Territorial Saturation: Global Ambient Intelligence Sensory Saturation.

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The 6 minute solution.

Revision 1.4

Lakhvinder's recommendation to Covertly Explore, Research, Design, Develop and Deploy Global Ambient Intelligence Sensory Saturation and the subsequent formation of a Command: AIScom (Ambient Intelligence Sentinel Command).

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1.0   Ambient Intelligence

1.1   Informal Preliminary Orientation

Our use of the term "Ambient Intelligence" shall refer to a computing and sensory model in which computing, sensors and invasive scanners are neither tied to a central computing logic system nor are they tied together in a conventional structured hierarchical order. In Ambient Intelligence, a given environment is saturated with very simple, inexpensive and robust devices autonomously carrying out very simple tasks. Each device, in the process of carrying out it's simple task, broadcasts information to the Ambient Environment and/or listens for information in the Ambient Environment. This Information becomes Ambient to the given Environment as the devices emit information and listen for emissions in a reflexive manner. Reflexive, in that, the information is emitted as a reflex to their simple function. Information received whilst listening triggers or elicits reflex responses from the devices for whom a said datum is relevant to it's task, function or

existence. The devices do not emit datum with the intention of eliciting a specific response nor to emit to any specific devices. The devices in an Ambient Intelligence merely carry out their simple task or function whilst emitting datum, and reacting to relevant datum, in a purely simplistic reflex. Whilst the devices, and their individual functions, are very simple-- the collective Ambient Intelligence performs very complex and useful tasks.

In this manner an Ambient Intelligence is formed which collectively and dynamically adapts to a changing environment or to something entering the environment. In a home or office environment the Ambient Intelligence Environment reacts to a person or people moving around the building and even to light conditions, and the position of the sun and thermal radiation. There is no computer to which the devices are reporting nor are they receiving instruction from a computer or control system. Motion sensors merely emit datum Ambiently in response to movement, sensors emit datum in reflex to temperature, motor devices listening to the Ambient emissions react by moving blinds, Air Conditioning, Humidifiers, dehumidifiers, Air Purifiers, valves in ducts partition zones, etc.

A given environment can also include chemical sensors, valve controls, water sensors, hatch controls and motors, fire detectors, hazardous gas fume and particulates sensors, corrosives bands, fire suppressant valves and thermal sensors operating in dynamic unstructured collectives throughout a submarine to control and react to propellant leaks, chemical leaks, water leaks, fire and so forth. Rather than reporting to and being instructed by humans or an external computer-- the Ambient Intelligence reacts by means of reflexive logic (insect level reflex intelligence)-- reflexive intelligence.

The devices operate in a simplistic unstructured and inherently robust manner-- the Ambient Intelligence is emergent and the structure is in the selection and design of the saturation.

- motion detector emits --> light fixture listening turns on light.

- rain detected cause reflex emission of datum --> sprinklers turn off.

- freezing and frost detected, reflex emission --> pool cover closes whilst heat lamps activate around citrus without any devices being aware of the others even in a low observable low detectable encrypted Ambient Environment.

- Temp datum and A/C datum--> Fan motors adjust rpm in reflex to both together.

- water sensor (leak) --> hatch closes, alarm sounds.

- sensors emit datum --> weapons react.

- heart sensor emits datum --> phone contacts emergency services with status and location, street lights near the victim cycle intensity to mark the location.

The Ambient Intelligence Saturation can also include devices such as small sensors and small weapons packages air dropped to saturate a valley and react to troop movements autonomously or with only a kill or no kill directive.

This concludes this subsection. This subsection has served to expose the reader to concepts and information, some of which, shall be superseded in the coming subsections and sections.

1.2   In the Context of a Functional Architecture

In the context of a Functional Architecture, Ambient Intelligence shall refer to the collective of devices existing and operating in a given finite 3-space and to the resulting emergent behavior arising from said collective. In this context the Intelligence of Ambient Intelligence refers to the functional logic, architecture and emergent behavior of the devices and their collective presence.

1.2.1   Vocabulary

- We shall refer to the individual devices as a Sentinel or as Sentinels.

- We shall refer to a Sentinel which is embedded within another system as an embedded Sentinel. An embedded Sentinel thus allows said system to participate in an Ambient Intelligence, or, integrates said system into an Ambient Intelligence. An embedded Sentinel may be a device construct of hardware and/or software.

- We shall refer to the finite 3-space in which a given set of Sentinels exist as a Cell.

- We shall refer to the sowing, seeding or deployment of Sentinels within a cell or cells as Saturation.

- We shall refer to the emergent behaviors, emergent actions and emergent functions of the Sentinels which exist within a given cell as behaviors, actions and functions of the Collective.

1.2.2   Sentinel

A Sentinel is a simple, inexpensive, robust and autonomous device designed to autonomously perform a simple, well defined and well understood function over a potentially long service life or over a short terminal service life. A Sentinel is an unobtrusive device whether for reasons of Lo Load (LO LoaD: Low Observable, Low Detectable) or for reasons of aesthetics.

A Sentinel may be unpowered, draw it's power from the environment (cell), or possess a self-contained power source. When drawing power from the environment the Sentinel may be powered by:

- Solar Power

- Environmental Chemical or Biological Sources

- Wind

- Wave or water current

- Heat from biological or chemically assisted biological decomposition

- Connection to a local power grid

- or any other means as a function of it's environment (cell) and function.

In the process of performing it's simple function, a Sentinel may broadcast information to the Ambient Environment of it's Cell. The Sentinel emits this datum as a causal reflex without the

intention of transmitting to a particular device nor is the emission intended to elicit a particular response. The datum is emitted as a reflex in the course of the performance of the Sentinel's function and tasks thereunder. The datum joins the other Ambient Data which permeates the Ambient Environment of the Cell.

In the process of performing it's simple function, a Sentinel may listen to the Ambient Environment for Ambient Data which is relevant to the Sentinel's own task, function or existence. The Ambient Data contains neither instructions nor commands. The Ambient Data contains information emitted by other Sentinels as a causal reflex of their own simple function. The Sentinel may listen to the Ambient Information passively as part of the Sentinel's own function or as a reflex caused by the Sentinel's own function. This Ambient Information is neither intended nor addressed to a system or specific device. The Sentinel listens for Ambient Information which is relevant to the Sentinel's own task, function or existence. The Sentinel continues in the performance of it's function and existence in a manner conducive to that function with the relevant Ambient Information.

Some examples of Sentinels include:

- Temperature Sensor: senses temperature and emits the datum.

- Over/Under Temperature Sensor: emits datum upon temperature outside of a nominal range.

- RPM Sensor: measures rpm and emits datum.

- Corrosive Sensor Band: emits datum upon corrosives damaging the wires of a pipe collar band or insulator sheath.

- Heart rate or Pulse rate Sensor: emits datum of rate or emits datum upon rate out of nominal range.

