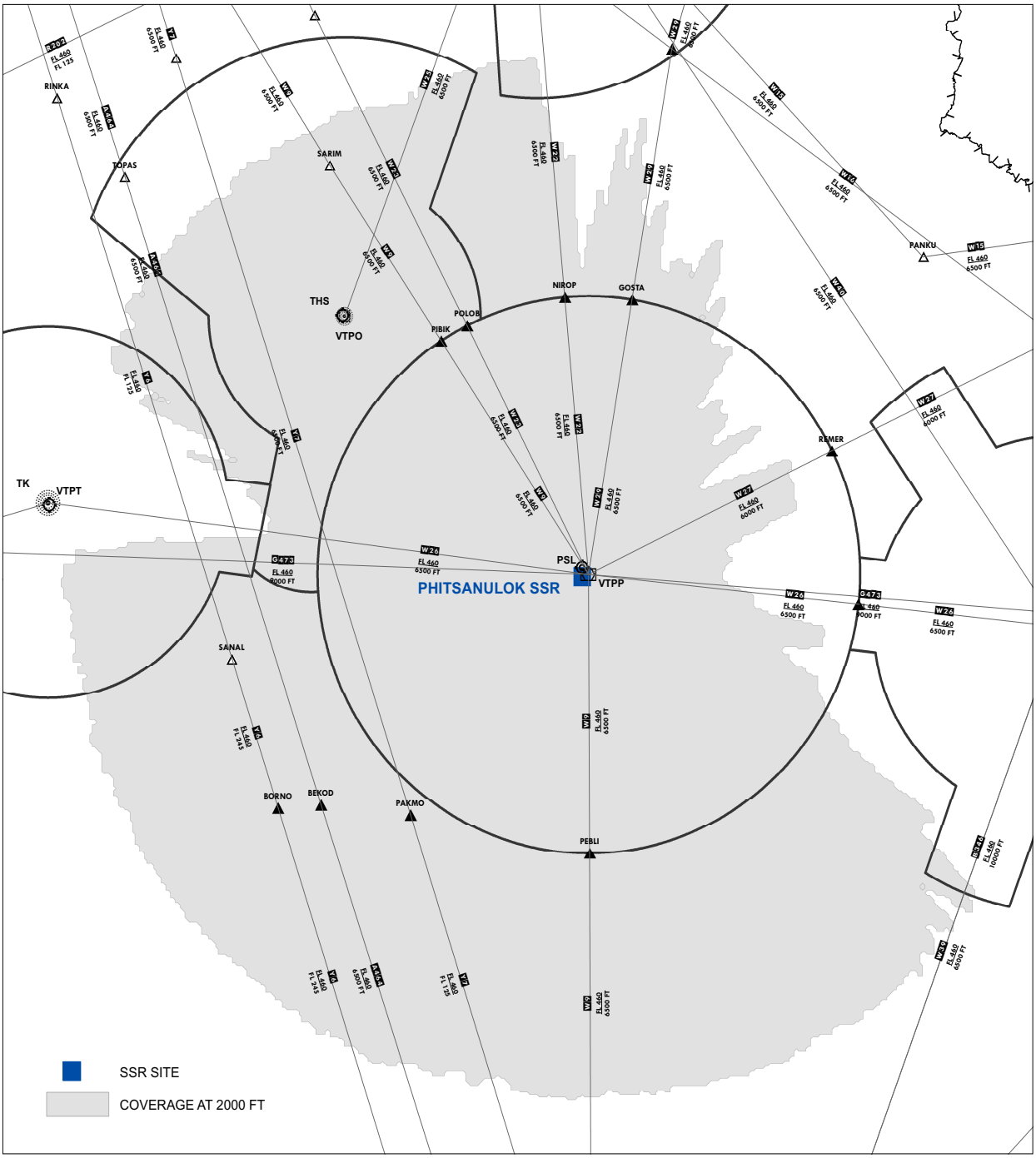


## Area of Theoretical SSR Coverage

## Figure ENR 1.6-H - Chumphon SSR Station Coverage at 2000 FT

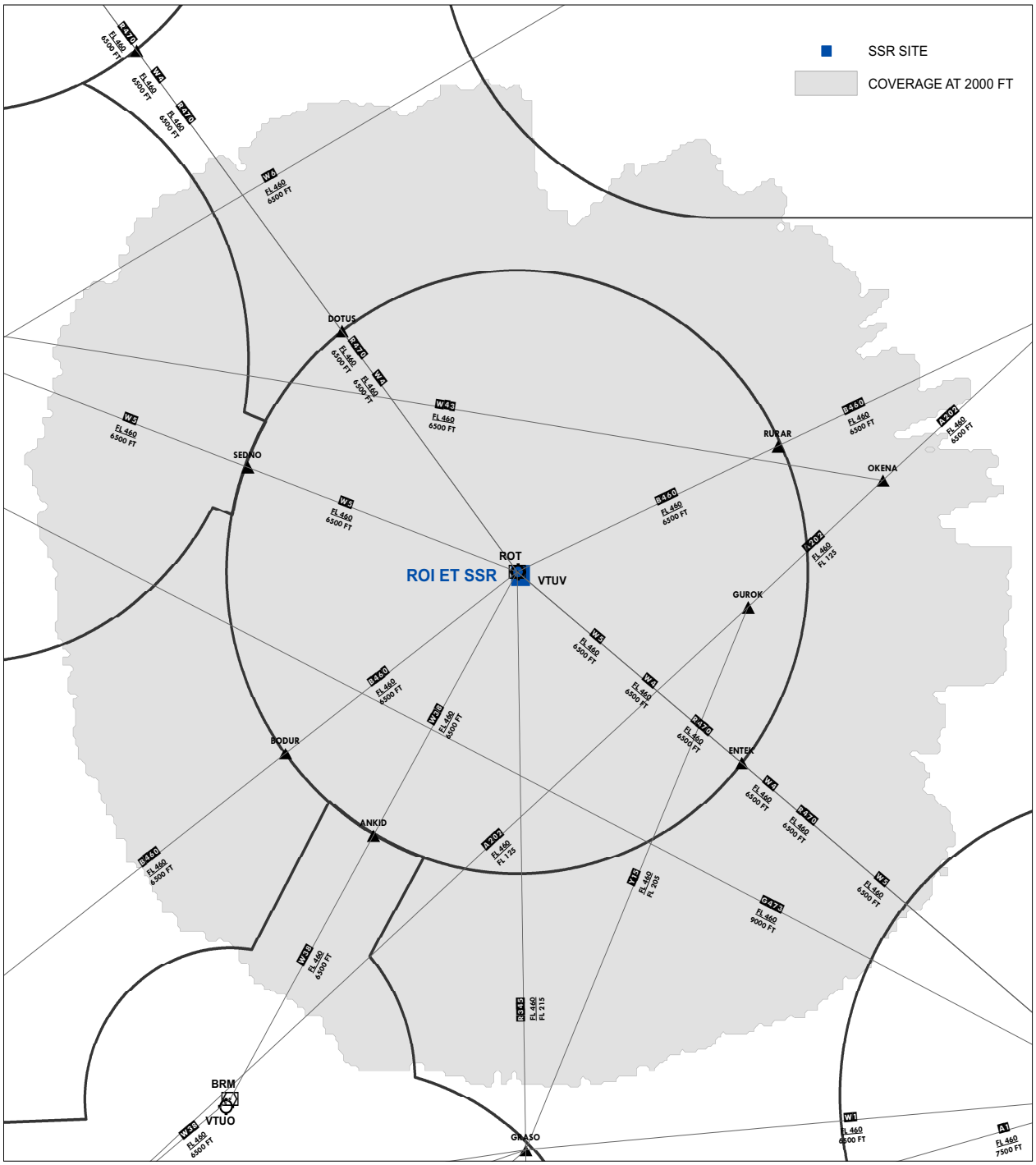


