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(54) NETWORK STATION IDENTIFICATION BASED ON GEODETIC DATUM

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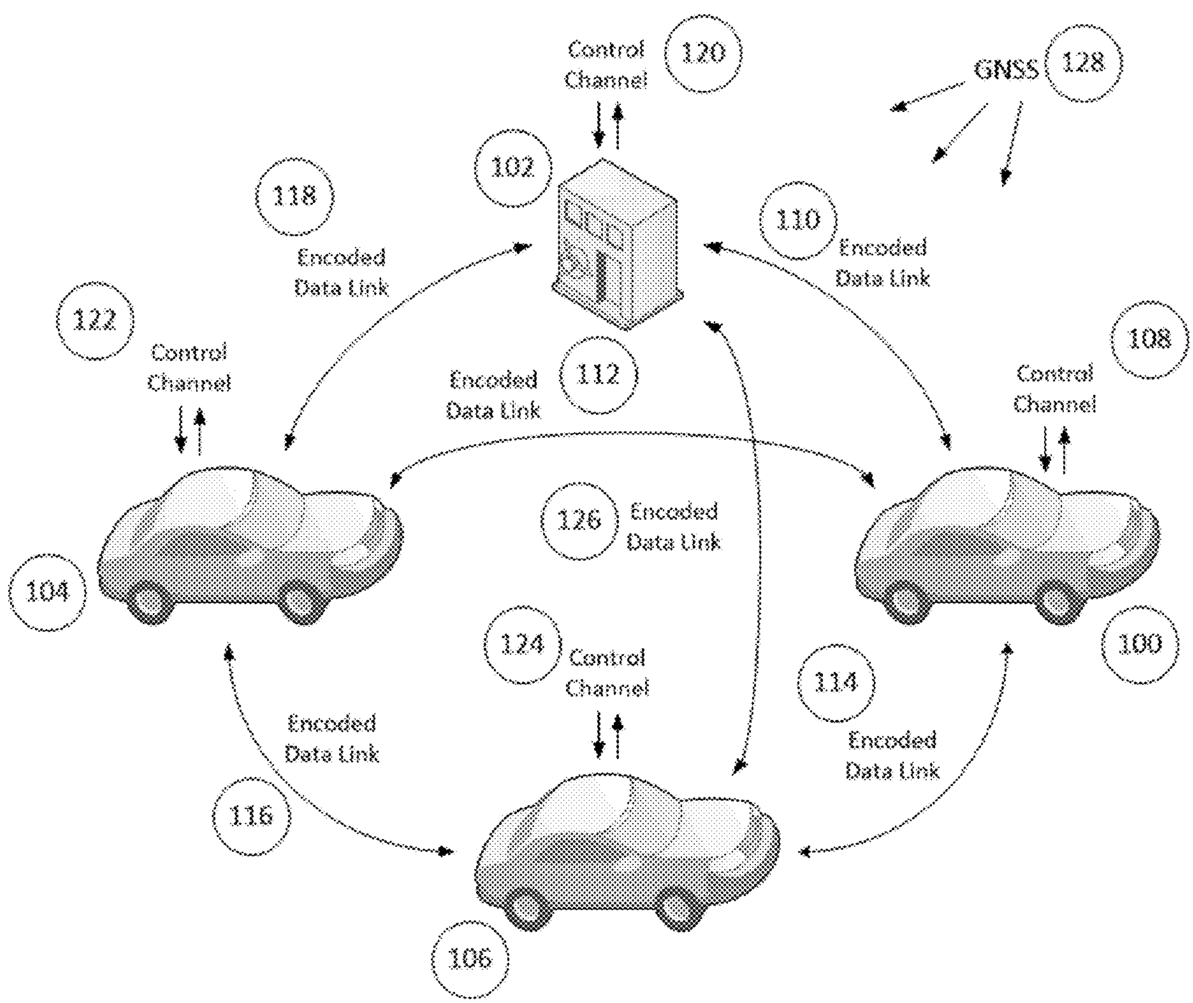
(57) **ABSTRACT**

A unique system for the implementation of a communications system whereby network communicators such as service providers and service users are accessed based on geodetic datum. Service providers broadcast geodetic based network identification information on a common control channel for reception by local proximity service users. The service user evaluates each received broadcast and determines if a secure paired network connection is required. The encoded data link is negotiated between user/provider for secure data transmission based on current geodetic network identification information. Geodetic information, being temporary in nature, can be propagated in position, time or both to provide dynamically updating network identification for any participant.