- Neutron Sensor: emits datum of rate, volume or out of nominal range.

- Shirt Button or Shoulder Unit Patch: multiple chemical reactants sensitive to various chemical, biological and nuclear threats. Upon a reaction, the Sentinel emits a datum indicating a reactant was tripped and a datum indicating which datum was tripped.

- Rain Sensor: emits datum upon detection of rain. If equipped with a gauge, it emits datum with precipitation rate or time and total.

- Accelerometer: G's or G's out of nominal range, emits datum.

- Hatch Motor: opens or closes hatch upon hearing relevant Ambient Information, then emits datum of open or close status.

- Particulate Sensor: measures particulate volume in air, emits datum with ppm.

- Air Conditioning, Ventilation and Heating Duct Valve Motor: opens, closes or adjusts position of valve according to multiple relevant datum it hears. Thus creating zones for cooling or even sealing zones off for compartmentalization. Can be designed to emit status changes, emit constant status or emit status only in conditions where Ambient

Information indicates emergency status.

- Road Traffic Safety: A Sentinel consisting of and inexpensive CCD, lens and embedded single chip compute node. This Sentinel performs the computationally simple function of tracking vehicle flocking in lines. If vehicle flocking becomes chaotic, it emits a datum indicating interruption of nominal flow and emits a datum with a photographic image or video loop. In the near future the CCD and embedded computer can be integrated into a single chip, just place a lens in front a solar panel and battery.

- Air Conditioner Trip: engages or disengages air conditioner in accordance with it's function and multiple possible relevant datum.

1.2.3   Ambient Information Emissions

A Sentinel emits datum to the Ambient Environment as tagged datum on various spectra of the electromagnetic spectrum including the use of spectra hopping patterns. Listening Sentinels need not process all Ambient Information, they can identify relevant Information by spectra and tag.

Sentinels in overt public applications can employ bluetooth, rfid, Wi-Fi or other industry standard topologies in addition to new standards or even infrared emissions and detection. Additionally, Sentinel employ a tamper resistant municipal, federal, or corporate authentication header with the datum or burst stream of data.

For more security conscious overt applications the Sentinels employ authentication headers and encrypted payload.

For covert Lo Load (Low Observable Low Detectable) applications, Sentinels employ spectra hopping, authentication headers, encrypted payload and novel forms of emissions from infrared to ultraviolet to acoustic to chemical markers and natural harmonics as a carrier of datum.

A Sentinel may also have the function of hearing relevant Ambient Information within their Cell which they then repeat or propagate outside of the Cell. This Sentinel can be useful for Meta-Cellular propagation of Ambient Information, and, as a concentrator or relay for the Collective of Sentinels. This allows, also, for the use of Natural Harmonics Emissions in zero-power micro Sentinels. This can also be of use for Lo Load (Low Observable Low Detectable) covert applications.

1.2.4   The Collective

The Sentinels themselves are simple, robust, mass produced, inexpensive devices each autonomously performing a simple well characterized and understood function. From these very simple Sentinels arises a Collective Behavior which is emergent. Also, emergent, is an inherent resilience, fault-tolerance and ability to repair. The Collective is also inherently tolerant of attrition whilst Collectively amenable to scalability in Sentinel Function and Collective Function through subsequent re-Saturation.

Some examples of the behavior of the Collective;

1. Hatch motor Sentinel in a submarine closes hatch and emits hatch closed status. This Sentinel performs this task under it's function upon hearing relevant Ambient Information which was emitted by Sentinels with the functions of pressure range sensor, water sensor

and water gauge. Simultaneously, klaxon Sentinels each trip their klaxon's and lights upon hearing the same relevant Ambient Information. Depressing a button will cause the Hatch motor Sentinel to open the hatch unless the device is designed to ignore the override in the case of a certain level of emergency or condition determined by hearing additional relevant Ambient Information.

2.   In a home or building Sentinels emit datum showing a room is occupied, is warmer than other rooms, has thermal radiation and light entering through a window. Sentinels adjust the blinds, increase fan speed and adjust a partitioning valve in the ducts in order to increase cooled airflow into this zone.

3.   Soldiers on patrol are wearing shoulder patch reactant Sentinels. The soldier on point is exposed to a biological threat, the reactant in his patch corresponding with the threat is tripped by the reaction. His patch emits a datum indicating bio/chem/nuclear threat and emits an additional datum identifying the particular threat that corresponds to the reactant which was tripped in the patch. Several Sentinels then react in causal reflex simultaneously upon hearing the relevant Ambient Information. The soldier's combat system Sentinel alerts him. The squad and other soldiers in the vicinity are alerted by their combat system Sentinels as they also hear the relevant Ambient Information. One of the soldiers, or their combat vehicle, has a Sentinel which performs the function of Meta Cellular propagation-- passing relevant Ambient Information outside of the Cell. This Sentinel emits a datum outside the Cell using longer range communications equipment. The datum propagates both within the Cell and outside of the Cell and is heard by Sentinels for whom the datum is relevant.

4.   A Highway Traffic Safety Sentinel consisting of CCD, lens and simple single chip embedded compute node performs the simple task of observing the flocking pattern of objects (vehicles) from it's perch atop an overpass overlooking a stretch of highway. The Sentinel observes anti-flocking or chaotic flocking patterns in mass, the Sentinel then emits a datum indicating status followed by a datum containing a still image or video loop. Vehicles in the cell approaching the perch of the Sentinel hear the relevant Ambient Information (the first datum) via Sentinels in their vehicles. Upon hearing the first data, Sentinels in their vehicles alert the passenger of a traffic hazard (incident or obstruction) ahead whether by GPS display, indicator light, voice through speaker, automatic rolling stop, or whatever their particular vehicles Collective Sentinels are designed to do. Simultaneously, a local area or remote traffic center hears the relevant Ambient Information including the second datum with the image or video through it's relevant Sentinels. Operators determine from the video that it is a pile up and issue a single click directive as such resulting in the emission of an additional datum. This datum propagates to the various Cells to approaching vehicles to stop, to emergency services with the nature of the incident to respond, to trains causing them to stop, and a multitude of other functions. Sentinels on a truck carrying hazardous material emit datum relevant to Sentinels of responding emergency services.

1.3   In the Context of an Ambient Environment

In the context of an Ambient Environment, Ambient Intelligence shall refer to the Ambient Information or Ambient Data which now permeates a given cell (a given finite 3-space) as an

emergent result of the existence of a collective of Sentinels in said cell. In addition to sight, sound, smell, electromagnetic radiation, biology and geology which permeate a given 3-space-- Information or Intelligence is now Ambient to the environment. In this context the Intelligence of Ambient Intelligence refers to the Ambient Data or Ambient Information which permeates a given environment.

The functional architecture of Ambient Intelligence frees all information to be available to all authorized devices and hence all authorized functions as Ambient Information. This is Ambient Intelligence as Ambient Information.

