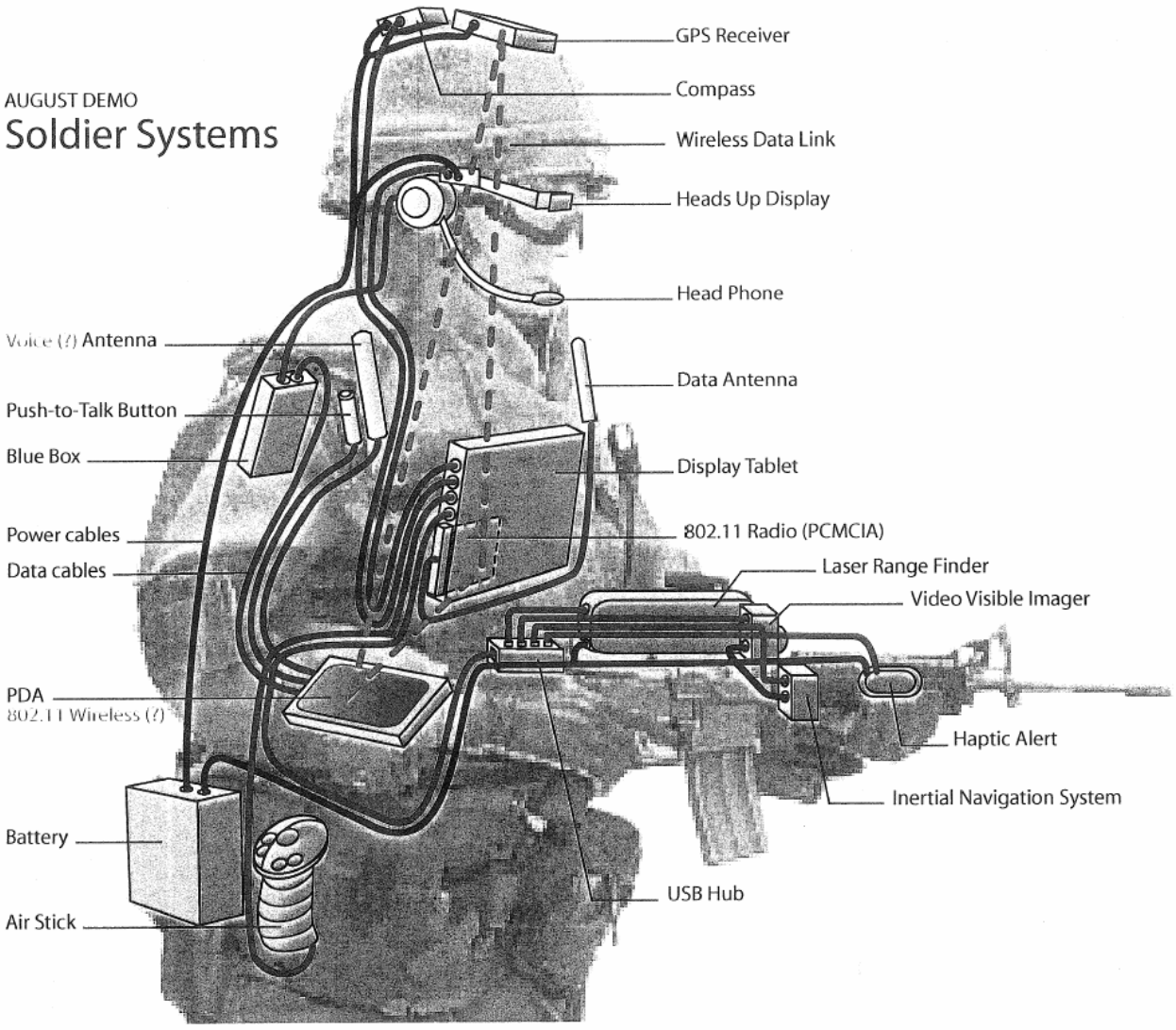
Army Transformation: Wireless Network Support to Horizontal Fusion