System Block Diagram

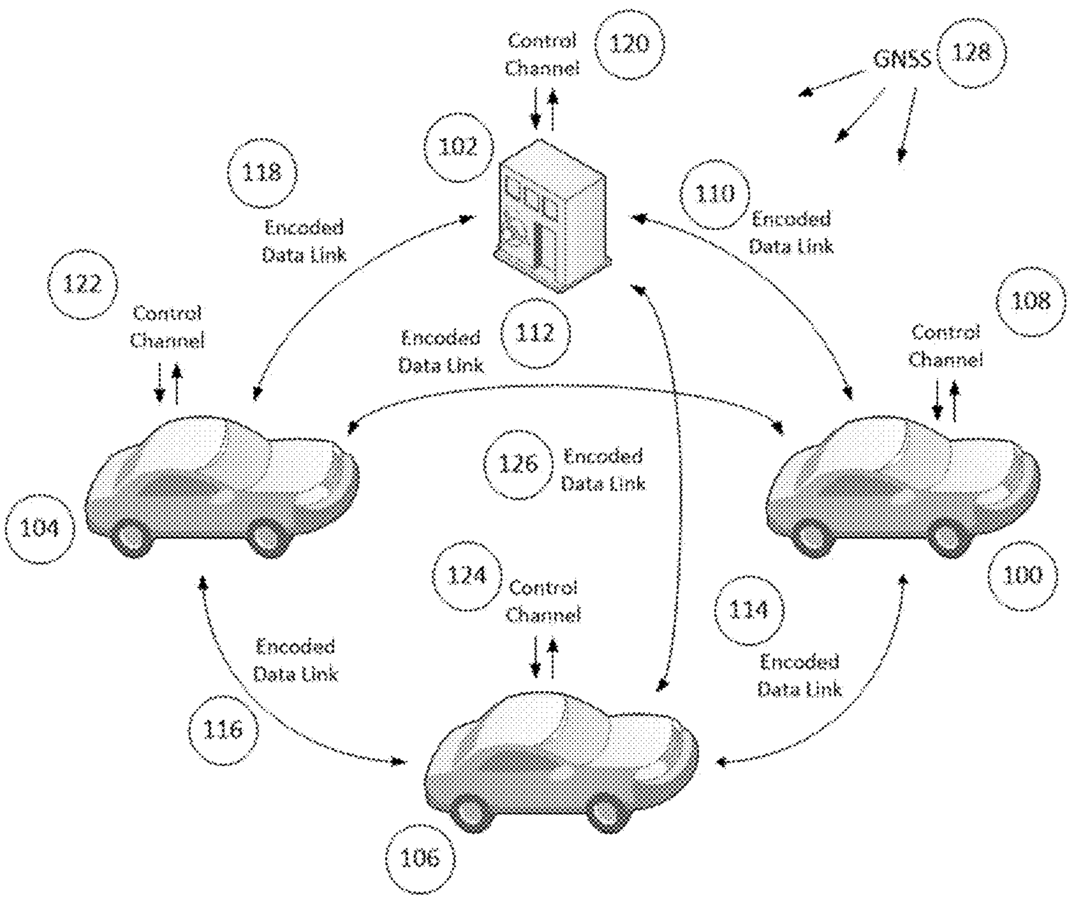


FIG. 1 – System Block Diagram