From the simple Sentinel functional architecture and model of Ambient Intelligence, and the permeating Ambient Information of Ambient Intelligence, arises emergent robust and resilient Collective form and Collective function. This is Ambient Intelligence as Ambient Function.

Let us explore some examples:

1. In a building, Sentinel Particulate Sensors are available throughout the Ambient Intelligence. They are used by Sentinels in air purifiers, manufacturing control, fire detection and control, fire department response, hazmat response teams, medical teams, humidity control and every other authorized Sentinel which finds relevant Ambient Information. Some Sentinels may find only the Particulate out of nominal range datum relevant, other Sentinels may find the particulate ppm datum relevant.

2. Sentinel motion sensors and Sentinel infrared sensors permeate the Environment with Ambient Information relevant and used by Sentinels in A/C and heating, fire detection and tracking, security, and police responding for the safe evacuation of personnel and tracking of intruders.

A Sentinel may be mobile. A Sentinel may also have the sole function of listening to the Ambient Information, the Ambient Intelligence as Ambient Information, and presenting the relevant Ambient Information to the human user. This Sentinel would take the form of a tablet or helmet mounted display, presenting Ambient Information relevant to the human user.

Let us explore some examples:

1. A fire department captain responding to a building fire is apprised of the status of battalion personnel and equipment. The captain is alerted to the presence of hazardous chemical or biological storage by the Sentinel tags on the containers in the building. Sentinels on the battalion trucks emit datum on particulates, thermal failure and chemical hazards which are picked up by the battalion chiefs Sentinel.

2. SpecOps operating covertly in peacetime foreign territory are alerted by their Sentinel helmet mounted or tablet of movement in their area. The Ambient data comes from Sentinel motion sensors saturated in the area 10 years ago during a conflict or during peacetime as a contingency or as a routine Saturation. The relevant Ambient Intelligence as Information may be heard directly by the SpecOps Sentinel from the local Cell, or it may be propagated from HQ to whom it was propagated from the local Cell.

3. Humans may have on their person, or in their possession, a Sentinel designed for the function of detecting weapons program indicators. The individual may not be aware the

Sentinel was planted upon them. The Sentinel now extends detection wherever the individual travels. The information is harvested is emitted when the individual is in proximity to authorized Sentinels seeded for the collection of information of this nature-- the world becomes the drop box for covertly gathered Ambient Intelligence. The Sentinel call also be designed to detect and not other Sentinel in proximity, thus providing Intelligence with which to form and map an organizations relationship network tree and operational pattern-- who knows whom, who meets whom, with whom, where, what pattern. This allows a map to be formed of the entire organizations entire structure and infrastructure covertly and globally. The Sentinels of all sides can be mobile, including the drop box Sentinel(s).

4. An airport Cell is permeated with Ambient Information from Sentinel passports to Sentinel luggage tags and airline schedules. Airport large screen display Sentinels hear and display Ambient Information on airline schedules. Your personal information device, whether it's a pda or cell phone or laptop or wrist watch, hears relevant Ambient Information and presents you with data relevant to your environment and a flight you may have scheduled in your device. The airport display and your personal information device simply enter the Cell and listen for Ambient Information which is relevant for them and you and present it within the context of their capabilities and what your personal information device knows about you-- with no configuration or conscious manual request. Meanwhile, encrypted Sentinel emissions cause your personal information Sentinel to alert you to the presence of friends or associates in the airport while your coffee is charged to your credit card by a Sentinel (future of rfid) credit card.

5. The Sentinels of a store, mall or shopping center emit Ambient Information about it's products and sales. Your pda or cell phone, containing an embedded Sentinel, possesses your wish list from your pc with items such as a) a reddish or blueish raw silk Vera Wang sweater for your wife, b) earth tone or copper earrings for your daughter's new wardrobe additions, c) any of the missing volumes from your collection of the Course of Theoretical Physics by Lev Davidovich Landau. As you drive by, walk by or walk through a shopping center-- your iPhone hears relevant Ambient Intelligence and alerts you to the proximity of a sale on an oxford red silk Vera Wang sweater at Nordstrom's on the second floor. Your iPhone picks up a map of the mall from the Ambient Intelligence emitted from the mall's Sentinels.

1.3.1 Physical Social Networking

Your iPhone, Blackberry, pda or cell phone emits information about you which you have selected into the Ambient Environment. This information may be configured on that particular device, or, on your PC from whence it is automatically configured on your devices. This information can include interests, occupation, hobbies, wish lists, likes, dislikes, hometown, alma mater, business wish lists, medical information, emergency information, group memberships, subscriptions, favorite designers, favorite musical groups, favorite genres of arts and anything else you could imagine. This information can be anonymous or identifiable, and, can be organized for emission or encryption by groups such as information for public, for fellow employees, friends list, family, emergency services and any other groups you organize. Your embedded Sentinel equipped device, and those of others, now emit this information into the Ambient Environment in accordance with your configured wishes for various classes of privacy.

When entering a shopping center or bookstore, your embedded Sentinel in your iPhone can identify the types of merchants in the shopping center, or, that you are indeed in a bookstore. Your Sentinel can then listen for Ambient Intelligence relevant to you as described previously, and, can also anonymously or identifiably emit relevant items from your wish list which are then picked up by the Sentinels of the merchants in your proximity. Thus, the merchants systems with embedded Sentinels can search their databases for items from your wish list and emit matches to the Ambient Environment which are then picked up by your iPhone's embedded Sentinel.

In an airport, whilst waiting for a delayed flight, your iPhone detects the proximity of a colleague or colleagues from work or a business partner of your organization. Your Sentinel iPhone's and Blackberry's bring you together while you wait for your flights, all in accordance with your configured wishes for privacy.

Driving by a sports arena, your iPhone alerts you to season tickets available for your favorite team or an upcoming match featuring your favorite team as a visitor.

Including your son's favorite lists and wish lists alerts you to a new Armin Van Buuren album at a department store or an upcoming Goa concert while driving by a sports arena.

While at a car show, your Sentinel alerts you to booths of interest to you. Later, your iPhone identifies the proximity of a person possessing a part on your wish list for your '63 Stingray. Said person is alerted by her Blackberry of the proximity of a person, you, wishing to procure a part which she owns and had entered into a list on her Blackberry for this show. Your devices bring you together on the floor of the show in accordance with your configured wishes for privacy and meeting initiation.

At an industry conference, your areas of specialization, hobby and interests are picked up by the employees and systems of a company which is seeking to employ a person for a venture into a new field for which you are a match.

Walking by or entering a pub, your iPhone Sentinel listens to Ambient Intelligence and gauges the politics, likes, dislikes, hobbies and interests in the Ambient Environment so that you may decide if this is a pub of interest to you. Whether similarity or diversity is your cup of tea, or pint of ale, is up to you.

Walking into a room to present a speech, a glance at you Blackberry Sentinel provides you a view of the political and social leanings of the gathered people.