MAJ William L. Crowley,
Department of Mathematical Sciences,
USMA

ABSTRACT

Quantum Leap is a multi faceted experiment, with different agencies taking the lead in different programs, to test network-centric warfare operations. Army Research Laboratory (ARL) is responsible for the Warriors Edge program which consists of sending and receiving data from robots that will follow and support ground soldiers. In order for these devices to communicate to the ground soldiers, and for the soldiers to communicate with each other using various devices, a robust communications network is essential. Since army radios are not currently sufficient for the volume of data that must be transferred between all of the nodes, the ARL networking team turned to commercial of the shelf 802.11x wireless technology in order to ensure the overall success of the program. With this equipment, a wireless network was established with the necessary bandwidth, range and separation of data to ensure that all of the many assets in the scenario were able to effectively communicate in order to accomplish the Quantum Leap mission.

WARRIOR'S EDGE



COMMUNICATION NODES

Note: These systems will be able to talk to the soldiers via hard wire connections between the 802.11a and the 802.11 b/g WAP's

PDA Video Camera
on the 802.11b network

PACBOT's
on the 802.11b network.
capable of switching from
ADHOC to infrastructure
Mode via software commands

Robots
on the 802.11b network.
trying to upgrade to Netgear
WGE101 bridges So they can
operate on the 802.11a network

These Wireless Access Points (WAP) will be mounted in cases at designated positions (the AP 2000's) and in areas as required for coverage

Proxim AP 2000 WAP
Proxim 802.11b/g and
Proxim 802.11a Cards inserted
(With this configuration, clients
will be able to communicate with
802.11a or 802.11b/g

Netgear A and G
WAP's

MULE:
Equipped with a Netgear 802.11A/B/G card with an antennae and a Proxim 802.11b/g card with a 100 mw amplifier and an antennae

Netgear wireless card
WAG511 802.11a/b/g
Modified for externally
Mounted antennae

The MULE will communicate with a Netgear WAP located In the church steeple. The
WAP will also have a 100mw amplifier and an antennae. The network will be channel 1 on the 802.11 g network. This will in turn communicate with SPAWAR in Charleston, SC via a secure tunnel from the trailer that is hardwired into the WAP at the Church's steeple.