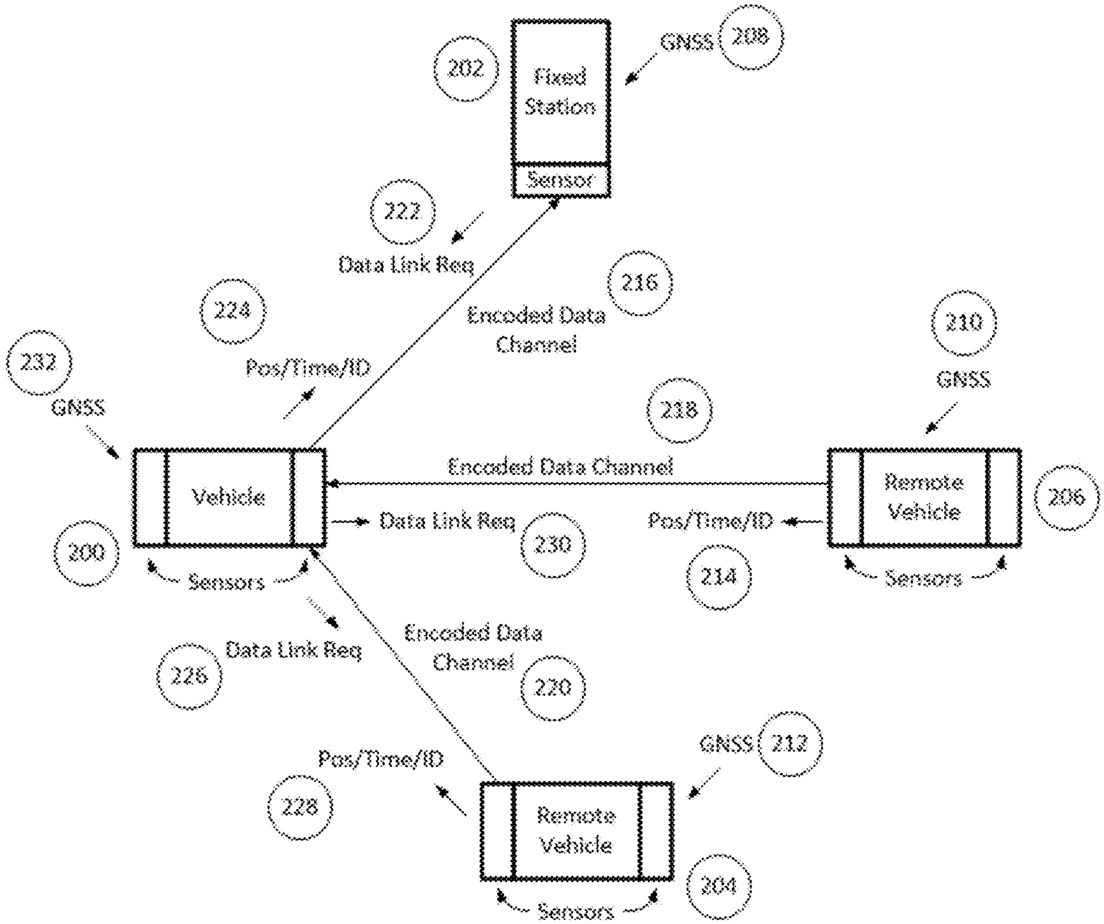


FIG. 2 – Communication Block Diagram

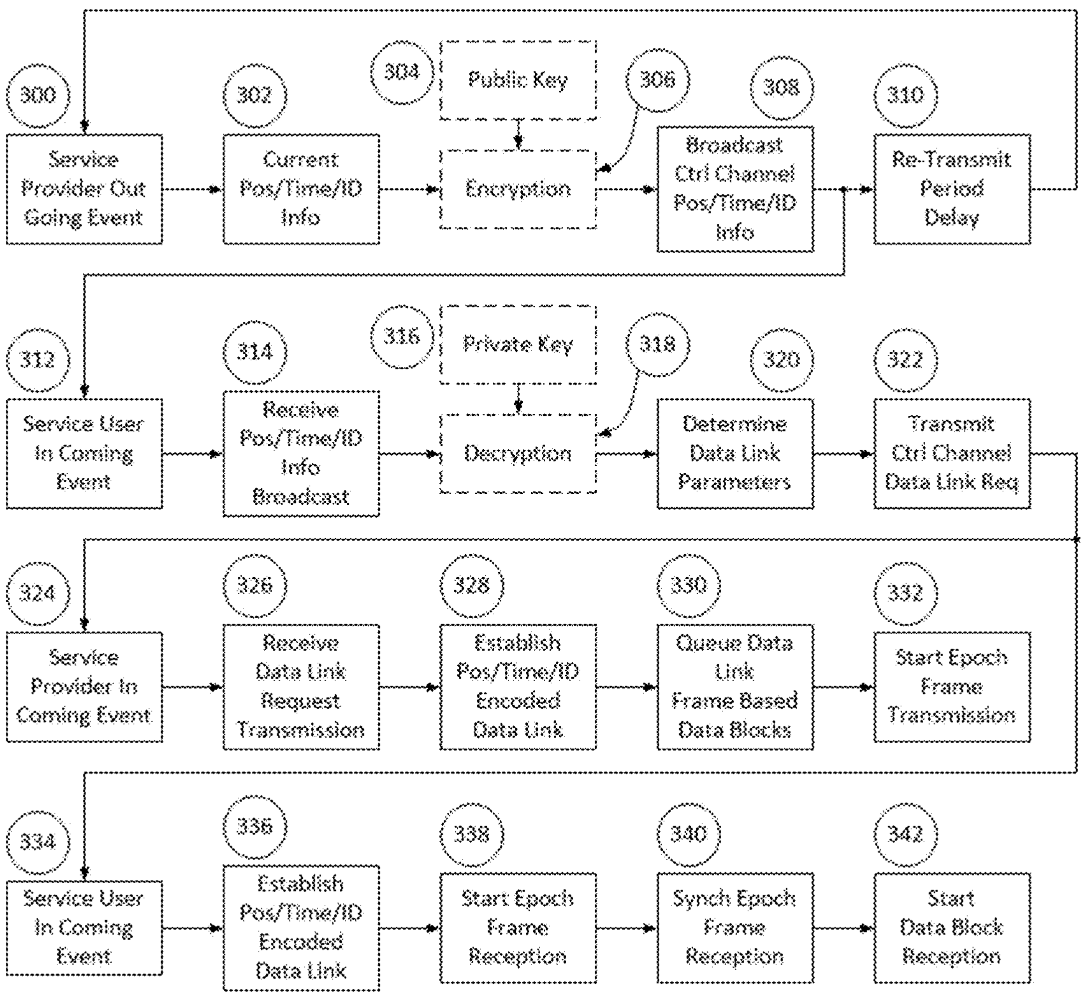