Driving through or entering a neighborhood, fraternity or sports club offers a glimpse into the diversity or closed-minds of the Cell.

In any social or professional setting, Sentinels bring together people of diverse similar or complimentary likes, dislikes, hobbies, interests, seek lists, desires, wish lists, occupations, and other factors. Sentinels thus bring Social Networking to the Physical World. Physical Social Networking.

1.4   Existing Technologies: Locked and in Infancy, awaiting Ambient Intelligence

Many existing technologies are precursors to Ambient Intelligence, with information locked in closed loops and going unused. This can be compared to computers awaiting ARPAnet and the Internet. Closed loop devices also result in duplicated devices, needless complexity, multiplied redundant expense, duplication of effort in development of custom and closed loop systems, and a hampering of rapid innovation which would be possible with simple Ambient Intelligence Sentinel which integrate by simply existing or passing through an environment.

- Communications exist in the form of bluetooth, Wi-Fi, rfid, cellular broadband, IrDA and others.

- Biochemical electric marker emission communication exists, and are in use, within your brain.

- Micro magnetic compasses exist within the brains of species of animals.

- Motion Sensors exist in homes, buildings, vehicles and outdoors with data locked inside of closed systems. These hardware closed loop devices merely trip a bit and rely on a closed system to even interpret the meaning of the flipped bit. To share the information requires complex interfaces between systems.

- Rupture disk sensors exist and are in use in factories in closed loop hard wired systems which lock the data and operate in networks which are susceptible to the very condition which they are designed to detect.

- Miniature magnetic wireless RPM sensors are in use on road racing bicycle wheel hubs and pedals. The information is locked in a closed loop to a wireless handlebar cycling computer. Meanwhile, heart rate sensors are in a separate closed loop from your jersey to your watch with the information locked. Your jogging sneakers contain pressure sensors which are locked to your iPOD as a pedometer for jogging information.

- MEMS accelerometers exist and are in use today. These micron scale devices use a pressure or strain sensitive bar with a mass attached to one end. They are in a closed loop with the airbag deployment system in your car. The information is locked. Pressure sensors in your seat are in a closed loop to engage and disengage your airbag deployment seat by seat based on occupant and occupant size. MEMS accelerometers and pressure sensor exist and are in use today.

- Small, single chip, compute nodes exist in $3 holiday cards and are used and discarded routinely.

- High-performance embedded micro-processors are available in bulk for <$10/unit.

- Embedded lasers $9.

- Disposable CCD digital cameras $12.

- 1 mega pixel to 10 mega pixel CCD's $5 to $50.

- Micro dot embedded micro-processors and logic gates in volume are available and in use today for $0.75 to $2 each.

- rfid credit cards, passports, vehicle toll pass tags and id cards are in use today.

- GPS is in prevalent inexpensive use today.

- Biochemical reactant detection arrays electrical interface contacts are in use in everything from glucometers to hormonal pregnancy test kits to biohazard detection starting at 70 cents per unit.

- Laptops, tablets, pda's and phones are in use today awaiting Sentinel integration or Sentinel in software form.

- Harsh environment MEMS pressure and oxygen sensors are in use within automobile engine today.

- Electrical sensors on catheters are routinely directed into human hearts to map and diagnose electrical activity.

- Chemical reactant detection arrays are in limited use in Agricultural inspection applications for the detection of illegal use of pesticides. They are overtly placed for ease of tampering and provide information to the closed loop of an inspector and her clipboard.

- Meta data tagging is in use in XML today.

- Authentication and payload encryption are in use today from AES to PKI, from certificates to IPSEC.

- Ambient Information also, in it's infancy, exists and is in limited use awaiting Ambient Intelligence as isolated information and computers awaited the ARPAnet and the Internet. GPS emissions permeate our Ambient Environment providing information from which location may be calculated and other quantities may be mathematically and logically calculated, GPS emissions for time are available, NIST Fort Collins Colorado emits time and frequency information by RF through WWVB, WWV and WWVH. RFID has begun emitting in several forms.

2.0   Territorial Saturation: Concept A

We shall now explore the first concept for Ambient Intelligence.

2.1   The Sentinel

The Concept A Sentinel is a small lightweight device of composite construction. The Sentinel geometry is that of a polyhedron of several inches diameter. The polyhedron is then extruded up

from the top to give a shape morphed between the original polyhedron and a teardrop. The smoothed points of the polyhedron are designed for the aerodynamic effect of inherent auto rotation for descent rate constraint in aerial deployment. In addition to descent rate control, the shape aims for inherent distribution. The teardrop extrusion is designed for a chubby bottom stable self righting base. The top and side facing skins of the Sentinel are solar panels coated with marpat camouflage allowing for best general environment coverage. Naturally, Sentinels may need to be produced in different skins from some environments such as arctic/nordic, however, marpat provides for a ready inventory for most Saturations. Additionally, the extruded polyhedral shape provides for no regular edge detection. Built for Lo Load (Low Observable Low Detectable).

2.2   The Function

The Sentinel is solar powered by light with solar charged battery by dark. The Sentinel contains satellite communications with rod type antenna housed inside the top. Battery and electronics at the bottom for stable bottom weight distribution. MEMS motion Sensors at the top sides. MEMS accelerometers designed for seismic vibration detection mounted inside.

The function of the Sentinel is to detect motion and vibration from humans and vehicles transmitted through the ground. If motion and/or vibration is detected, the Sentinel emits datum indicating the Sentinel's own serial number, coordinates, time, motion and/or vibration tags, and calculated weightings for motion and vibration useful for calculating the nature and scale of the activity. This Sentinel emits the datum via Satellite to AIScom. From AIScom the data can be propagated to the relevant units including intel or even SpecOps in the field or Brigade to Company to Platoon to Squad.

If the Sentinel has heard datum signifying the presence of a friendly force in the Cell, the Sentinel will also emit datum to the Ambient Environment of the Cell. SpecOps need not emit datum if absolute Lo Load is desired, Ambient Information shall be propagated to them through AIScom.

2.3   Saturation

The Sentinels are Saturated by aerial deployment. They are small and cheap, shovel them out the back of a bird like hay. If indigenous combatants discover one and crush it, there are thousands more. You've been spotted, hang around, death rains down from the skies or from behind the boulder. Instead of cluster bombs, it's cluster sensors-- the cluster bombs follow.

2.4   Operations

Upon detection in a combat theater, forces in theater can task satellite, UAV, aerial, fast patrol vehicle or infantry to identify or shadow or attack or spot for artillery or air strike.

SpecOps or combat forces in the area using tablet Sentinels or laptop Sentinels or combat information system helmet mounted Sentinels have immediate alert of activity around them. They can then avoid for zero footprint, or, bait and kill.

In non combat theater, the intel is logged and propagated to organizations of interest including intel. Satellite, allied forces, SpecOps, aerial recon or UAV can be tasked to investigate with the

subsequently appropriate action.

