Sharing Experiences @ 50+ Years of PII Conference Eindhoven

High-Altitude Platform Systems (HAPS) as complement to Communication Satellites

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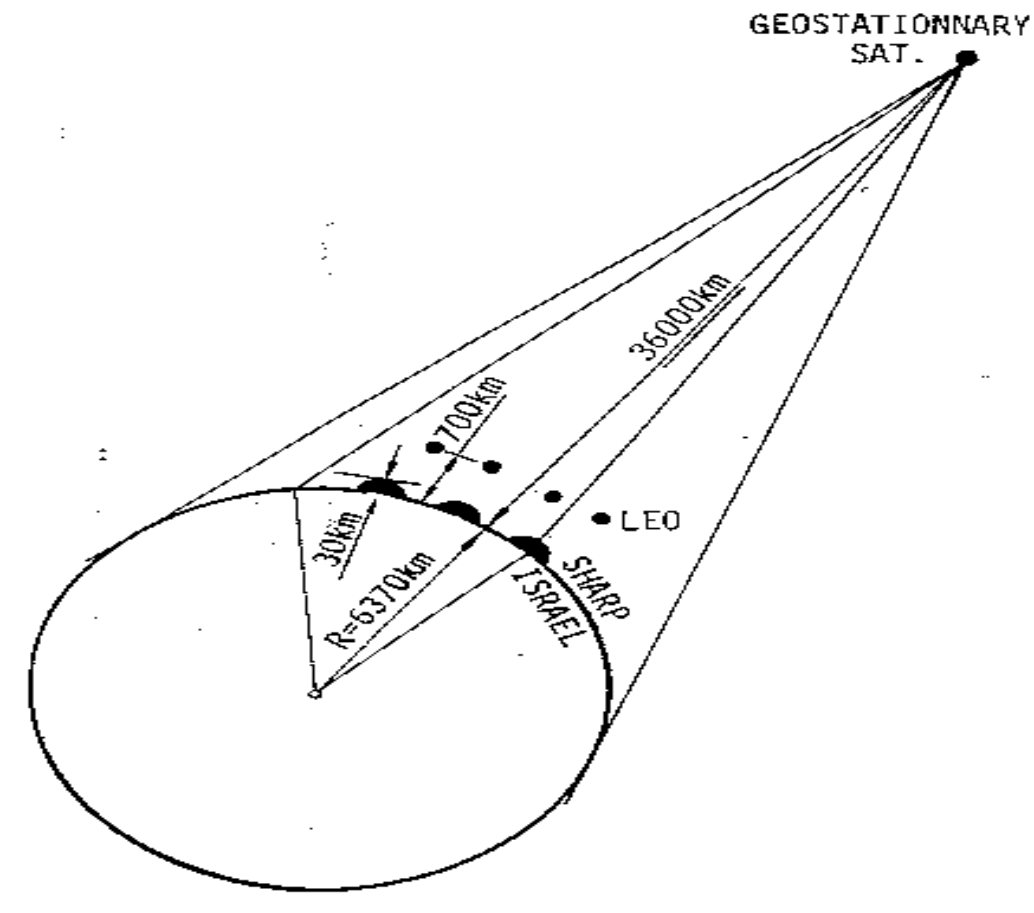
Introduction

- Summary of main activities from PII-HUIZEN
- Control-RADAR
- Radio Communication and Especially Satellite Communication and HAPS

Stratospheric Quasi-Stationary Platforms (HAPS)

GEO Sat.



Comparison between GEO, LEO and HAPS for radio systems

World Map of Stratospheric / HAPS Activities

HAPS Main Applications.

