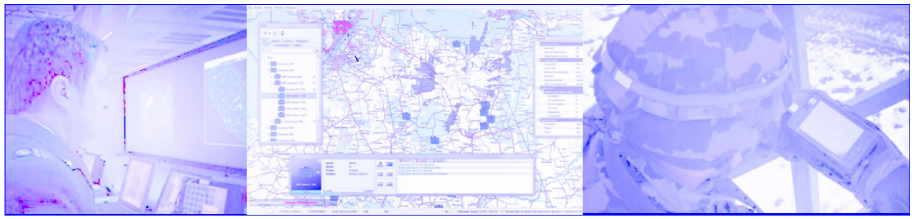

18th ICCRTS

(International Command & Control Research and Technology Symposium)

Institute for Defense Analyses

Degraded operational environment:
Integration of social network infrastructure concept in a traditional military C2 system

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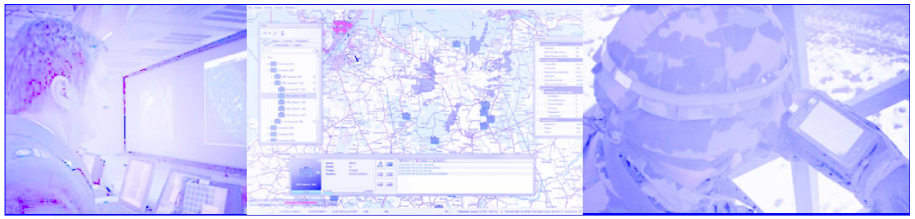

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AGENDA:

- CURRENT MILITARY OPS
- PARAMETERS
- C2
- DECENTRALIZATION
- REQUIREMENTS
- POSSIBLE SOLUTION
- SECURITY
- SIMULATION (SIM LABS)
- CONCLUSIONS

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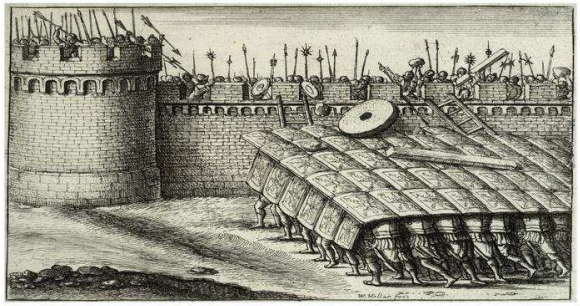
CURRENT MILITARY OPS

military organizations are usually to plan the use of Armed Forces in a space battle, using rules inherited from our recent past: the Cold War.



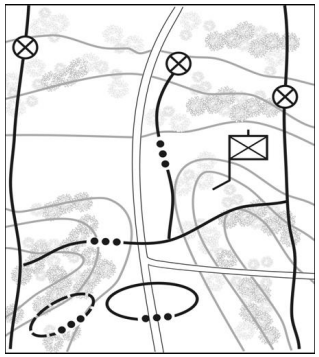
move on the ground moving troops, vehicles and equipments that need to be guided and managed through the key function of a military force: **Command & Control**.

where this function is not sufficient the risk is not handle own resources, driving through a failure

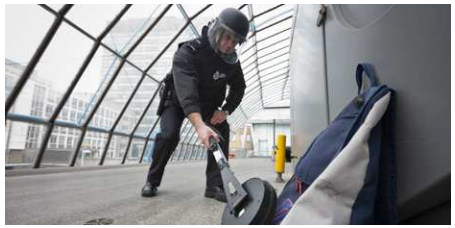
opposing forces must has a semblance of "**sustainable conceptual equality**" in order to compare two or more sides, to manage benchmarks, analyze power relations, product plans and predict opponent's tactics.

PARAMETERS

current military operations and scenarios are changed from the past, transforming them from open combat areas to "patchy" domains



terrorist actions are not only for environmental or cultural conditions.



Doctrinal evolution leads to consider towns as center of gravity for stabilization operation and where develop military operations.

Urban terrain
- Artificial obstacles
- contrast
- achieve concentration of power
- maneuver in tight space
- monitoring activities

Mapping territory
- absorb huge time, resources
- diverting attention from other ops
- **degrading C2 capabilities**

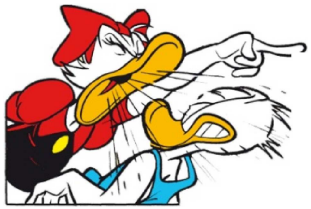
"humint" will allow forces gravitation and the use surgical weapon systems