In an area which is no longer of interest (post-war, post-operations), stop listening to the Sentinels. 5 years later, if conditions worsen, start listening to the Sentinels again. If flood, age or massive bombardment have caused attrition of the Sentinel population-- re-Saturate to bring up the Sentinel population.

3.0   Territorial Saturation: Concept Pebbles

The Pebbles concept consists of a Saturation of 3 Sentinels forming an Ambient Intelligence.

3.1   Pressure/Strain Sensor Pebble Sentinel

3.1.1   This Sentinel is a Pebble.

Crystals exhibit many attributes from conditional resistance, fractoluminescence, thermal electric properties, mechanical luminescence, piezoelectric properties, oscillatory properties, pyroelectricity and even the triboluminescence resulting in visible blue sparks when crushing wintergreen lifesavers and some diamonds which glow when rubbed.

At the core of the pebble is a crystal selected and configured for pressure sensitivity. When pressure is applied, the crystal emits a natural harmonic. Around the crystal core is a ceramic shell designed to act as a cavity resonator which amplifies the natural harmonic of the crystal into a more useful natural harmonic. Cavity resonator were used quite effectively by the USSR in eavesdropping on the US Embassy in Moscow. After initially being stumped, the UK and US figured out the theory of the device and proceeded to use variations against the USSR and it's eastern block cohorts. Around the ceramic shell is another covering for durability and matching the native rock and pebbles of the target of Saturation. The outer shell is manufactured to allow the cavity resonator to function.

Step or drive over the pebble, or near a pebble pressed into the ground, the Pebble Sentinel emits a minute natural harmonic-- no batteries required! The ultimate in Lo Load: Low Observable, Low Detectable!

This natural harmonic is then detected by the Sentinel Spike. Natural Ambient Intelligence.

3.1.2   Ceramic Variation of Pebbles

While crystal pebbles would likely use a synthetic crystal such as $GaPO_4$, there is another possibility to explore. The entire core and cavity resonator shell may possibly be manufactured in a single piece using electroceramics produced by ceramic laser sintering. Natural harmonic emitted for detection by a Spike. No batteries required!

3.1.3   Powered MEMS Variation of Pebbles

Another variation to explore is a solid state MEMS using ceramics, however, assembled as a chip in a single package. This package is then encased with a power source (button battery) into the pebble case. This unit integrates pressure/strain membrane sensor and seismic vibration rod and ball sensor onto a single MEMS. This Pebble variation does not produce a natural harmonic, rather, it produces an actual signal to be heard by the Spike. Powered, however, batteries are included!

3.2   Seismic Vibration Sensor Pebble Sentinel

This pebble follows the same design philosophy as the Pressure/Strain Sensor Pebble, however, it is designed to sense seismic vibrations of walking, vehicles, engine and mechanical vibration, low flying helicopter, battlefield munitions and even hovercraft. The same variations of electroceramics and, of course, single pebble integration with MEMS.

3.3   The Spike Sentinel

3.3.1   Geometry

The Spike Sentinel is a Spike, sharp at the nose with fins at the aft. Similar to a WWI aerial bomb but elongated at the nose, similar in proportion (not size) to the Steyr 15.2mm APFSDS. Naturally, the size is a variable. The fins aft serve two roles:

1. Aerodynamic stabilization and descent rate constraint during aerial deployment, and,

2. Canopy stakes in the ground.

When the Spike strikes the ground, it partially penetrates with the aft protruding. The aft opens drawing down to open a canopy with the fins staking into the ground. The Spike is of metal weighted frame with composite skin. The canopy is constructed of solar panels with a marpat matte camouflage. The center of the canopy allows for the satellite signal penetration antenna below and a disk protrusion of the aft just above. The spike operates solar by light, solar charged battery by night. The aft protruding disk houses a 360° panoramic multi-spectral or hyper-spectral camera (we are awaiting specs on a hyper-spectral camera).

3.3.2   The Function

The Spike Sentinel listens for natural harmonic emissions from the Pebble Sentinels, or, emissions from the powered MEMS variation Pebble Sentinels. Upon hearing the relevant Ambient Information from the Pebbles in it's Cell, the Spike analyzes the Ambient pattern of the information to determine the level, scale, scope and other characteristics from the intensity, type and volume of datum being emitted. Upon processing and correlating with precomputed mathematical models the Spike calculates a characterization of the activity. If the Spike determines the activity to be of sufficient interest, the Spike collects an audio sample while simultaneously collecting a 360° panoramic multi-spectral or hyper-spectral set of images. The Spike then emits datum containing the serial number, time, location, events, and characterization. The Spike proceeds to emit datum containing the audio and image. This Ambient Information is emitted to AIScom and, if authorized US Force presence in the Cell is heard in the Ambient Information, the

information is emitted into the Cell. How much of the Ambient Information is used by the authorized US Force varies as a function of the relevance to, and capabilities of, the authorized US Force's or Device's Sentinel. As the Spike is a Sentinel with more capabilities, it should employ tamper detecting semiconductor technology to wipe sensitive certificates and semiconductors.

3.4   Saturation

The Saturation of the Concept Pebbles Sentinels is by aerial or vehicle based deployment. The Pebbles are deployed by shoveling them out or dispersing them with systems with the effect of dropping fire retardant. For every Cellular field of Pebbles, one or more Spikes are deployed near the Pebble fields. The pebbles control their descent rate by inherent terminal velocity.

This Ambient Intelligence consists of 2 or 3 types of Sentinels with 1 or 2 being the Pebble Sentinels which emit to the Ambient Information. The other Sentinel is the Spike Sentinel which emits to AIScom via Meta-Cell Propagation and emits to the local Cell if Authorized Sentinels make their existence known in the Ambient Information.

3.5   Additional Notes

Pebbles with other functions can also be mixed with the cocktail to produce emergent functions such as diesel exhaust detection.

Weapons systems Sentinels or large deep Sentinel mines can be deployed and triggered by the Spike autonomously in a kill box, or, the Spike can await a kill or no kill directive from AIScom or authorized forces in the field. AIScom or authorized forces in the field can examine the images or "eyes on" in the field, then issue a kill directive to have the Ambient Intelligence emit a kill datum. Weapons System Sentinels then treat the Cell as a kill box and engage any targets of opportunity in the Cell.

Pebbles can also be produced with reactants for the detection of biological, chemical and nuclear hazards. This Ambient Information can also be useful for the collection of war crimes evidence and evidence, and indicators, of the violation of international weapons proliferation treaties and embargoes.

MEMS exist today, nano scale in the future. The future brings the possibility of Sentinel Sand in the place of Pebbles and Sentinel Rocks in the place of Spikes.

The geometry of Spike is a variable as a function of the anticipation of existing chassis which may be modified from applications of munitions deployment and as a function of camera and solar technology we anticipate as preexisting.