- Radio Communications
- Cellular 4G

HALO system

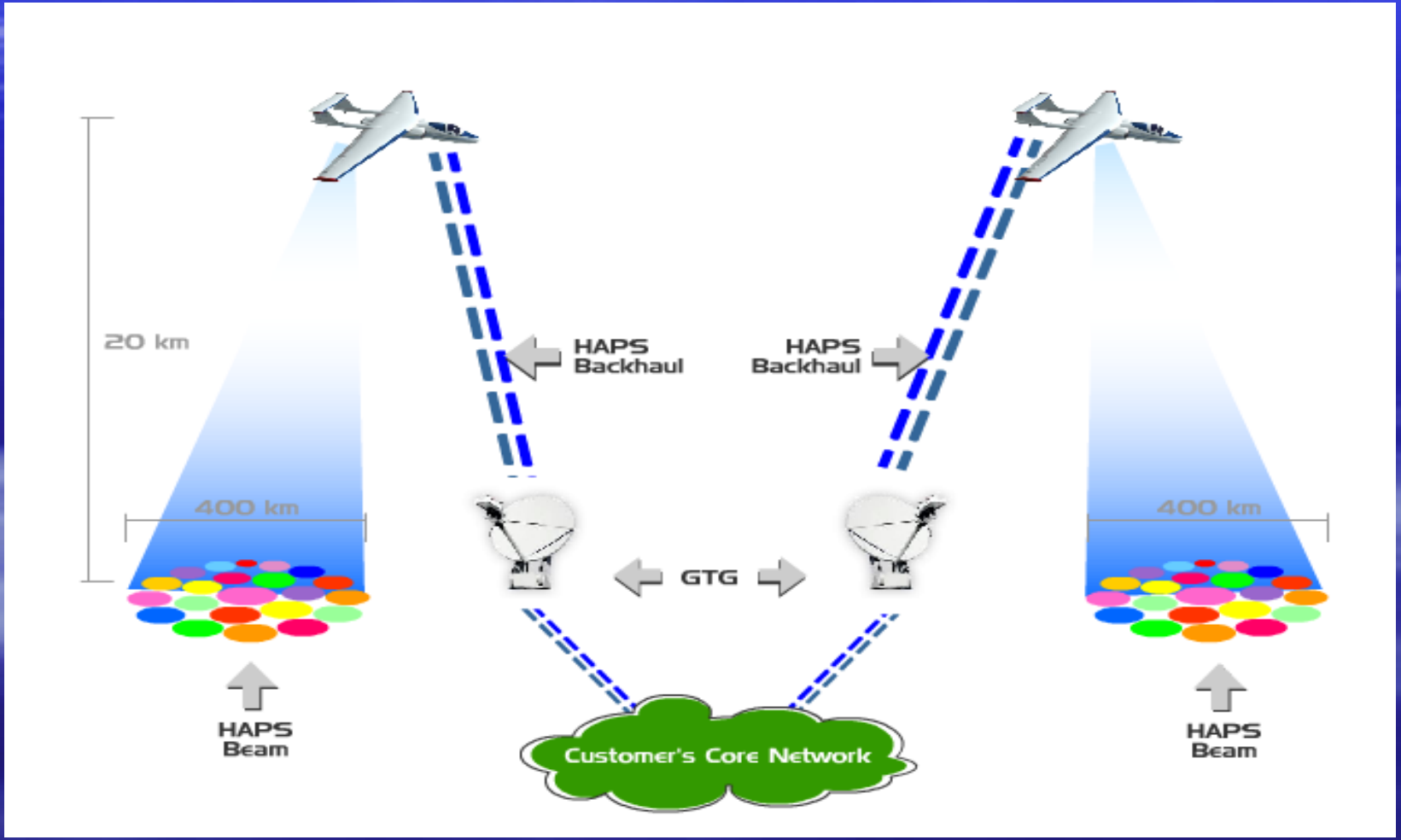
- High Altitude Long Operation
- Future Performance:
  - Manned aircraft
  - 18 Km height