COMMAND & CONTROL

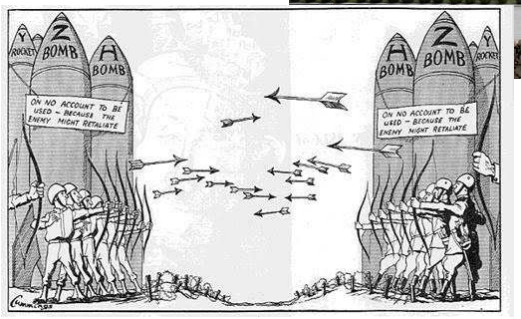
conceptual need for soldiers to identify a way to be connected to his C2 network

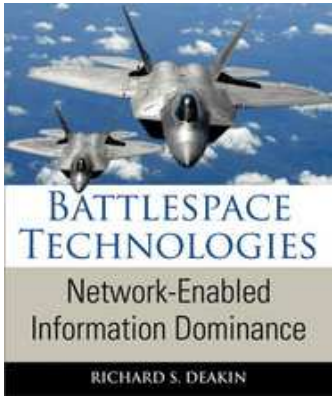
considering the possibility that network services could be unavailable, unreliable or having degraded performance

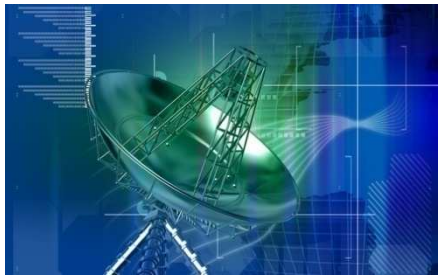
identify possible new communications and information capabilities to allow a sufficient orders/data transmission.



C2 system makes sense when we consider a standard military forces confrontation, with strategic denies of cyber space to the adversary.

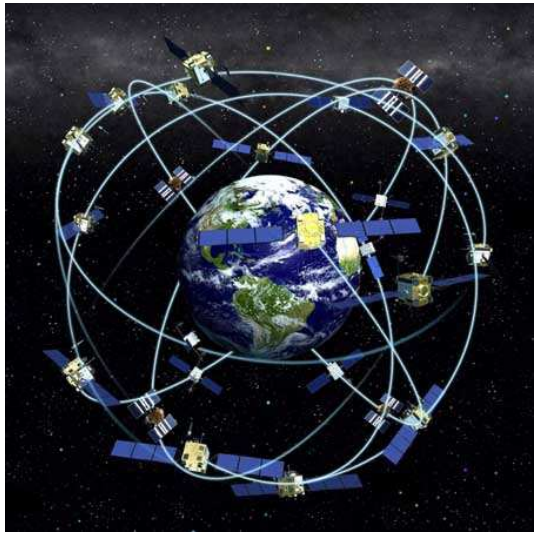






adoption of innovative information technologies that would enable information dominance.

Satellite communications and GPS today are force multipliers, providing wide coverage and enabling control over battlefields, supporting most of warfighting functions.



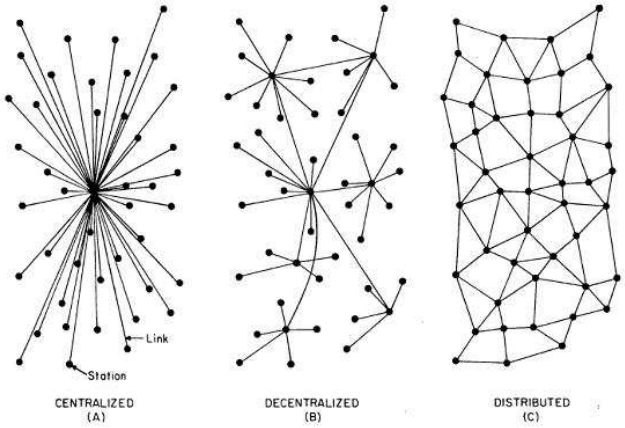
These capabilities can reduce uncertainty and suppress threats but they must be integrated in such a way as the adversaries find new ways to deny, disrupt, and degrade resources, satellite-based intelligence functions;

over reliance on SatCom should be considered a critical vulnerability, independently from the C2 in use.

The strongly asymmetric C2 confrontation exceeds all conventional stages, trying to "dislocate" the capacity of a conventional force until it becomes irrelevant, falling in the paradox of "David and Goliath".

DECENTRALIZATION

A classic hierarchical system of C2 is not designed to efficiently decentralize a decision-making process in a modern Support Ope



Decentralization: all leaders are most responsible; achieve local management and tactical missions.
Difficult in synchronization of actions at the operational level and difficult to achieve strategic targets.

Decentralization means physical, technical and operational isolation for certain missions and also isolation of chain C2.

C2 system oriented to decentralization and coalition activities tends to share faster more information with more users.