4.0   Territorial Saturation: Further Concepts in Brief

1. Autonomous mobile land, air and sea Sentinels designed as Seekers able to traverse Cells

during the observation of Items of Interest.

2. Autonomous mobile land, air and sea Sentinels designed as hunter-killers able to traverse Cells whilst engaging targets with a kill directive.

3. Pebble Sentinels tilled into the sands of beaches for the detection of beach landings including humans and hovercraft.

4. Pebbles at borders, around ports and customs warehouses. These Sentinel cocktails can include Pebbles for the detection of non-human items of interest.

5. Sentinels Saturated into rivers, lakes and oceans designed to gather a cocktail of data from natural environmental to synthetic parameters. These Sentinel may be placed on, or in, marine life to study the marine life or as a means of mobilizing the Sentinel beyond currents.

6. Aerogel encased Sentinels Saturated to float in air to monitor industrial and biochemical/ nuclear parameters. For Saturation in our own territories and covertly in foreign territories of hostile, neutral and allied nations.

7. Drop box Sentinels deployed in cities designed to "debrief" other Sentinels which have been planted on unknowing people, vehicles and equipment.

8. Turtle or Tortoise Sentinel to replace Spike with a device in the shape of a turtle shell with a telescoping projection housing the hyper-spectral camera. This configuration depends upon the specification of the camera and a suitable aerial deployment system. Provides for better Lo Load.

5.0   AIScom: Ambient Intelligence Sentinel Command

As Ambient Intelligence develops to critical mass, a command must be formed. Ambient Intelligence must be covertly deployed globally, Ambient Intelligence must covertly Saturate the planet. This command must be formed within the military or intel community, outside of the mainstream. This command and the technology cannot be entrusted to groups such as the FBI and DHS, in their current structure, nor to mainstream military and intel. However, it should be noted that DHS did have the sense not to go with 9mm sidearms.

AIScom should be headquartered in the domestic US in a secure and hardened facility with a redundant shadow fail over.

All Global Ambient Intelligence shall flow into AIScom where 3-space from around the globe shall be transformed into 4-space by dataflow and storage into what will be the largest databank in the world.

5.1   Logic Systems

5.1.1   BFM™ / SAViM™

AIScom shall live on the Lakhvinder BFM / SAViM system. Limited functionality may be deployed on conventional computing systems.

5.1.2   Cellular Bundle Databank™

Data / information shall live in the Lakhvinder Cellular Bundle Databank. Limited functionality may be deployed on conventional databases in conjunction with conventional flat file systems.

5.1.3   The Discriminator

The Discriminator refers to, and shall be defined for our purposes here as, a Lakhvinder construct which may be regarded as a "Virtual Logic Functional Device". A Discriminator is constructed of logic code in a very high level language within the framework of BFM / SAViM. The Discriminator is then available in a graphical programming environment which allows the Discriminator, in the form of a graphical widget, to be dragged from a library and dropped into a dataflow. The Discriminator may be opened in real time to adjust parameters, and may be dropped into a dataflow in real time. Multiple Discriminators may be dropped in sequence within a left right dataflow, data will flow through the Discriminators in that sequence. Dataflow can be redirected by Discriminators to new data flows. Multiple Discriminators may be built within a single Uber Discriminator which may then be manipulated as a single widget. When a Discriminator is modified by an authorized author, all Discriminators in the system are modified accordingly including those within an Uber Discriminator.

For our purposes here, Discriminators come in three flavors:

1.   Logic: purely logical and mathematical.

2.   Bayesian: stochastic, trainable and adapting with experience and environment.

3.   Neural Network: stochastic, trainable and adaptive to patterns.

Further, our Discriminators come in four classifications:

1.   ADAC: Atomic Datum Atomic Cell: Analyzes a single discrete datum type from a single discrete cell.

2.   MDAC: Molecular Datum Atomic Cell: Analyzes and correlates multiple datum type from a single discrete cell.

3.   ADMC: Atomic Datum Molecular Cell: Single discrete datum type from multiple cells.

4.   MDMC: Molecular Datum Molecular Cell: Multiple datum type from multiple cells.

As an illustration to solidify the concept in the readers mind, consider the following Discriminators:

1.   A Discriminator which simply receives data from a cell and sends it to two others, one to pass right further along the flow whilst the second stores the data in a database.

2. A Discriminator which correlates all of the datum types from a cell in order to discriminate movement as human, vehicular, animal or irrelevant. This Discriminator can be a Discriminator or an Uber Discriminator designed for a particular Cocktail of Saturation. This Uber Discriminator then exists in the library and can subsequently be dragged and dropped for new Cells with the same Cocktail. With some modifications, replacements or additions of constituent Discriminators-- the Uber Discriminator can be used for different Cocktails, updated for new theory or updated for re-Saturation of Cells with new Sentinels.

3. Further to the right in flow, a Discriminator can perform image edge detection or image recognition with an interrogation of databases to identify from amongst vehicles known to operate in the area.

4. An Uber Discriminator to analyze and extract multi-Cellular intelligence to extract indicators through 4-space of a probabilistic multi-Cellular path of movement indicating threat consistent passage through no-pass regions. This Uber Discriminator can then be adapted for multi-use for differing political and national borders. This Uber Discriminator would be fed after Discriminators such as 1 and 2 above.

5. A Discriminator which applies indicator weighting and threat probability to an incursion or activity in a Cell or Cells.

6. A Discriminator which is fed by multiple flows from multiple Discriminator such as 5 above. This Discriminator analyzes the indicators of these flows for possible Actionable Items of Interest (AII). AII are then fed to Discriminators which collate and prioritize AII for alert to AIScom Operations Group.

7. A Discriminator which parses Cells and datum type tag's propagation.

8. A Discriminator which propagates relevant streams of intelligence to NSA, a small unit in the field, divisional HQ, or theater command.

9. A Discriminator which retards the accuracy of intelligence propagated to FEMA or NOAA providing data with the accuracy required by FEMA and NOAA without exposing the density or accuracy of the Saturation to FEMA and NOAA.

10. MDMC Discriminators which collect and structure data from Sentinels installed from a feed from NYSE, flight schedules, air traffic control data or NORAD. These Discriminators then feed the data to new relevant data flows.

11. A MDMC Discriminator which analyzes and correlates data from both flight schedules from NORAD.

12. Discriminators to extract indicators and analyze the resulting structures for relevant data by priority for the various groups, theaters, organizations, threats, etc.

The Discriminator interface exists as a graphical interface with a library of widgets to one side and a workspace with in-use widgets connected by lines representing dataflow in a left to right path and branches in the vertical. Much like a block diagram or very clean electronic schematics. Widgets open Discriminators to graphically change numeric, string and boolean parameters for the Discriminator or Uber Discriminator.