STRATALITE

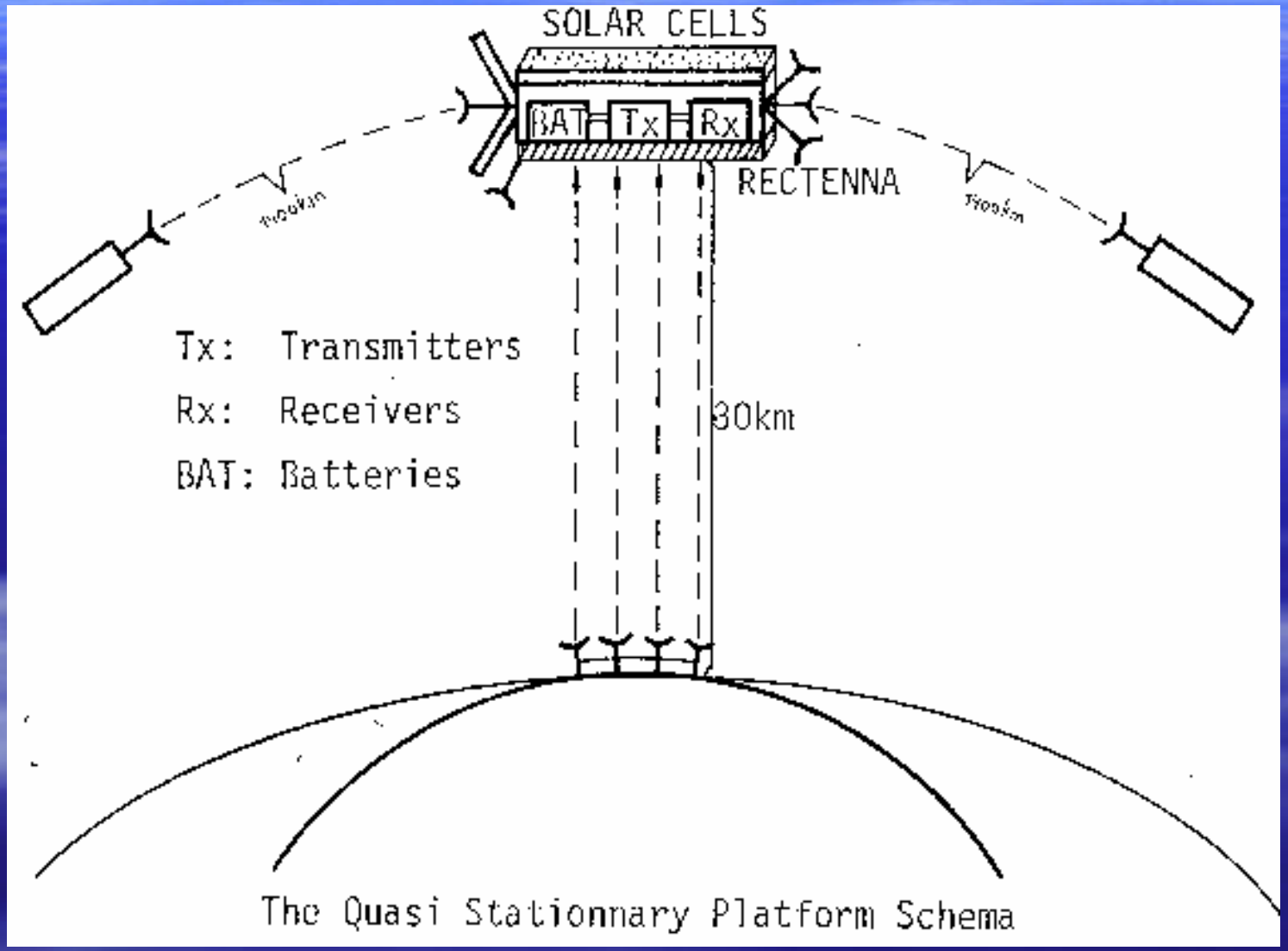
(Globe Tel communication corporation)

- High Altitude Air Ship intended to replace cellular phone Towers. Scheduled for launch on 2009.
- STRATALITE Performance and Specifications:
  - Cruise altitude 20Km
  - Solar cells powered
  - 800,000[km^2] LOS
  - 1400 Kg payload
  - Maximum duration 18 months

HAPS Cellular Radio Network



SQ-SP Schema


SOLAR CELLS
BAT
Tx
Rx
RECTENNA
Tx: Transmitters
Rx: Receivers
BAT: Batteries
30km
The Quasi Stationnary Platform Schema