Last crisis teach what happen in a confrontation of two o more parties in a complete asymmetric environment

(i.e. Syria, Egypt, Libya crisis)

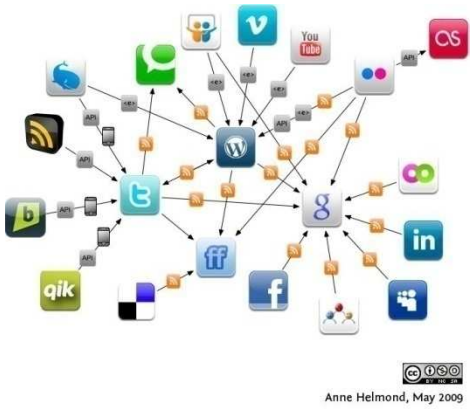
Vs

Emphasis of asymmetric environment

Enemy can destroy networks but cannot disrupt his own vital networks or exercise a global control over public networks.

In Afghanistan telecommunications sector have created in the last 5 years more than 60,000 jobs and one billion dollars of investment.

The deployment of standard military communication systems cannot be sufficient.



Mass of people can react to simple inputs using some networks “social”.

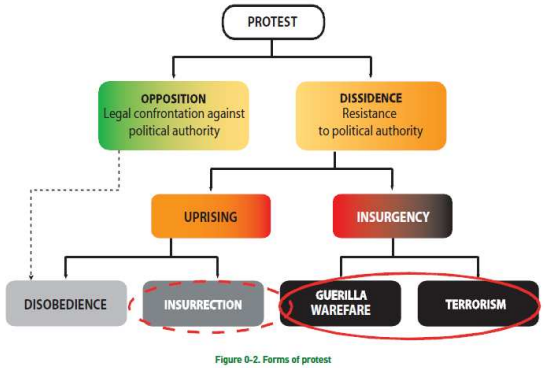


Figure 0-2. Forms of protest

latest generation of smart phones can use multiple frequencies bands.

Next operating environments will answer to a centralization and decentralization of commanders needs that should be able to use the best method that suits the operating situation

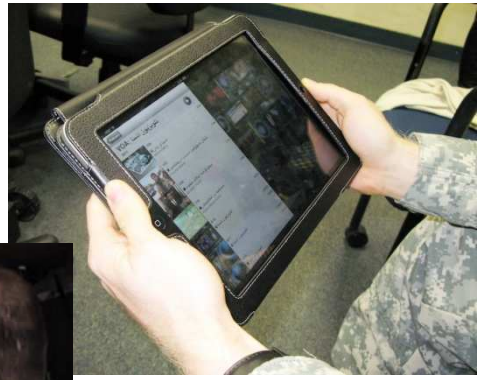
New technologies will make it easy to parallelize and integrate different architectures as C2 network and a social network-based.

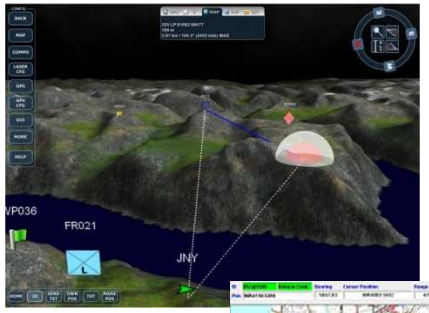
information flow, info access, type of mission, size and nature of the operation areas, capacity and training of personnel influence the achievement of mission and the degree of de/centralization of C2

REQUIREMENTS

The requirements for these needs can be identified in:

- Put the information in time;
- The sources of information must be controlled;
- Security of information;
- Absence of conflicts in information.



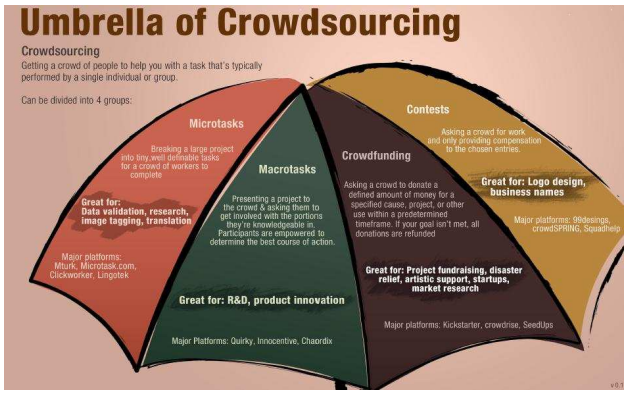


information management will assure:
- Capacity to bring the information quality in time;
- Knowledge, access and use of information;
- Tracking information and its origin;
- Use of common protocols for the exchange of information;
- Synchronization and scalability of information and data mining.