5.2   AIScom Organization

AIScom shall be organized into 3 groups:

1. OG: Operations Group: Front-end, real time 3-space operations and analysis. The Command Center.

2. AG: Analysis Group: Middle, real time, near real time, and total 4-space analysis and mining.

3. TAG: Theoretical and Applied Group: Back-end, Research, Experiment, Design and Development.

5.2.1   OG: Operations Group

The OG is the front-end Command Center, manned by operators and operations analysts, this group is responsible for the real-time operations and monitoring of the Global Ambient Intelligence. This group operates primarily in the domain of 3-space with a short operations oriented window on the 4th (time).

The AIScom OG Command Center shall be organized into 4 units:

1. OG Operations: responsible for the operation and monitoring of the Global Ambient Intelligence and AIScom.

2. OG Theaters: responsible for the analysis and dissemination of Ambient Intelligence in active theaters of combat and sub-organized by theater.

3. OG Activities: responsible for the analysis, dissemination and real time liaison with military and intel units currently engaged in specific activities or operations including long term operations and operations which transcend borders and theaters. The future of warfare, the world is the theater with shadow armies aligned with shadow countries which exist around the world with no borders, no geography, no capitals and a similarly decoupled distributed symbiotic feeder economy. Current and future generations shall, and do, view their country as the place they hang their hat-- their true country is a shadow country or countries of people around the world who share common and overlapping cells of mind sets. This unit is organized by, and deals with, operations level activities (classic) and by class level activities (threat class such as nuclear, air traffic anomaly, drug trafficking, genocide, military border crossings, etc.)

4. OG Saturations: responsible for operations and liaison with operations of Saturation.

The AIScom OG personnel shall designate objects of interest and priorities thereof. These objects may be theaters, regions, cells, specific classes of detection with territories, specific operations, even the Ambient Intelligence associated with global operations involving a particular group or specific threat signature. These personnel shall also designate direct feeds for certain Ambient Intelligence to specific units such as NSA, a specific division command or even a SpecOps team in the field in real-time.

As Global Ambient Intelligence arrives to AIScom, the AIScom computer stores the data, processes the data and directs feeds to NSA (intel), CIA (general intel or real time intel for an

operation in progress), DHS (border and port security), a SpecOps team covertly in the field real-time, SpecOps command (until SpecOps is equipped with Sentinels), EPA (environmental alert data), AFWA and NOAA (real time climate data), and/or any other organization fed by AIScom. This also allows for data to conventional military whilst protecting the true breadth and scope of Global Ambient Intelligence in and outside of combat theaters. Additionally, DHS border security, NOAA and even USGS (real time or alert seismic data) can be fed with high quality and dense information with now idea of the scope of the source. As the AIScom computer processes the data, alerts are presented in the command center for Actionable Items of Interest (AII) in accord with the priorities and algorithms selected by the command center. In addition, the computer finds patterns in the wealth of Information outside of the scope of what human personnel expect in order to identify and present Actionable items of Interest (AII) for to the command center for Action.

The AIScom OG command center is also where AII are presented to AIScom for kill or no kill directives. Forces in the Cell may receive the Ambient Intelligence locally via their Sentinel devices listening to the Ambient Intelligence or via propagation through AIScom.

The operators and analysts of OG configure priorities, propagation and areas of interest by adjusting the parameters of front end Discriminators. Front end Discriminators referring to Discriminators which appear later (to the right) of the Dataflow after previous Discriminators have performed a great deal of technical analysis thus presenting OG operators and analysts with Discriminators dealing with priority, geography, activity, threat probability, operations scope, etc. Bayesian Discriminators at this level also learn from operator's decisions of relevance and non relevance from choices made upon presented Actionable Items of Interest (AII). OG analysts can also coordinate with AG analysts to mine through 4-space Intelligence with greater sensitivity in order to detect factors such as post-detection movement paths and vectors, detailed link analysis, etc.

OG, under their operational gui, have access to the front-end Discriminators (extreme right side of flow). This is akin to operating stick-pedal-throttle but then being able to adjust trim, tanks and mixture. OG handles real time operations, configuration and the front-end Discriminators.

Information, naturally, can be discarded, rotated or stored as 4-space by the AIScom computer. The stored data is then available for subsequent search for pattern matching and link analysis as events unfold, develop and are understood.

5.2.2   AG: Analysis Group

Analysis Group is the middle group. AG handles real-time analysis, near real-time analysis, and total 4-space analysis and intelligence mining. Under their operational gui, AG have access to the middle-level and Front-end Discriminators. This is akin to driving wheel and pedals and having access to the engine computer. AG is responsible for detailed analysis of Intelligence as opposed to the real time operational configuration and reaction of OG. Additionally, AG performs non real time total 4-space temporal intelligence interrogation, analysis and mining. This is most similar to analysis organization of NSA and CIA with the addition of the tremendous data and computation. It is anticipated that NSA, CIA, FBI and DHS will have their own AG's receiving raw Ambient Intelligence from AIScom or Ambient Intelligence which has been preprocessed by AIScom analysis middle-level Discriminators. From here, the additional organizations mentioned will have their own stores of Intelligence and processing of Intelligence.

AG is also responsible for the construction and parameter configuration of Discriminator sets for

new Saturations which are then deployed by OG. AG also constantly tunes and optimizes the middle level Discriminators.

5.2.3   TAG: Theoretical and Applied Group

TAG is the Theoretical and Applied Group consisting of a range of personnel from computer scientists to engineers, scientists, climatologists, sociologists, military scientists, mathematicians, etc. TAG is responsible for all theoretical, experimental and application of technologies and Discriminators. TAG, under their operational gui, has access to all Discriminators. This is akin to popping the bonnet to get to the guts. TAG conducts research in ranges as diverse as information theory to image processing, vision systems to anthropology, cultural anthropology, military intelligence, systems analysts and the entire super set of an intelligence organization and national lab. All Discriminators originate from TAG.

6.0   Operations

7.0   Some Development & Deployment Time Lines

Once the fundamental architecture and foundation of Ambient Intelligence are laid and built, it allows for a surge in the creative design of simple Sentinels untethered from the drag of concern for interoperability and integration. Thus, Ambient Intelligence becomes all about the ingredients of the Cocktail and the Saturation thereof.

7.1   Sentinels

7.1.1   DNI / DTO request for a Proof of Concept Prototype (DTOsentinel)

The DNI (Office of the Director of National Intelligence) and the DTO (Disruptive Technology Office) have proposed that Lakhvinder construct a non-functional larger than scale prototype of a Sentinel. We can deliver a functional centimeter scale Sentinel prototype within 30 days without a shell. We can deliver said Sentinel prototype with a rock-like shell within 90 days. We can deliver said Sentinel with the Concept A teardrop case within 90 to 180 days. Said unit can be delivered with approximately 1mW power consumption plus desired sensors resulting in a solar powered Sentinel, or a non-solar battery powered Sentinel or a solar / battery hybrid powered Sentinel with the battery powered unit providing 500 to 1200 day battery life depending upon the Sensors desired and the function. Said Sentinel shall have a maximum communications range of 100 meters providing for a large area Cellular Cocktail. Spikes and meta-Cellular Sentinels then extend the Saturation beyond the Cell.