## Area of Theoretical SSR Coverage
## Figure ENR 1.6-I - Phitsanulok SSR Station Coverage at 2000 FT



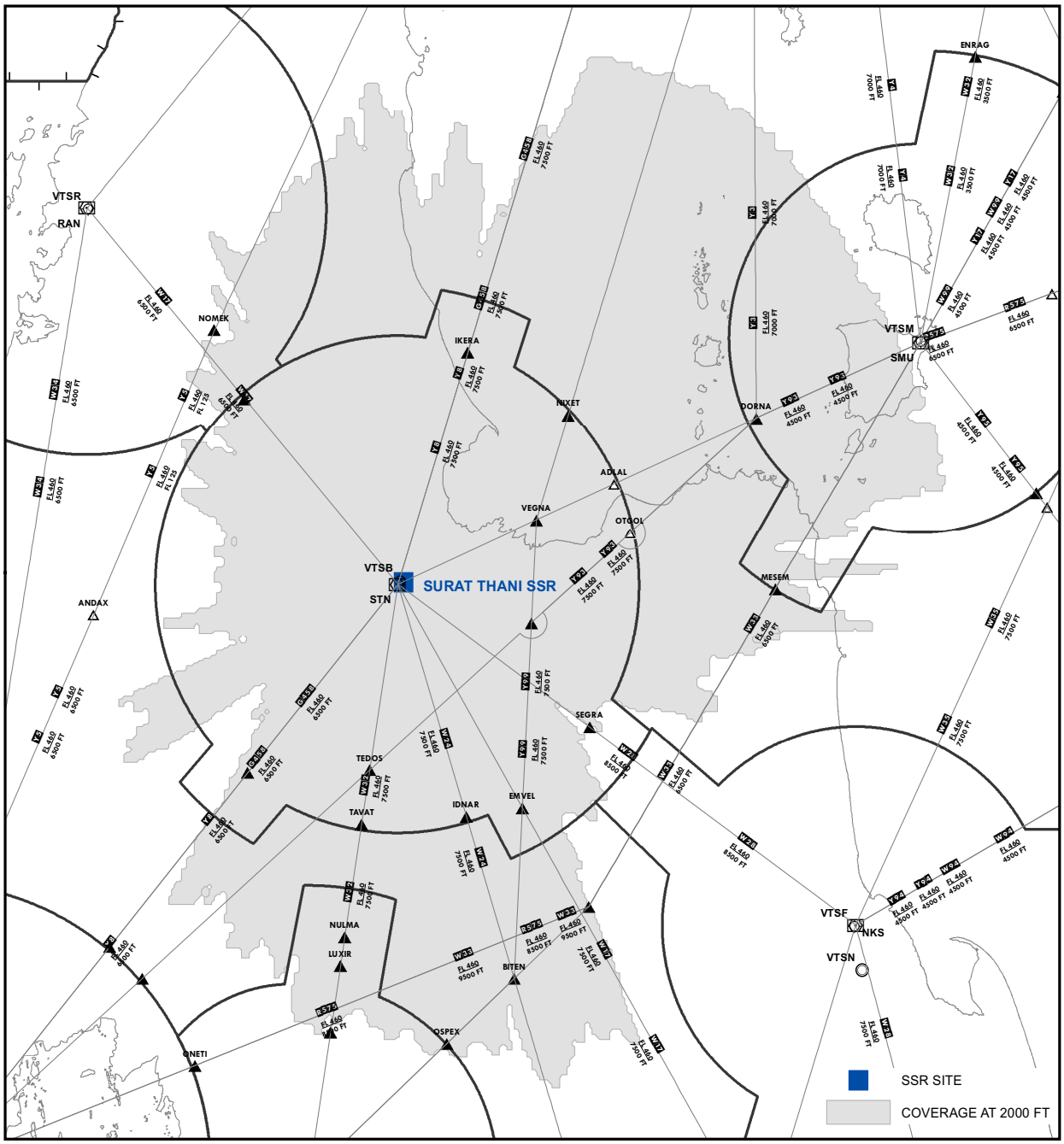