FIG. 3 – Establish Data Link Example Process Diagram

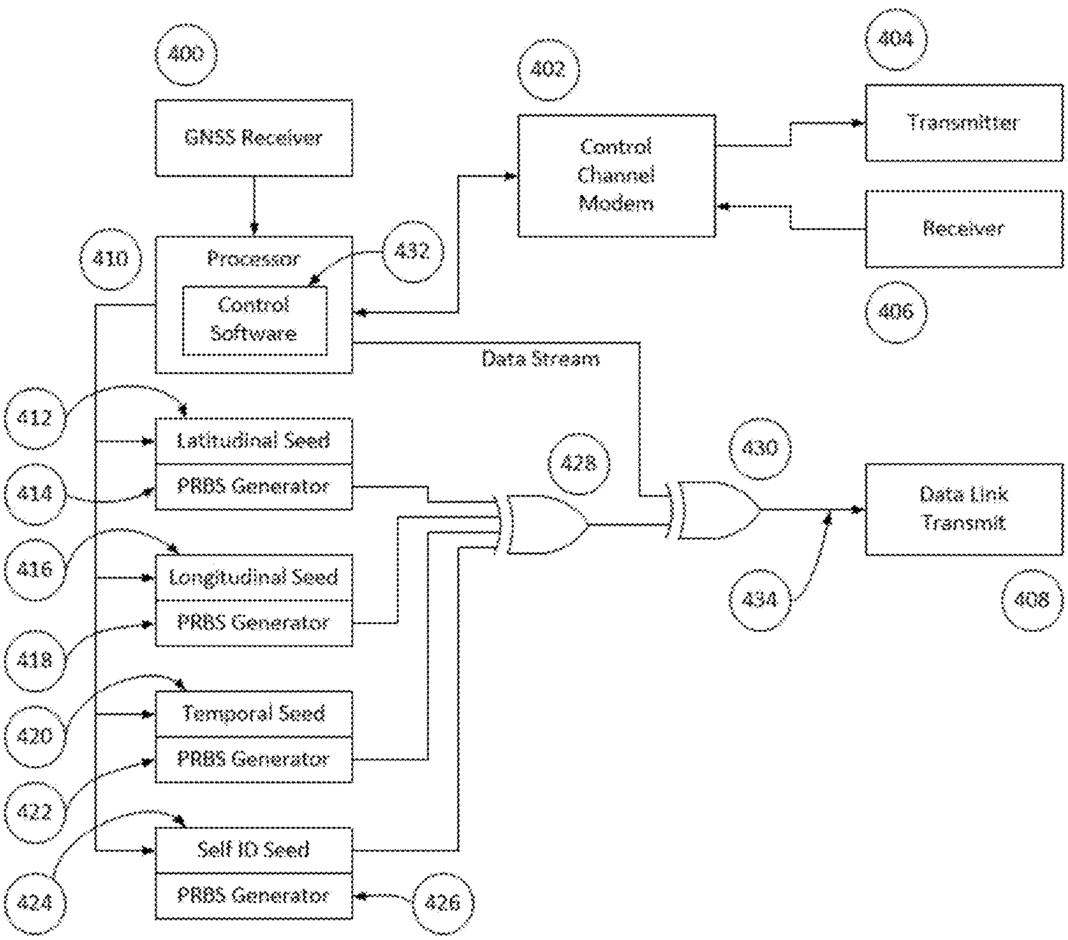