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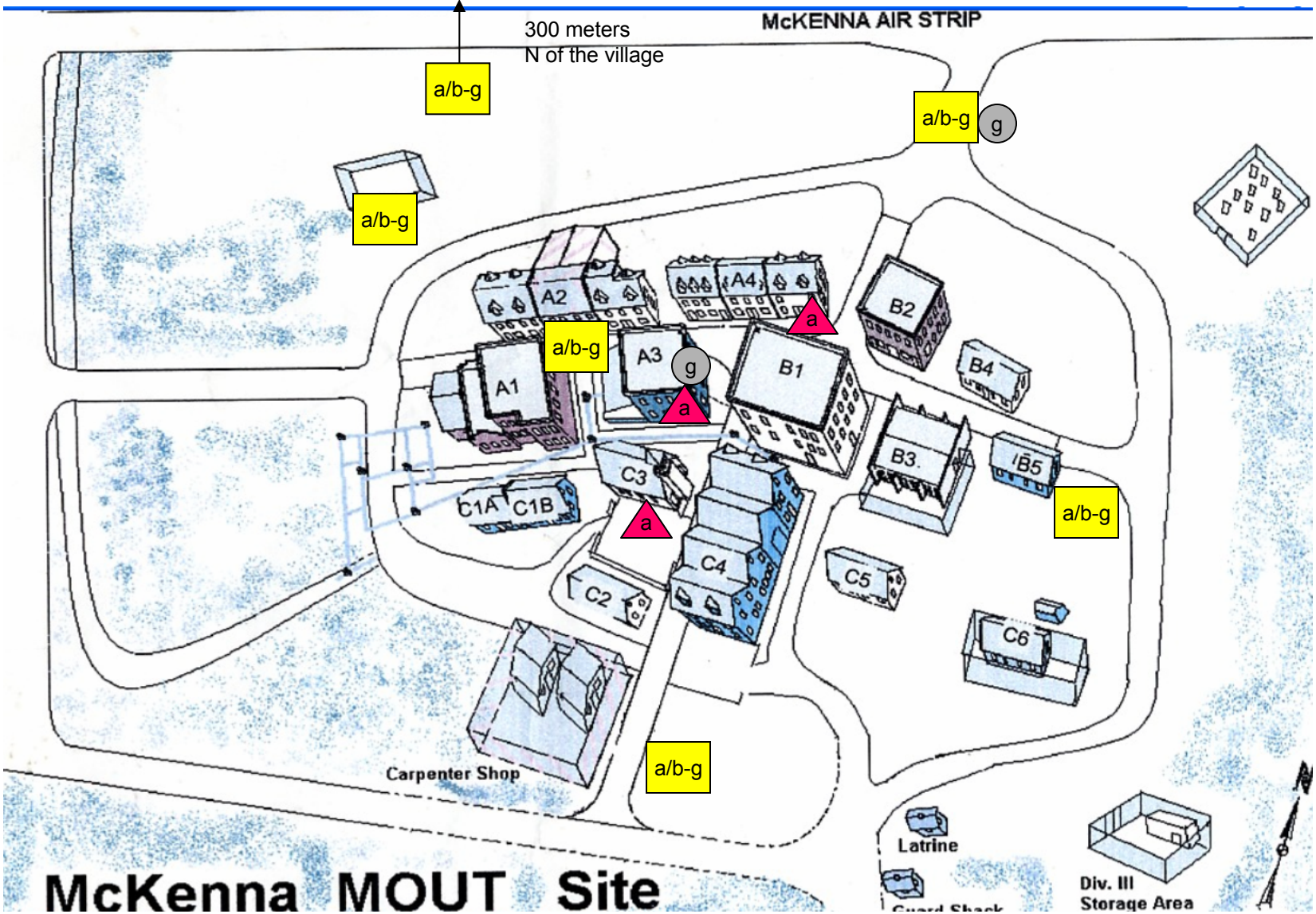
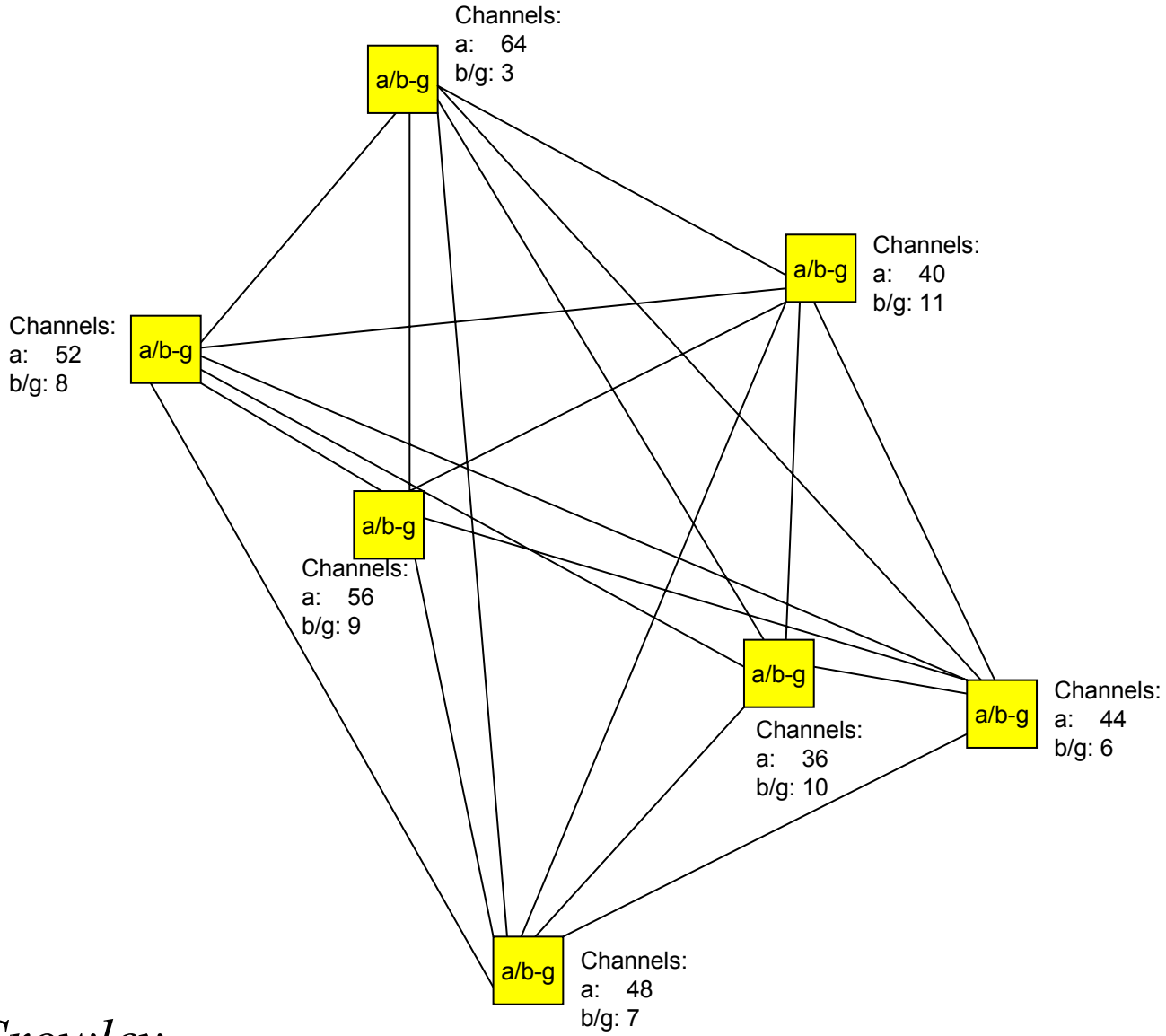
McKENNA MOUT SITE EXISTING NETWORK