## Area of Theoretical SSR Coverage

## Figure ENR 1.6-J - Roi Et SSR Station Coverage at 2000 FT



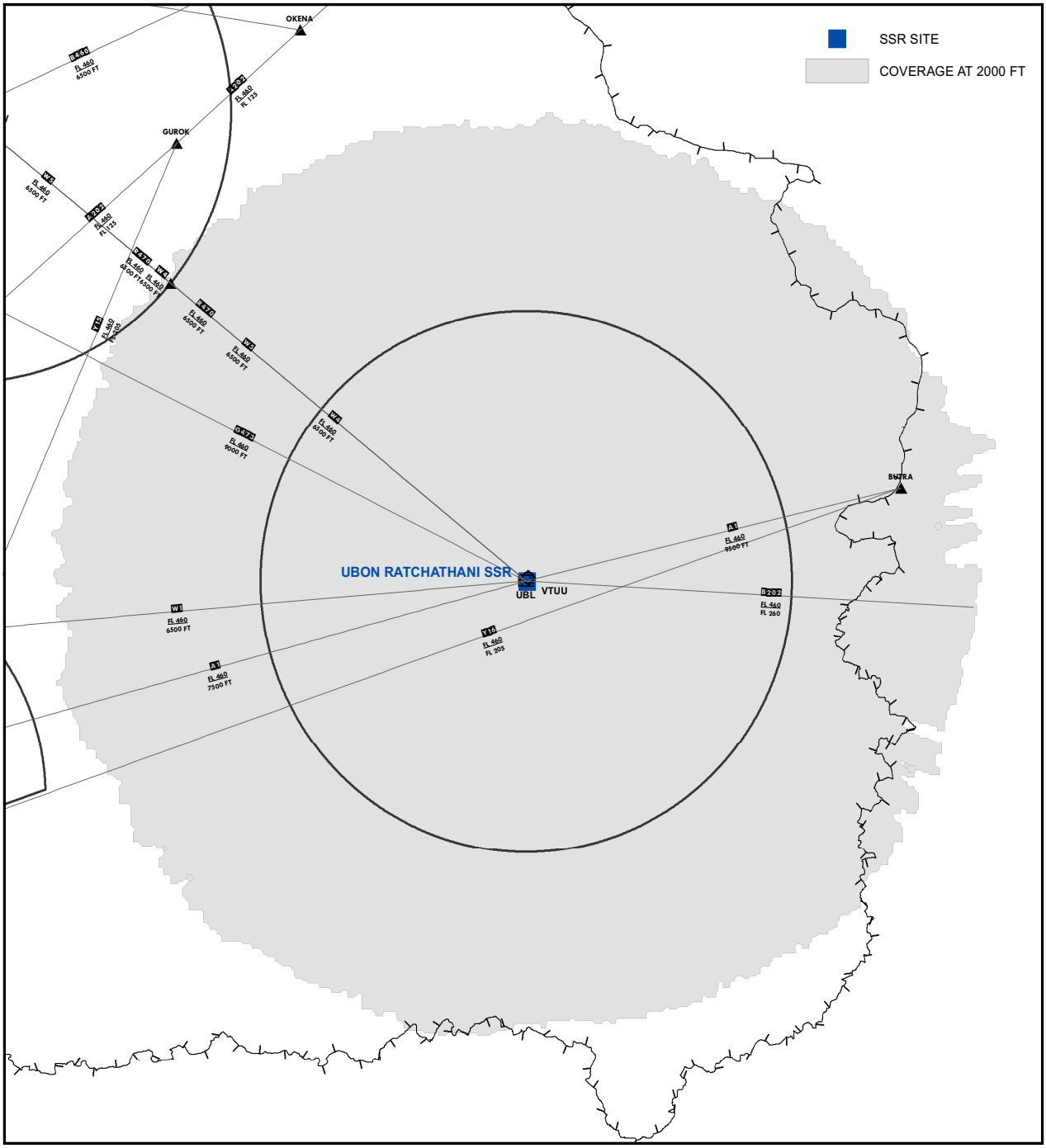
# Area of Theoretical SSR Coverage

## Figure ENR 1.6-K - Surat