POSSIBLE SOLUTION

The answer can come from the integration of a traditional C2 system with:

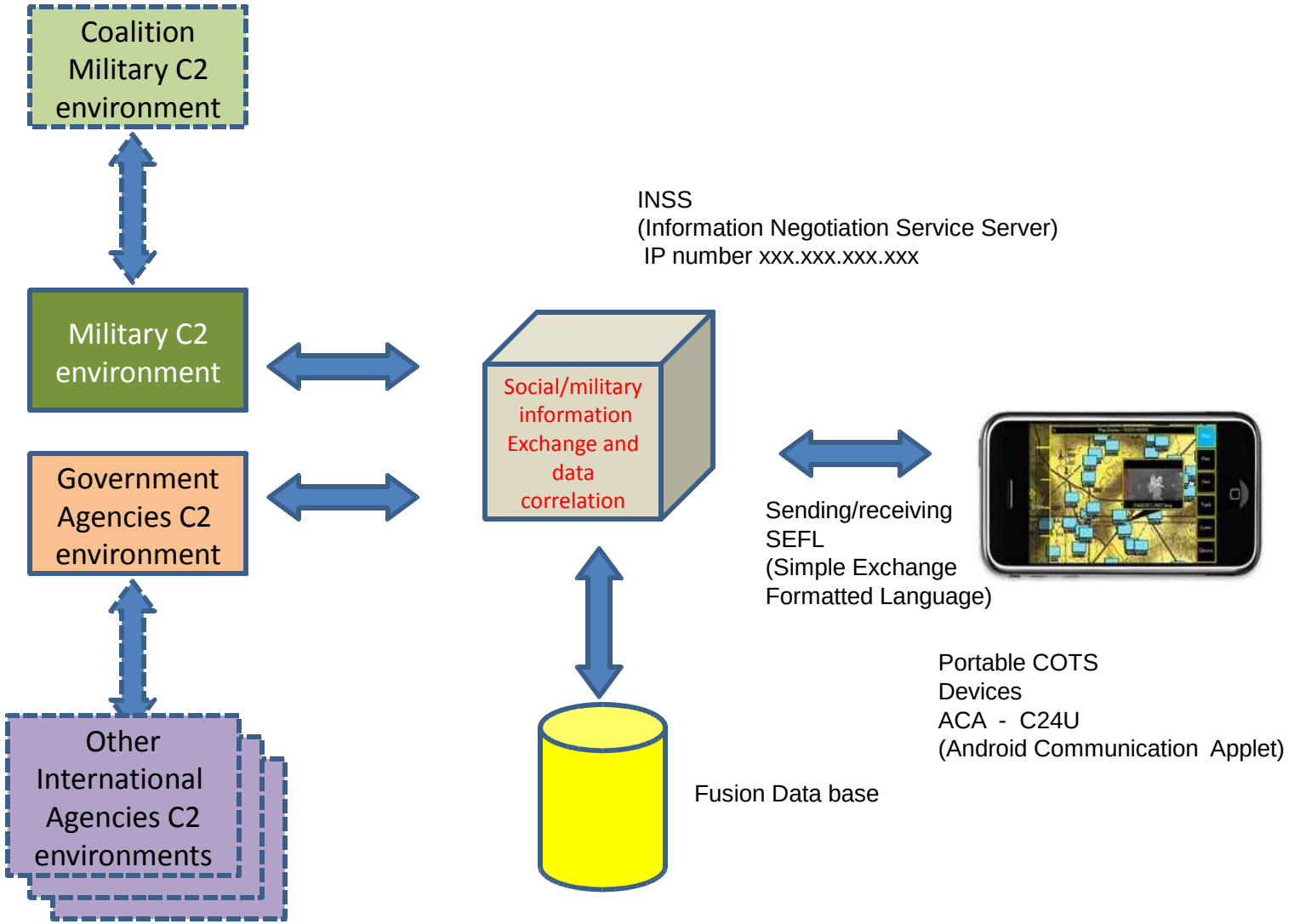
- a social network infrastructure concept;
- a simplify C2 system “applet” applied to COTS devices;
- a supporting concept like crowdsourcing philosophy but in a protected environment