McKENNA MOUT SITE PROJECTED NETWORK



Access points: a/b g a

NETWORK DIAGRAM



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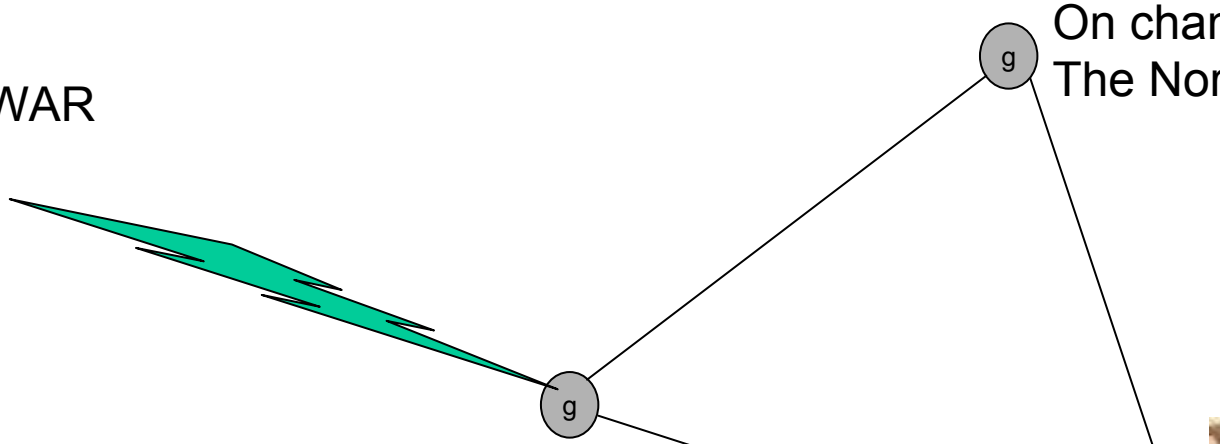
NETWORK DIAGRAM FOR THE MULE