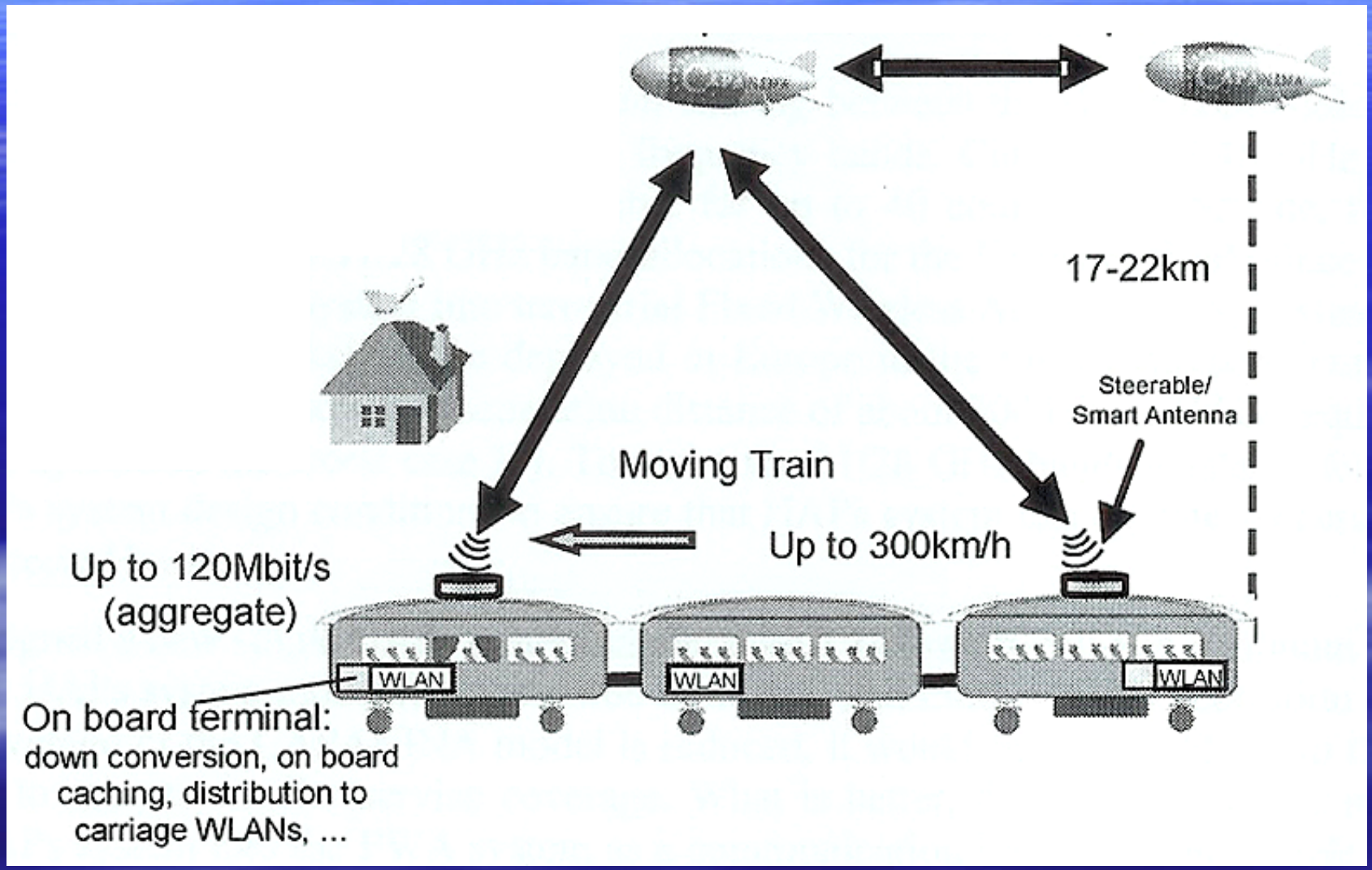
Link Budget Comparison

	h(km)	d(km)	$20\log d(dB)$	$Pr_i(dBm)$	ΔA
Geostationnary Sat.	36000	40000	92	-136	-
Leo Sat.	800	1000	60	-104	32dB
Stratospheric Platform	21	40	32	-76	60dB