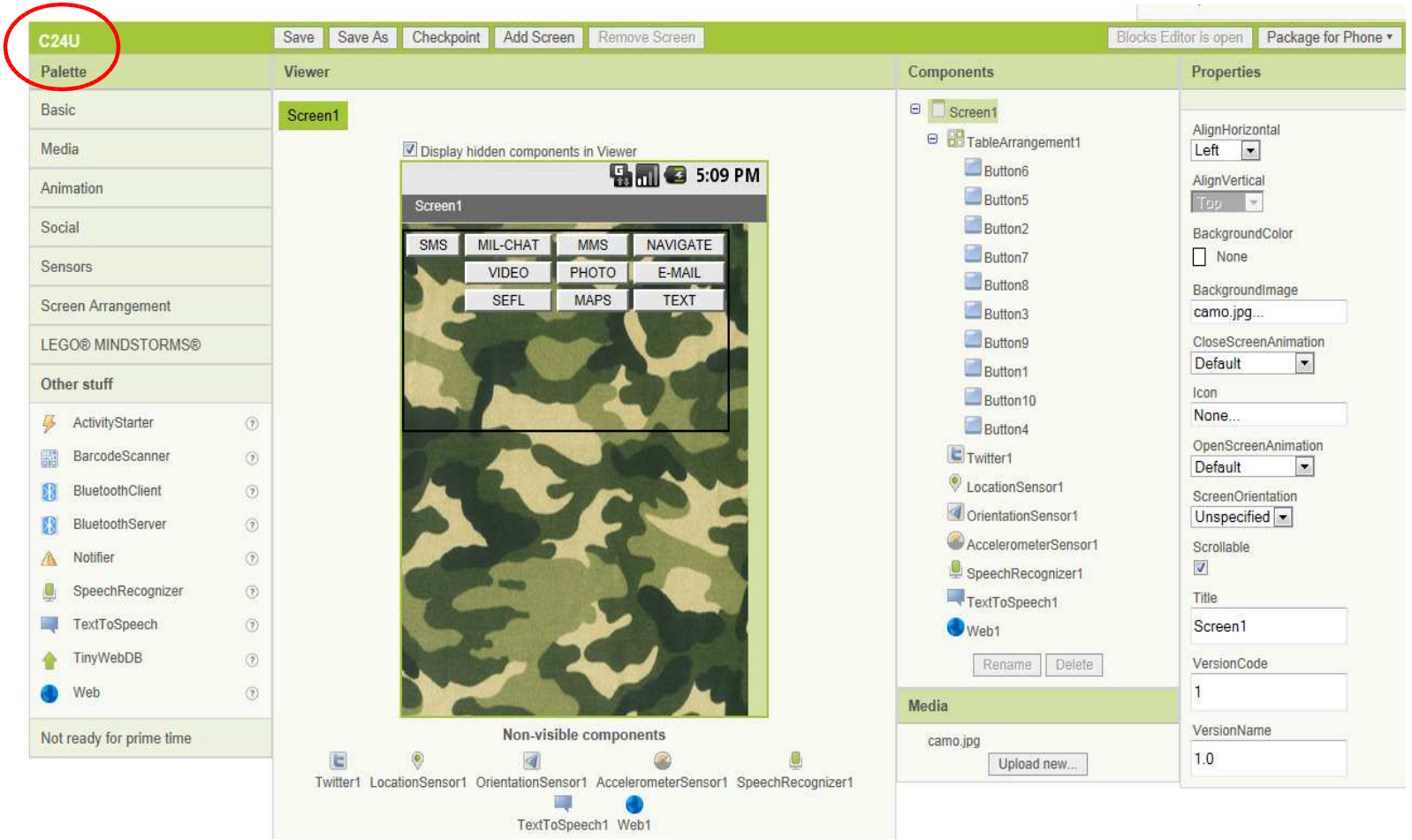
HOW TO INTEGRATE MOBILE COMMUNICATION TECHNOLOGIES AND BUSINESS NETWORKS IN TACTICS C2

