

TWENTYNINE PALMS LTE DEMO

SCOPE

This document captures the LTE network specific elements of the Twentynine Palms LTE demonstration to the US Marine Corp.

DEMO OBJECTIVE

Demonstrate Cubic's LTE capability to the US Marine Corp as well as Cubic's ability to integrate and interoperate with existing systems and infrastructure.

TECHNICAL REQUIRMENTS

Shall = objective

Should = target

Requirement	Description:	Comments:
CD1	The demonstration shall comprise 4 x '4G network in the box' using BlackWolf and Attocore or Quortus embedded EPC	Attocore is work in progress. Quortus does crash. Blackwolf still in development, B28 variant does not yet exist
CD2	Each 4G 'network in the box' shall be linked to each other using either Cambium point to point units or ubiquity point to point WiFi units.	Link range and drone movement must be accounted for
CD3	The deployment shall support inter network handover.	Complete.
CD4	The 4G network shall radiate in the spectrum band designated as B28.	FFC application in progress – will take 8 weeks min B28 BlackWolf needs to be built
CD5	Each 4G network shall radiate on a specific and unique EARFCN.	FFC application in progress – will take 8 weeks min B28 BlackWolf needs to be built
CD6	2 of the '4G network in the box' shall be mounted to a tethered drone at a height of no more than 100m and using omni-directional antennas	Integration still underway
CD7	2 of the '4G network in the box' shall be mounted to a mast at a height of no more than TBDm	Mast height and type information is not yet available
CD8	For the 2 mast mounted '4G network in the box' systems, the antenna shall be: LNX-8513DS-VTM	Order
CD9	The antenna feeder cables shall be: https://www.fairviewmicrowave.com/n-male-7-16-female-cable-0.250-formable-low-pim-coax-fmc0136925-100cm-p.aspx	Order

NETWORK PLANNING

Both the drone and mast shall be located at location: 34 24.326 N, 116 15.667 W

With an antenna direction of: 280 deg

Using this location and the antenna: LNX-8513DS-VTM deployed at a height of 18m, the coverage simulation suggests a coverage pattern illustrated in Figure 1a. The coverage pattern for a tethered drone base solution (deployed a height of 80m) is illustrated in Figure 1b

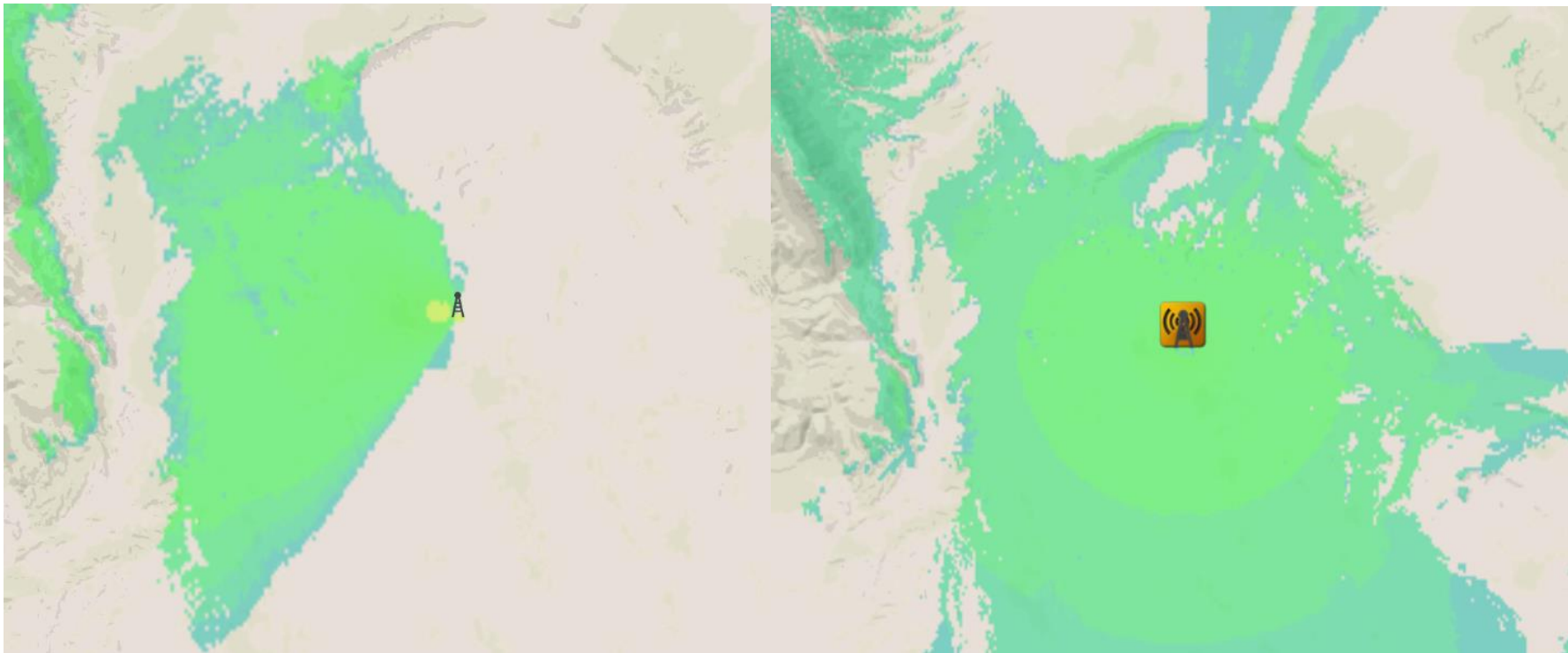


Figure 1: a) Directional antenna coverage simulation b) Drone at 80m with omni directional antenna

LTE EQUIPEMNT

DE1	2 of B28 BlackWolf with integrated EPC plus 2 spare (mast mount)	B28 BlackWolf needs to be built	TBC
DE2	2 of B28 BlackWolf with integrated EPC plus 2 spare (drone mount)	B28 BlackWolf needs to be built – lightweight enclosure for drone	
DE3	4 of LNX-8513DS-VTM plus 2 spare	Antenna order (for 6 antennas) to be placed by 9/Feb/18	TBC
DE4	Drone antenna set	Antenna order (for 4 antenna sets) to be placed by 9/Feb/18	
DE5	https://www.fairviewmicrowave.com/n-male-7-16-female-cable-0.250-formable-low-pim-coax-fmc0136925-100cm-p.aspx	Order to be placed by 9/Feb/18	TBC
DE6	BlackWolf GPS antenna	Order to be placed by 9/Feb/18	

ROLES AND RESPONSIBILITIES

- Network Setup: Cubic/Marine Corp
- Network Operation: Cubic
- Equipment: Cubic (LTE), Marine Corp (ITESS)