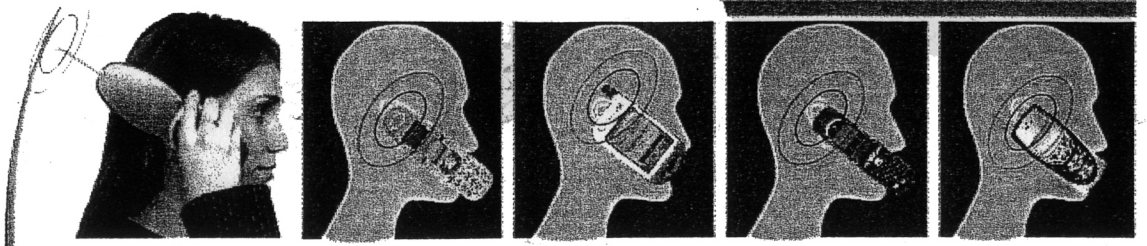
$$P_{(r)(dBm)}\ (EIRP) = 30dBW, G_{r_{(dBi)}} = 10dB \qquad f = 12GHz$$

$$\therefore P_{r_{dBm}} = 30 + 10 - 62.5 - 21.6 - 20\log d = -44.1 - 20\log d$$

Potential applications of FBS multiplexing techniques to HAPS communication



R95- Transmission above the head

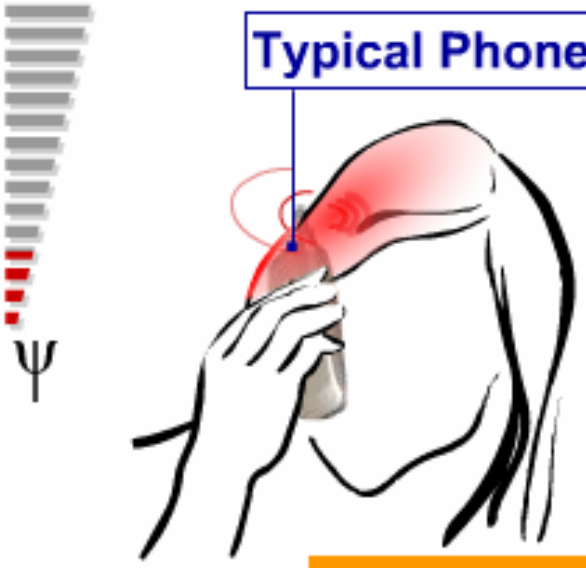


The R95 (patented mobile phone) consist...

US PATENT 6505036 • EP PATENT 1103086

Transmission above the head

Transmission TO the head



The R95 concept is applicable to all cellular phone systems and frequencies. SafeCom provides manufacturers with an economical method for improving their current phone models without changing the electrical circuitry.

