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**COBHAM**

The most important thing we build is trust



**AEROSPACE AND SECURITY DIVISION**

- Aerospace Communications
- Antenna Systems
- Commercial Systems
- SATCOM
- Tactical Communications and Surveillance



**DEFENCE SYSTEMS DIVISION**

- Defence Electronics



**MISSION SYSTEMS DIVISION**

- Aviation Services
- Life Support
- Mission Equipment

## Wide Bandwidth (>24kHz) HF Antenna for Vehicles on the Move



# Cobham Antennas Dourdan



- In the Paris suburb / Close to Orly Airport
- 6000 m<sup>2</sup> over 2 buildings / 4 outdoor measurement range (150, 35, 28, 15 meters)  
+ anechoic chamber
- Full Integrated operations : R&D, Sales, Production
- In the HF business since the 90's (Ground fixed stations, naval and vehicles)
  
- Growing production capacity (More than 17,000 antennas will be produced in 2014)
- Innovation with French Universities (Metamaterials, Magneto-dielectrics, multi-functions, conformal antennas...)



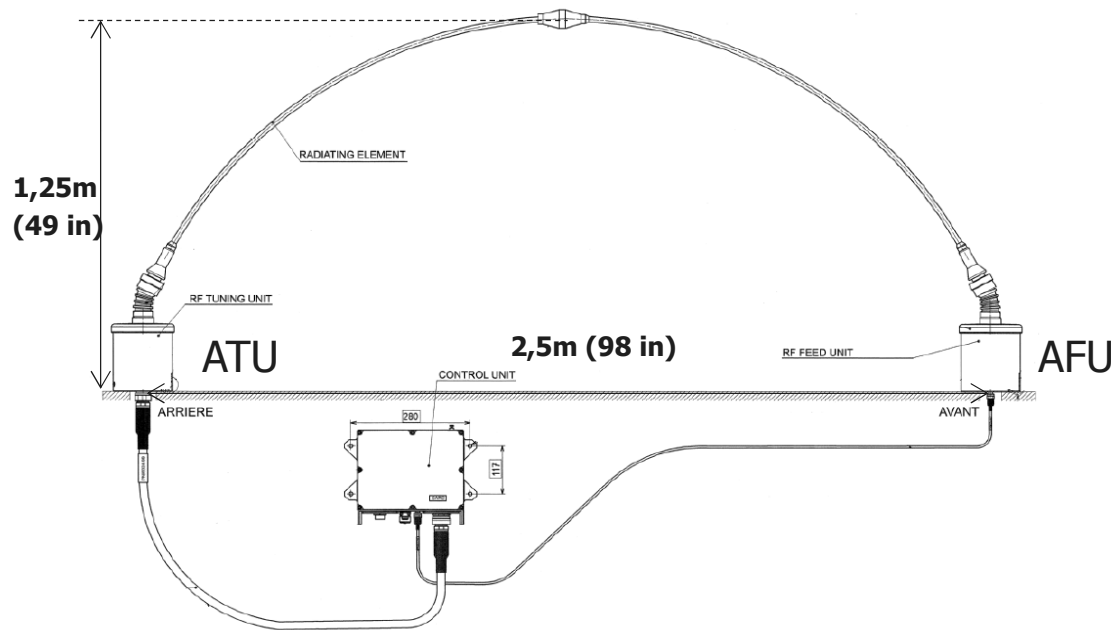
# Wide Bandwidth (>24kHz) HF Antenna for Vehicles on the Move



- In order to support a growing market demand we are working on a WB-HF “On the Move” antenna
- To reduce the time to market, we decided to re-used proven technologies, as much as possible, based on our half-loop (Réf. 3190-99) antenna
- We consider the half-loop as the best compromise between performances and size constraints, particularly desired by our Customers for OTM solution
- Our development plan:
  - ☑ December 2013: design simulation
  - ☑ **Today: Antenna mock-up**
  - ☑ Working prototypes early 2015
  - ☑ TRL6 product mid-2015
- Targets:
  - ☑ Achieve same antenna characteristics as current product (3190-99) + Wide Band capabilities (>24KHz)
  - ☑ Get a solid design for every kind of vehicles
  - ☑ Get a reasonable cost thanks to re-using many existing technologies

# Wide Bandwidth (>24kHz) HF Antenna for Vehicles on the Move

- Half-loop antenna design with “On the move” capabilities
- Dimensions:
  - ☑ Height: 1,25 meters (49 inches)
  - ☑ Distance between ATU and AFU: 2,50 meters max (98 inches max)
- Frequency range: 2-30 MHz
- VSWR in the frequency range: <2,5 (relative to 50Ω)
- Maximum admissible RF power: 150W +1dB PEP



# Wide Bandwidth (>24kHz) HF Antenna for Vehicles on the Move



- Bandwidth measurement on the Cobham WB-HF antenna mock-up (objective  $\geq 24\text{KHz}$ ):
    - ☑ 24 Khz Wideband Operation: from 2 to 30 Mhz
    - ☑ Extended Wideband HF (EWBHF): from 3 Mhz to 30 Mhz
- ↪ according BW at F0 -3dB (KHz)

Frequency (MHz)	BW at F0 -3dB (KHz)	BW at VSWR = 3 (KHz)	VSWR at F0	Config.
2,00	≈ 33,00	≈ 39,40	1,30:1	WBHF Hardware 1
3,00	≈ 66,50	≈ 27,32	2,20:1	WBHF Hardware 2
4,00	≈ 118,50	≈ 36,46	2,50:1	
5,00	≈ 49,00	≈ 41,46	1,47:1	Std. Hardware
6,00	≈ 95,00	≈ 59,90	1,32:1	
7,00	≈ 148,75	≈ 91,12	1,26:1	
8,00	≈ 197,50	≈ 137,56	1,28:1	
10,00	≈ 337,50	≈ 100,00	1,06:1	
15,00	-	≈ 277,88	1,17:1	
20,00	-	≈ 853,88	1,40:1	
25,00	-	≈ 1696,75	1,61:1	
30,00	-	≈ 3639,00	2,45:1	

# Wide Bandwidth (>24kHz) HF Antenna for Vehicles on the Move



- The objective of our new WB-HF half-loop antenna is to improve bandwidth up to 24KHz and keep the gain and performances of the COBHAM 3190-99 actual antenna.
- Results presented just below are first result based on the mock-up of the antenna. We are still working on it and improve hardware to get expected gain level.

Frequency (MHz)	Gain relative to 3190-99 COBHAM antenna	Config.
2,00	≈ Gain 3190 - 1,5dB < Gain WBHF Ant. < Gain 3190	WBHF Hardware 1
3,00		WBHF Hardware 2
4,00		
> 4,00	≥ Gain 3190	Std. Hardware

Frequency (MHz)	Attenuation on the Gain at F0 +12KHz and F0 -12KHz
2,00	-1,84 dB
3,00	-0,54 dB
4,00	-0,19 dB

# Wide Bandwidth (>24kHz) HF Antenna for Vehicles on the Move

**COBHAM**

To resume...

- 2015
  - ☑ OTM antenna solution introduction for the WB-HF Market
  - ☑ Gain improvement by working on the hardware
  - ☑ Communicate tests with Perseus system
  - ☑ Finalise Qualification
  - ☑ Specify the frequency range for the Extended WB-HF capability
- Use Ground WB-HF antennas technologies to Naval Market
- Propose a wide range of radios interfaces