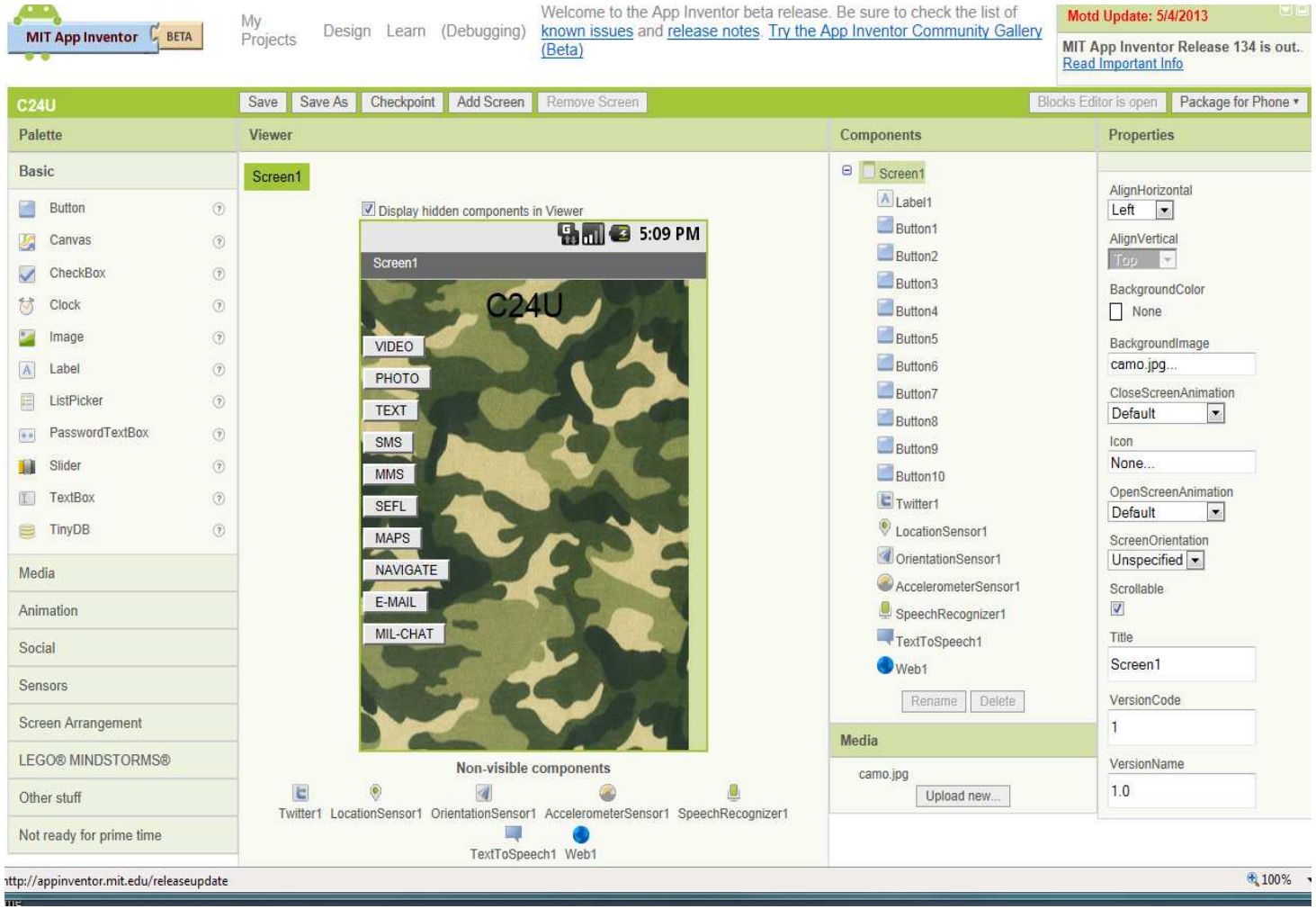
we will define a type of COTS HW smart phone that meets certain requirements with regard to safety (i.e. crypto devices) and resistance to shock and weathering and a set of software to use.