Thani SSR Station Coverage at 2000 FT

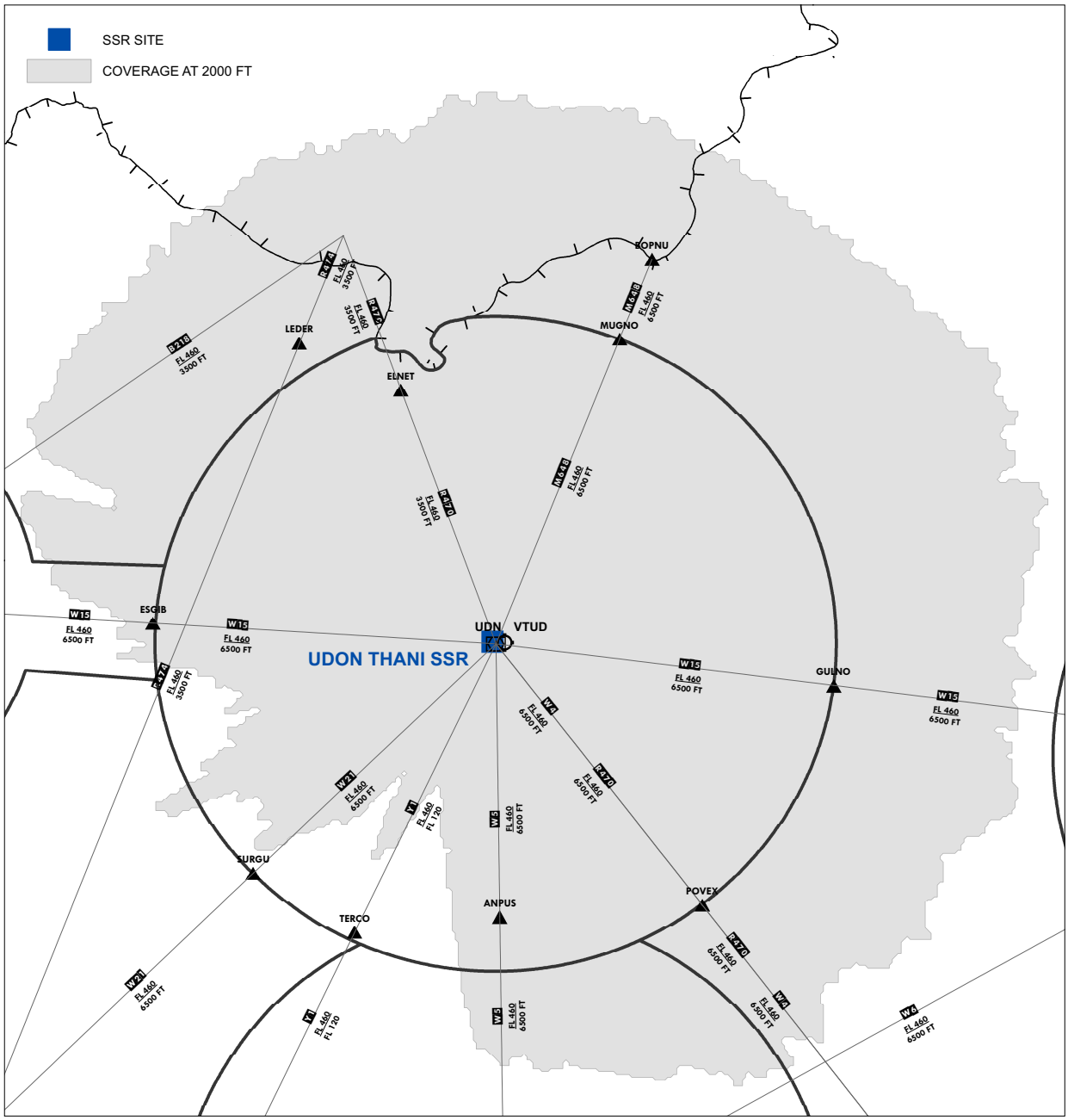


## Area of Theoretical SSR Coverage

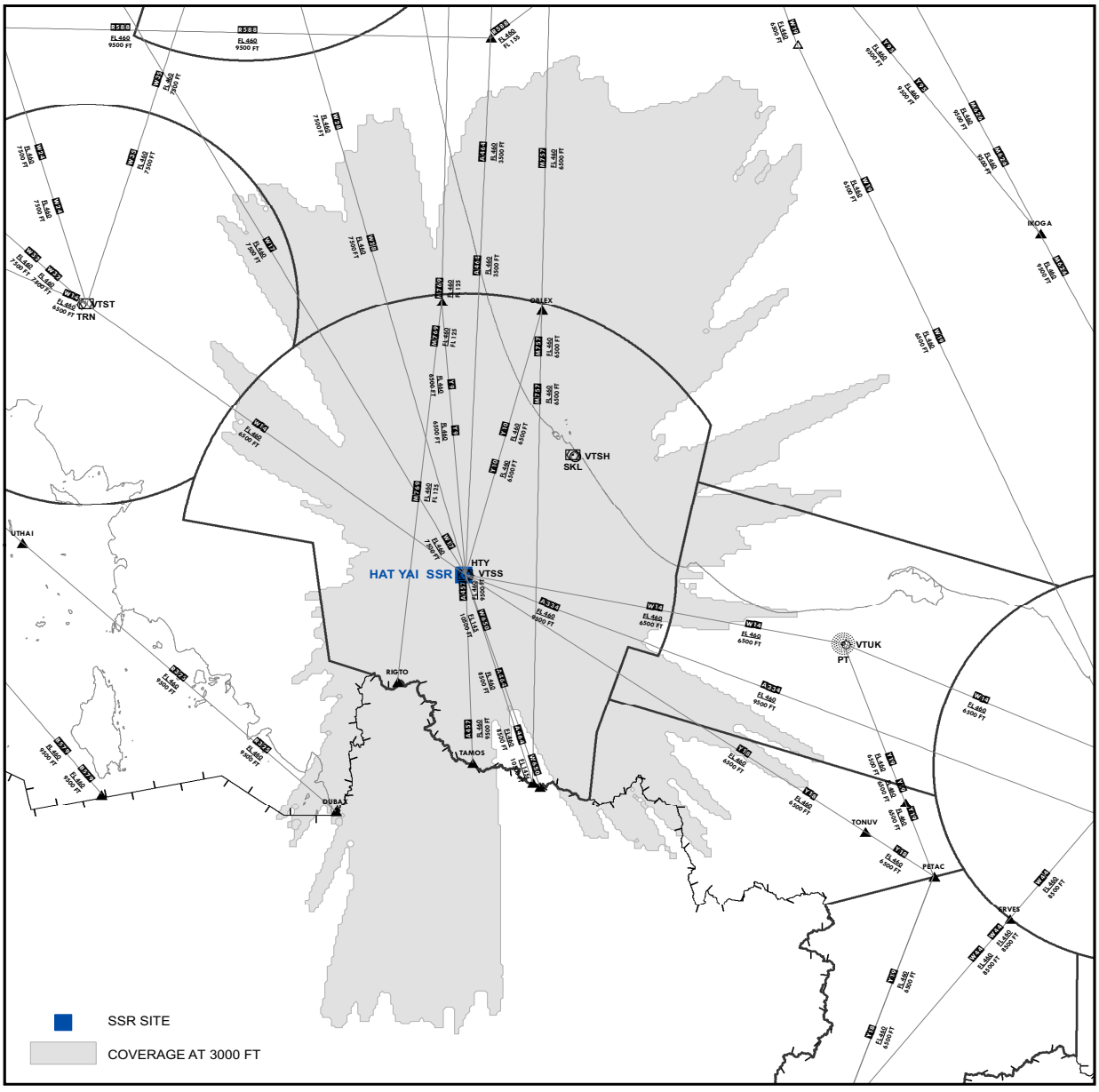
## Figure ENR 1.6-L - Ubon Ratchathani SSR Station Coverage at 2000 FT



## Area of Theoretical SSR Coverage
## Figure ENR 1.6-M - Udon Thani SSR Station Coverage at 2000 FT



## Area of Theoretical SSR Coverage
## Figure ENR 1.6-N - Hat Yai SSR Station Coverage at 3000 FT



## Area of Theoretical SSR Coverage

## Figure ENR 1.6-O- Phuket SSR Station Coverage at 2000 FT