BACK

A Common Hornet

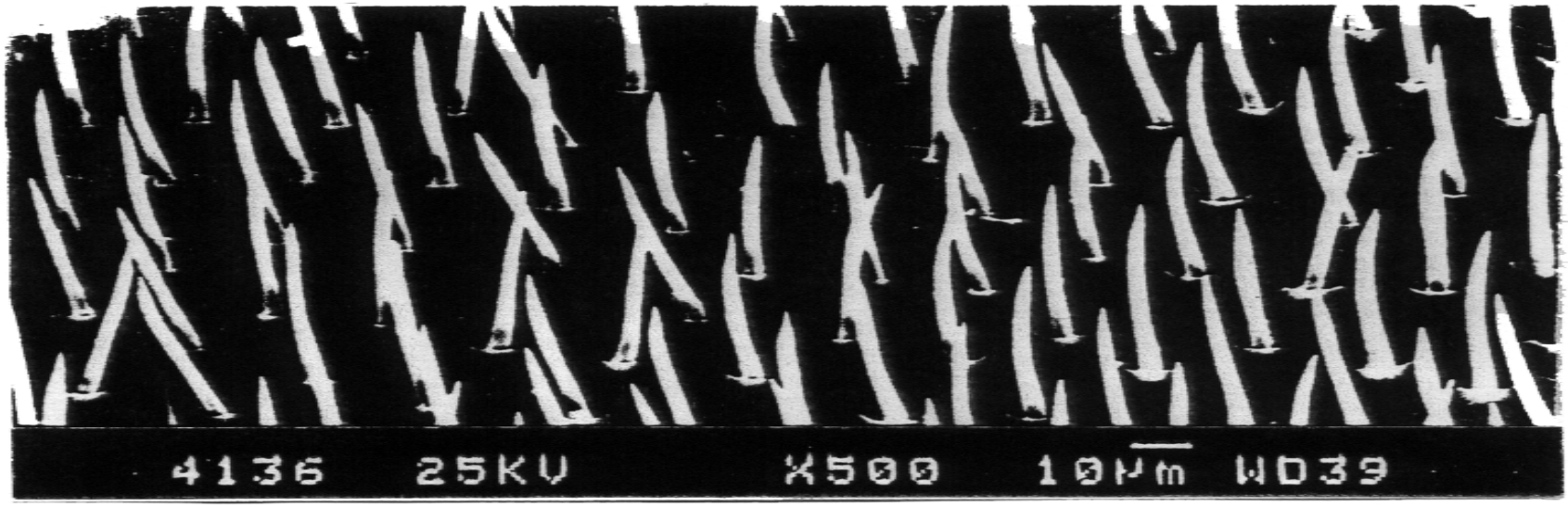


Figure 1. The denser phased array. As can be seen the spikes are about 55 μm long and at 20-25 μm distance from each other. Those spikes were photographed worker hornet on abdominal segment.

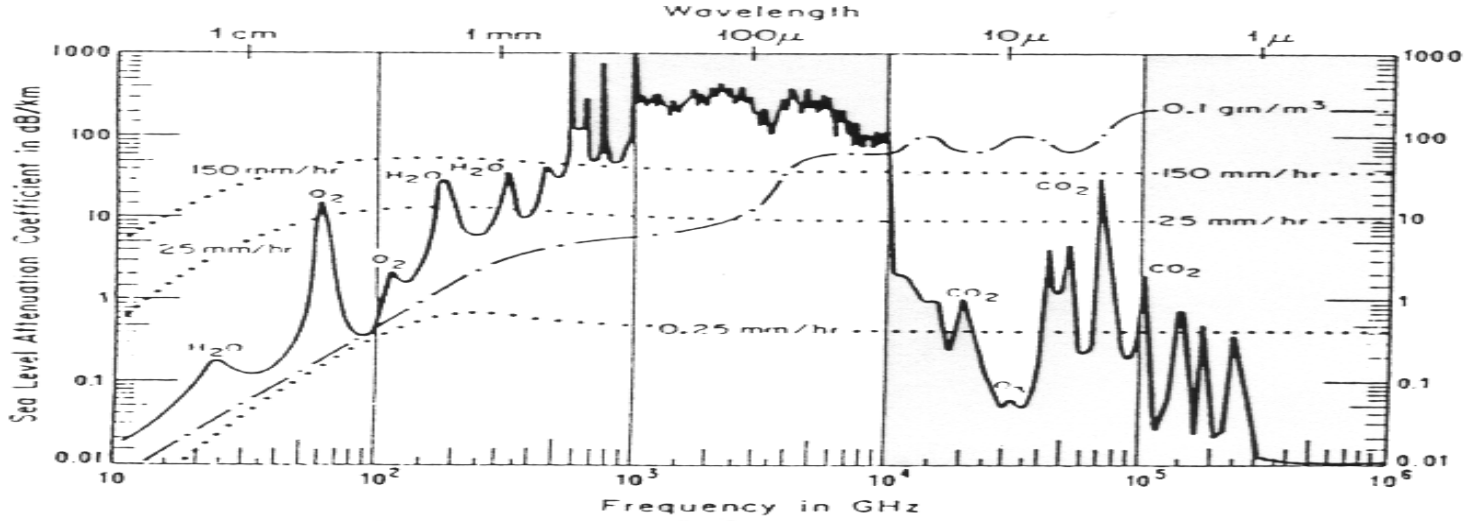


Figure 2. — Sea level attenuation coefficients, in decibels/kilometer, versus frequency for: the gaseous atmosphere (continuous line curves for 20°C temperature and water vapor density of 7.5 gr/m^3), clouds or fog (the dot–dash curve for water droplets 0.1 gr/m^3), and various rainfall rates (the dotted curves).