7.1.2 First Generation Sentinel Architecture (GIsentinel)

1. GI.1sentinel. We can deliver a fully functional first generation centimeter scale prototype Sentinel with a mock-up shell and an alpha or beta version of the ambML language within 6 months.

2. GI.2sentinel. We can deliver a fully functional centimeter scale prototype Sentinel with Concept A teardrop or rock-like shell and a beta or 1.0 implementation of ambML within 1 year.

3. GI.3sentinel. We can deliver a fully functional series of Sentinel prototypes ready for mass scale manufacturing within 1.5 years. Said Sentinels would be a series with various sensors for a complete cocktail and would implement 1.0+ ambML. Said Sentinels can be available in this time frame with both Concept A teardrop and multiple geology rock-like shells. Mass scale manufacturing shall then result in deployment from serial number 1 from the factory line. Development then proceeds at a brisk pace in order to expand the Sentinel series.

7.1.3 Second Generation Sentinel Architecture (GII.1sentinel)

Second generation Sentinels can be delivered as production ready prototypes within 2 to 3 years. Said Sentinels shall be at a smaller centimeter scale or millimeter scale. This development can be accelerated by moving directly with Second Generation development and / or by priority access to existing chip and MEMS fabrication facilities.

7.1.4 Third Generation Sentinel Architecture (GIII.1Sentinel)

Third generation Sentinels can be delivered as production ready prototypes within 2 to 5 years. Said third generation Sentinels shall be on the millimeter and sub-millimeter scales. Size and delivery time shall vary within these ranges in accordance with the particular variation of Sentinel (the desired sensors and function). This development may be accelerated, however, it must follow the Second generation Sentinel Architecture in order to garner "wisdom and knowledge". Third generation Sentinel architecture allows for the use of novel and advanced power sources in the environment itself. Third generation Sentinels allow for nominal service life in excess of 30 years.

7.1.5 Fourth Generation Sentinel Architecture (GIV.1sentinel)

Fourth Generation Sentinels can be delivered in select variations in 5+ years. Beyond these select variations, fourth generations Sentinels require development heavier on the research side. Select variation development can be accelerated with priority access to, or construction of, MEMS fabrication facilities. Research may be greatly accelerated with access to, or construction of, MEMS research facilities.

7.1.6 Fifth Generation Nano scale (GV.1sentinel)

Nano scale Sentinels require research and development of key technological capabilities and cannot be expected to produce usable results in less than 7+ years. This scale is purely a basic research effort at this stage.

7.2   The Spike Sentinel

7.2.1   The Spike Sentinel Prototype (SPIKEprototype)

We can deliver a partially functional Spike Sentinel with a non-deployable mock-up shell within 9-12 months.

7.2.2   First Generation Spike Sentinel Architecture

1. GI.1spike. We can deliver a fully functional first generation deployable prototype Spike Sentinel ready for mass scale manufacturing within 1.5 to 1.75 years with several camouflage kits. It may be possible to accelerate this development time line with access to specific COTS technology in the area of munitions deployment systems and satellite communications systems.

7.3   Ambient Intelligence intraCellular Communications Topology

7.3.1   First Generation Ambient Intelligence intraCellular Communications Topology

We can deliver a first generation topology within 1 year allowing for a Cocktail of up to 65,000 Sentinels per Cell.

7.3.2   Lo Load Adaptation of Ambient Intelligence Emissions

The Ambient Intelligence emissions system can be adapted to Lo Load Military and Intelligence applications within 1 year. This development time line may be accelerated with special access to manufacturers.

7.3.3   Second Generation Ambient Intelligence intraCellular Communications Topology

We can deliver the first generation with adaptation for Lo Load within 1.5 to 1.75 years. This development time line may be accelerated with special access to manufacturers.

7.3.4   SOEN™: Third Generation Ambient Intelligence intraCellular Communications Topology

We can deliver SOEN (Self Organizing Emergent Network) within 2 to 2.5 years. SOEN is a technology decoupled from BFM / SAViM technology and has been used in our production projects since the late 1990's.

7.4   AIScom Computation Logic System

7.4.1   First Generation Computation Logic System (GI.1cls)

The first generation system can be deployed on IBM, SGI or Fujitsu large scale systems on the front end with a custom set of arrays on the back end constructed of COTS technology. This first generation of AIScom Logic System can be delivered in 6 months plus component manufacturer

delivery time. Lakhvinder has had variations of this system in production use internationally for over 12 years at different scales. The 6 month time line represents planning and acquisition. Assembly and installation is a function of component manufacturer delivery time and the readiness of the installation site.

7.4.2   Second Generation Computation Logic System (GII.1cls)

The BFM / SAViM I can be delivered as a production system within 3 to 5 years. This can be greatly accelerated.

7.4.3   Third Generation Computation Logic System (GIII.1cls)

The BFM / SAViM II can be delivered as a production system within 4 to 6 years. This can be greatly accelerated, and, BFM /SAViM I can be skipped in order to move straight to BFM / SAViM II.

7.5   AIScom Logic System Information Architecture

7.5.1   First Generation Logic System Information Architecture (GI.1ia)

The first generation information architecture can be deployed with Oracle, MySQL and custom integration and information systems. The system can be delivered within 1 year. 6 to 9 month can be concurrent to the First Generation Computation Logic System, the remaining deployment must take place after sufficient assembly and deployment of said computation Logic System.

7.5.2   Second Generation Logic System Information Architecture (GII.1ia)

The Cellular Bundle Databank can be delivered as a production system within 3 to 5 years with development concurrent to BFM / SAViM I. This can be greatly accelerated.

7.6   Logic System Discriminator Architecture

7.6.1   First Generation Discriminator Architecture and Foundation (GI.1lsda)

Can be delivered in 1.5 to 2 years in the form of a 1.0 production system within the capabilities of the First Generation Computation Logic System and the First Generation Logic System Information Architecture.

7.7   First Generation Field PDA and Laptop Sentinels

1. Alpha version prototypes can be delivered within 6 to 9 months with an alpha version of ambML and without tacML.

2. We can deliver beta version prototypes within 1 year with a beta version of ambML and an alpha version of tacML.

3. We can deliver production ready prototypes within 1 to 1.5 years complete with 1.0 ambML and 1.0 tacML.

7.8   First Generation Production Territorial Saturation System

We can deliver a first generation production ready Territorial Saturation system within 2 years complete with an AIScom, Spike Sentinels and a series of Sentinels with up to 65,000 Sentinel per Cell. Manufacturing and deployment time is dependent upon size of Saturations desired, the number of Cells desired, the initial order commitment and upon manufacturer access.