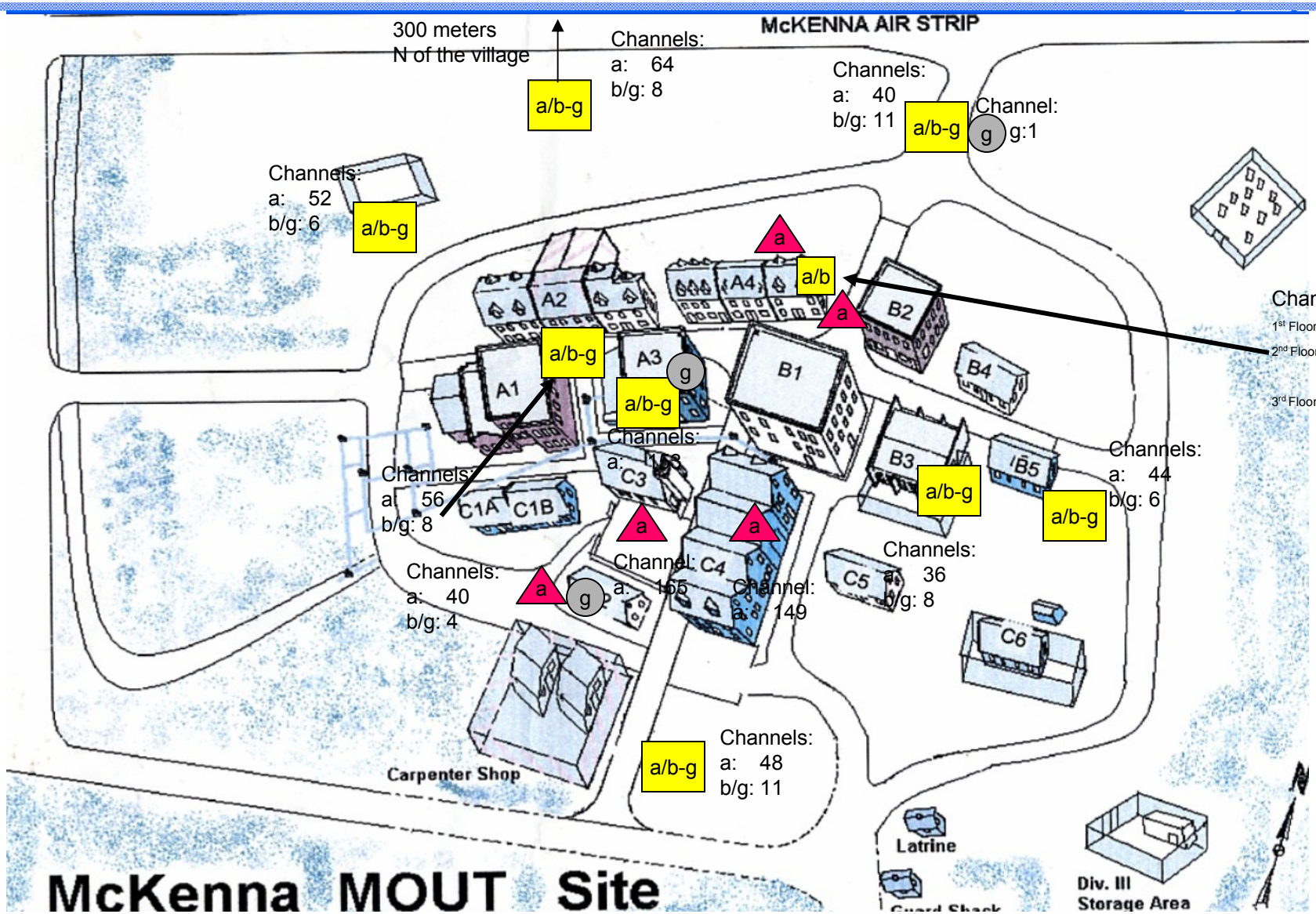
802.11g Access point
On channel 1 (Loctaed on
The North tower)

SPAWAR



802.11g Access point
On channel 1 (Located
In the church steeple)

McKENNA MOUT SITE NETWORK



OVERHEAD PHOTO FOR DEMONSTRATION WIRELESS NETWORK

Figure 5. Access Point Locations

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CONCLUSION AND ISSUES

- Coverage weak points
- Full coverage / free roaming
- Switching delays
- Acceptable shortfalls / successful network
- Future Quantum Leap II

QUESTIONS?

POC FOR THIS BRIEF

MAJ BILL CROWLEY

845 938 5931

AW3504@USMA.EDU