conceptual model takes into account the needs of both networks



Using a free application as “MIT APP Inventor” Android Software Development Kit




MIT App Inventor BETA
My Projects
Design
Learn
(Debugging)
Welcome to the App Inventor beta release. Be sure to check the list of known issues and release notes. Try the App Inventor Community Gallery (Beta)
Motd Update: 5/4/2013
MIT App Inventor Release 134 is out.
Read Important Info
C24U
Save
Save As
Checkpoint
Add Screen
Remove Screen
Blocks Editor is open
Package for Phone
Palette
Basic
Button
Canvas
CheckBox
Clock
Image
Label
ListPicker
PasswordTextBox
Slider
TextBox
TinyDB
Media
Animation
Social
Sensors
Screen Arrangement
LEGO® MINDSTORMS®
Other stuff
Not ready for prime time
Viewer
Screen1
Display hidden components in Viewer
5:09 PM
C24U
VIDEO
PHOTO
TEXT
SMS
MMS
SEFL
MAPS
NAVIGATE
E-MAIL
MIL-CHAT
Non-visible components
Twitter1
LocationSensor1
OrientationSensor1
AccelerometerSensor1
SpeechRecognizer1
TextToSpeech1
Web1
Components
Screen1
Label1
Button1
Button2
Button3
Button4
Button5
Button6
Button7
Button8
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Button10
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SpeechRecognizer1
TextToSpeech1
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Delete
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Upload new...
Properties
AlignHorizontal
Left
AlignVertical
Top
BackgroundColor
None
BackgroundImage
camo.jpg...
CloseScreenAnimation
Default
Icon
None...
OpenScreenAnimation
Default
ScreenOrientation
Unspecified
Scrollable
Title
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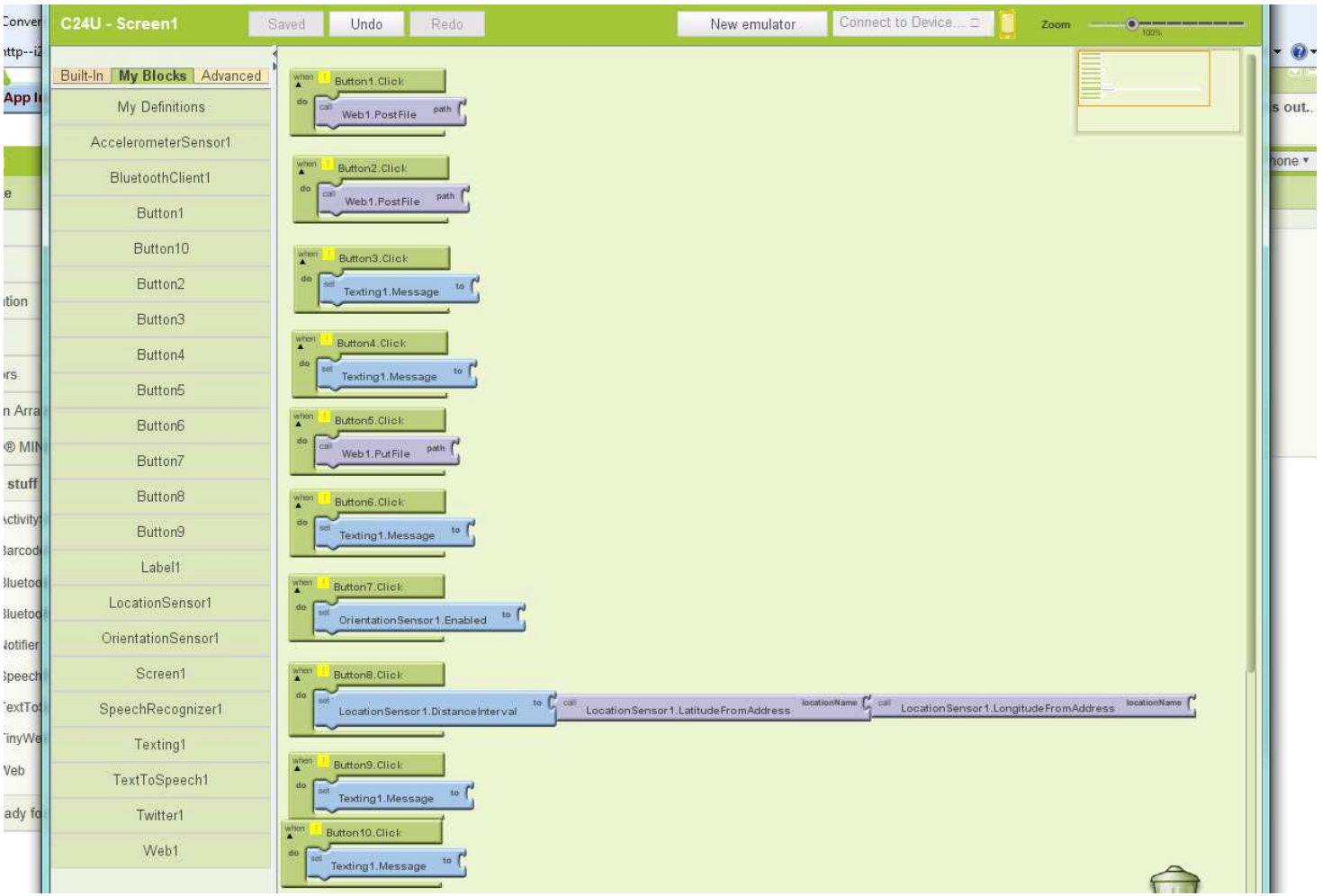
1
VersionName
1.0
http://appinventor.mit.edu/releaseupdate
100%

Associating functions…….




5556:<build>
5:29 PM
(No service)
5:29 PM
Monday, May 13
Charging (50%)
MENU


5554:<build>
9:42 PM
Alarm Clock
Browser
Calculator
Camera
Car Home
Contacts
Custom Locale
DemoHelloP
Dev Tools
Email
Gallery
Maps
Messaging
Music
Navigation
Phone
MENU