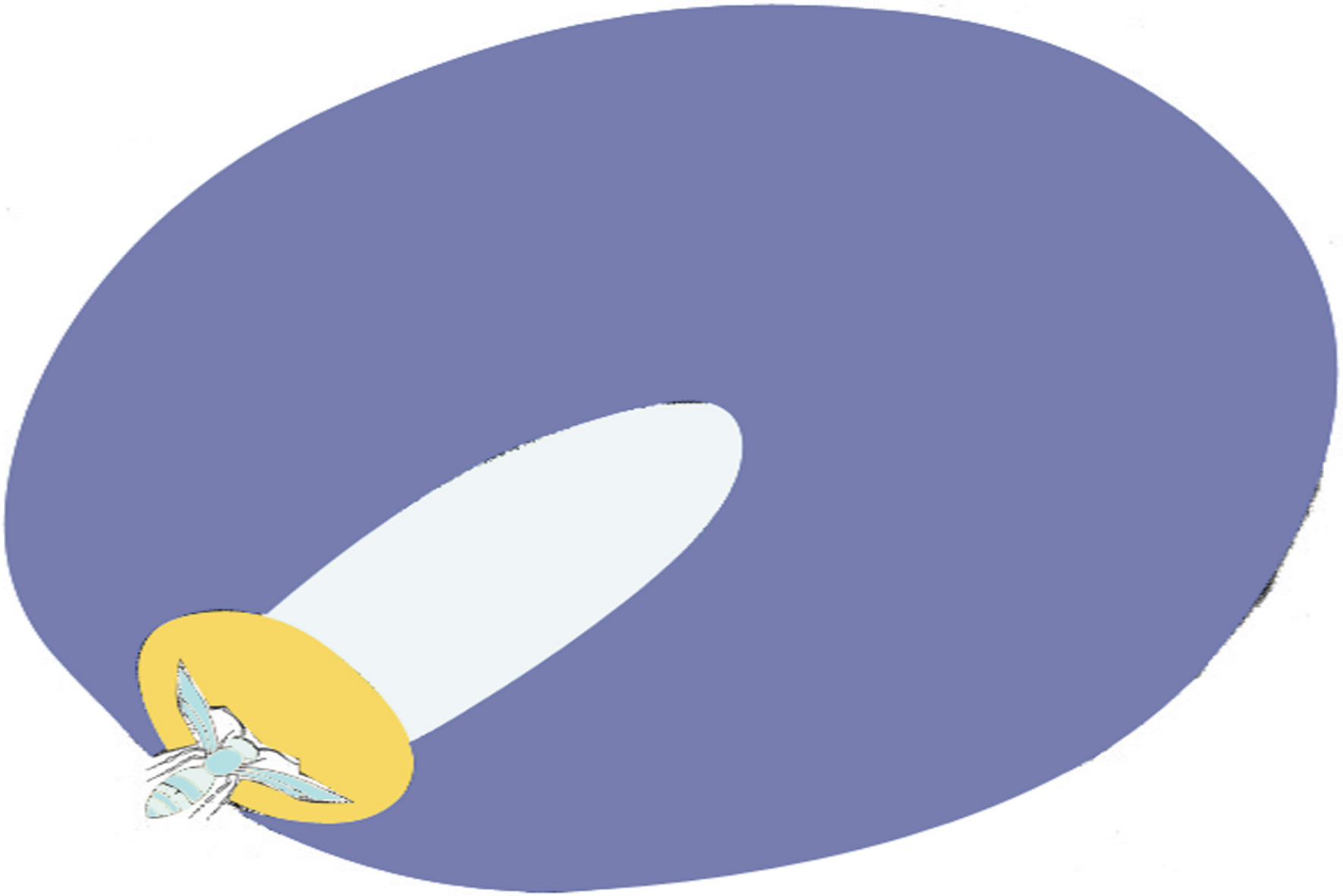


Figure 3. Three Mode Tracking Mechanism of Hornets Natural RADAR systems.

