Bundeswehr
Wir. Dienen. Deutschland.

Mode N – Potential / Military Requirements

ICAO EUR/MID Radio Navigation Symposium (Antalya, 6-8 February 2024)

unclassified

Mode N

Mode N

Concept draft by DFS

Systemarchitektur - Mode N Bodenstation

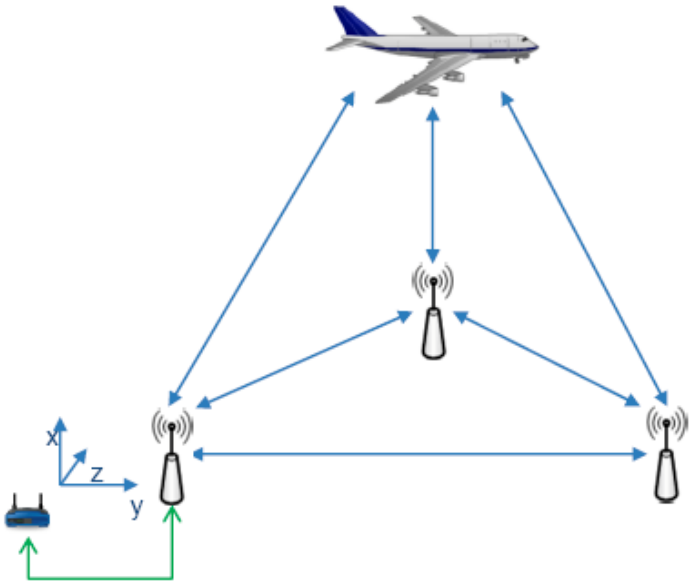
- Sichtverbindung zu anderen Bodenstationen
- Datenanbindung
- Abgestrahlt wird Mode N Squitter:
  - Position
    - Latitude: ±90°

      $\frac{\pm 90°}{2^{24}} = \pm 0{,}02'' \mathrel{\widehat{=}} \pm 59{,}64\ \text{cm}$

    - Longitude: ±180°

      $\frac{\pm 180°}{2^{24}} = \pm 0{,}04'' \mathrel{\widehat{=}} \pm 1{,}193\ \text{m}$

    - Höhe: 0 m - 4095 m
  - ID (drei Buchstaben A-Z)
  - Zeitoffset



Source: [Marquard2015]

Mode N

Potential:

- A-PNT, Replacement DME / TACAN, (VOR)
- „On-Board“-Integration into SSR-Transponder
- Efficient usage of L-Band
- Relais-functionality **air-air**
- Passive on-board operation
- Spoofing resistance
- Integrity monitoring
- Selective availability
- Dissemination of Time

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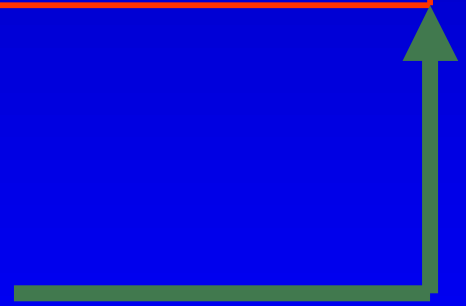
Military Requirements

Mode N - mil

Critical problems

- Synchronisation
- Protokol, Encryption
- Signal acquisition, Processing
- Robustness, Security



- Military Requirements

Mode N - mil

Military Requirements

- Passive on-board operation
- Spoofing resistance — Encryption
- Integrity monitoring — Encryption, Monitoring
- Selective Availability — Encryption, Key-management
- Robustness — Frequency Standards, Power reserve
- Synergies with other systems (IFF, ...) Enquiry
  mil. Data channel
- ? ? ?

Your Contact

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Literature

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[Madritsch2019] Madritsch, F., APNT Mode N - mil, AB-201901 *Abschlußbericht E/E610/IG007/FF037*, WTD 61, Manching, 2019.

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