5554:<build>
5:35 PM
Screen1
C24U
VIDEO
PHOTO
TEXT
SMS
MMS
SEFL
MAPS
NAVIGATE
E-MAIL
MIL-CHAT
MENU

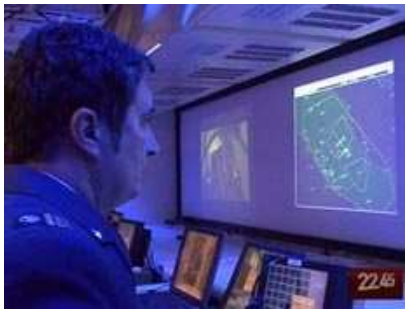
STRUCTURED MILITARY MESSAGING

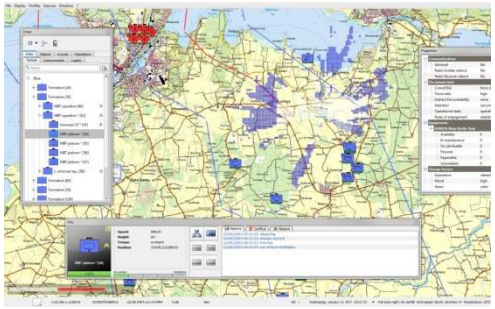
Starting from a formatted text language (i.e. like *IRIS FORM & IRIS Web FORM TOOLs from Systematic)* will be possible develop a simplified formatted language based on specific information, tailored for lower level units and up to Battalion where all info and data will be parallel integrated in a classical C2 military system.

GDO 21051245Z 13//
FM DOG1/SQUAD 3/PLT 2//
TO HAWK CP 3/INF BN 34//
BT
UNCLAS/ENEMY/MOVE/PLT /ARM/ 5 VEH/DIR NW-SE/ 7 KMH/GRAVEL//
COORD/ ME 33TCD 94567324 Q 460/ ENEMY COORD 33TCD 913456956 Q 150 //
ASK/WAITING ORD//
BT

SEFL (Simple Exchange Formatted Language) Standardization of certain semantic elements, using few selected key elements and words from ADATP-3 protocol to receive information, evaluate, correlate and integrate them into a Data Base of fusion with other information.

The primary exchange its intended between tactical military and commercial networks to facilitate the flow of information and ensure a communication simple system.
Mediation System INSS, could exchange data and other information between C2 others environments and hierarchical levels.

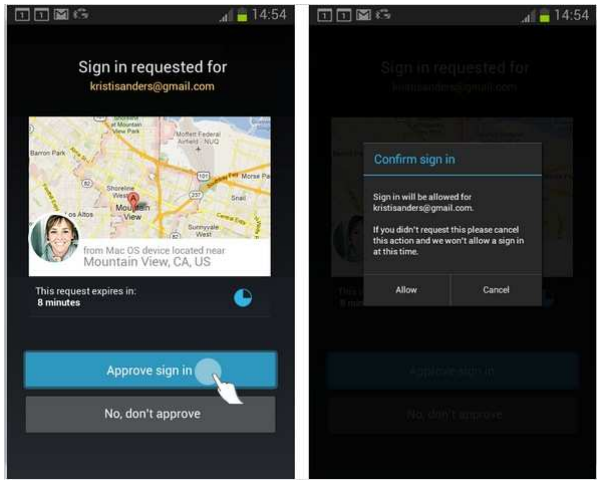




Using 4G LTE Tactical Cellular transceiver that support simultaneous users, voice, SMS/MMS data and video capability.

Fusion Networking System

Integration of different dedicated networks will expose to a security problems.
We can't solve this trouble but there are many different possibilities to mitigate and realize the best connections as possible.



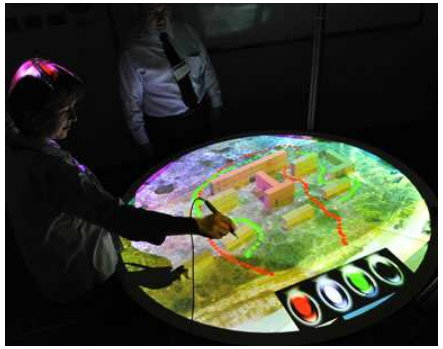
- Keeping a low level of information classification
- Accreditation of individual devices
- Personalize access to the applet with password
- Possibility to deny access from servers to devices and viceversa
- Security Labels and Digital Signatures
- Scanning of attachments
- Reliable message transfer protocols
- End to end acknowledgements provide reliability and tracking (delivery & read receipts)
- Optimized protocols for constrained links
- Flexible precedence handling (priority)
- Personalization and interoperability of directories

- The validation (CD&E) of this concept as interaction through military and business network will be possible through simulation;
- SimLabs asset from FINMECCANICA, as integrator of different realties (Armed Forces, Industry and Academia) is capable of providing the virtual System of Systems environment to test the different interaction among the different actors, networks, and devices;
- Simlabs has been already used in a operational scenario with the NATO M&S COE in Rome.

CONCLUSIONS

Technology is not a universal remedy but, can became an enabler for commander's decision process and help to decentralize C2

Technology would always enhance capabilities of forces on the ground and make simple apply special TTP, especially in the urban environments.



Using COTS available will reduce cost of development of new tools, implementing current technologies and make simple choose the best C2 method to implement on a specific operational situation, maintaining control and cohesion among more dispers

To have success in a COIN environment will be also necessary innovate, learn and to adapt the equipment to the close operational environment.

Questions?