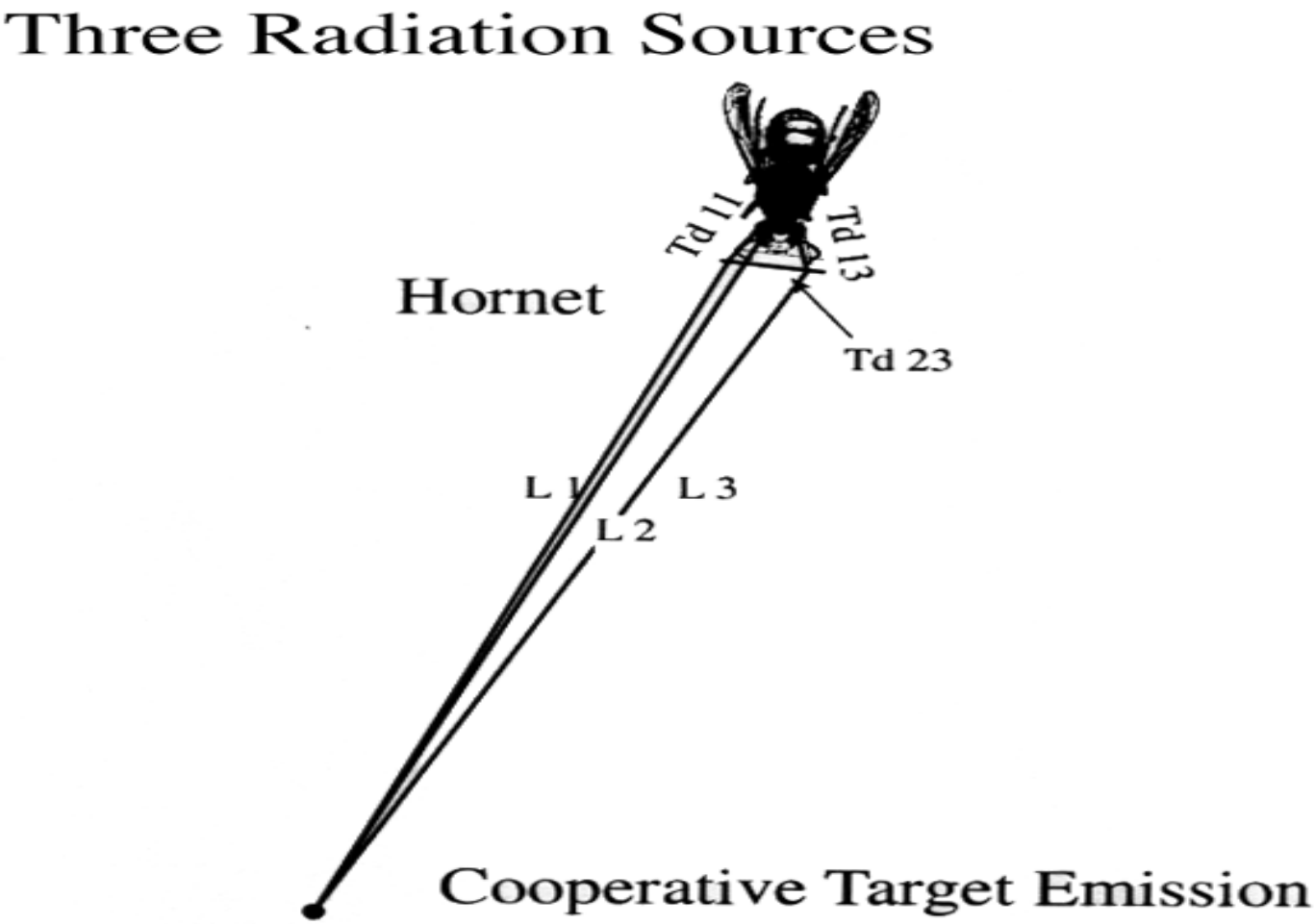


Fig. 4. The Hornet Direction Finding Technique for Remote Target Detection and Localization.

Conclusions

- A Lot of Interesting R&D Tasks Still to Do

Conclusions