FIG. 4 – Encoder Example Circuit Diagram

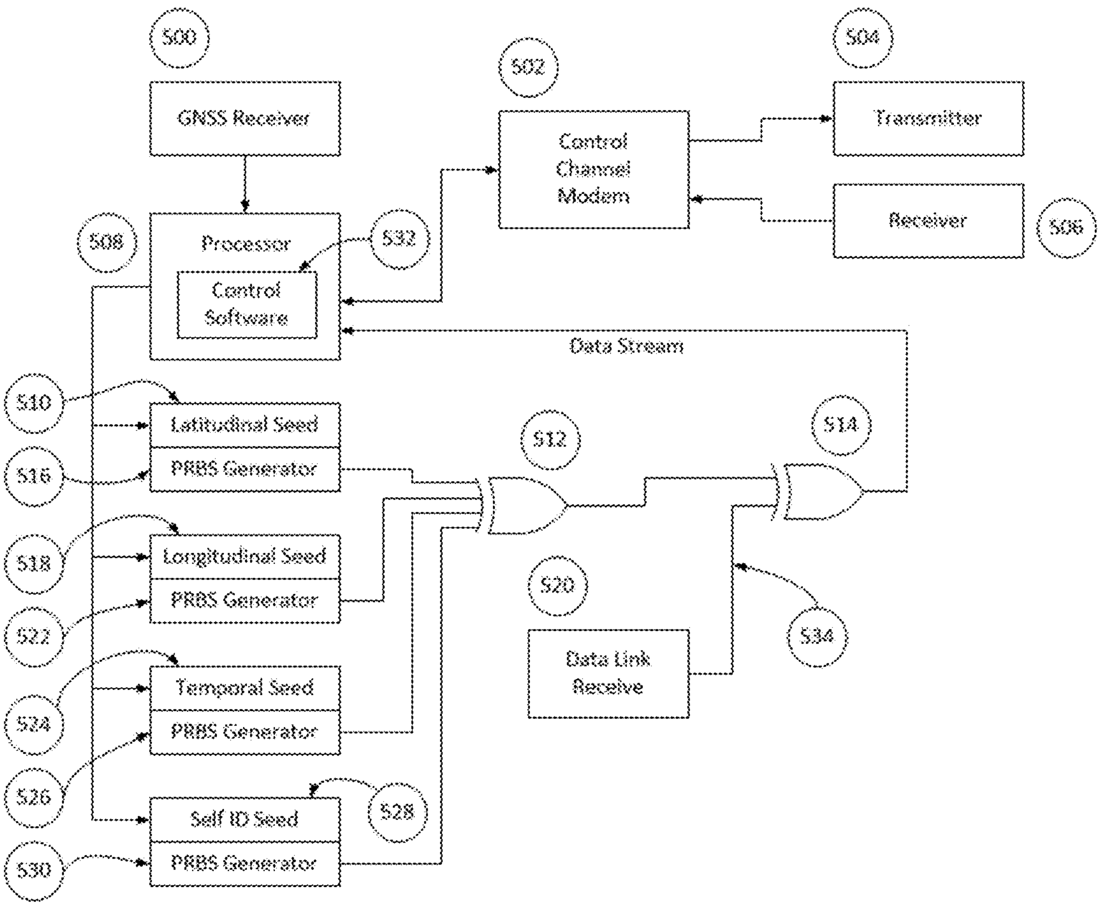


FIG. 5 – Decoder Example Circuit Diagram

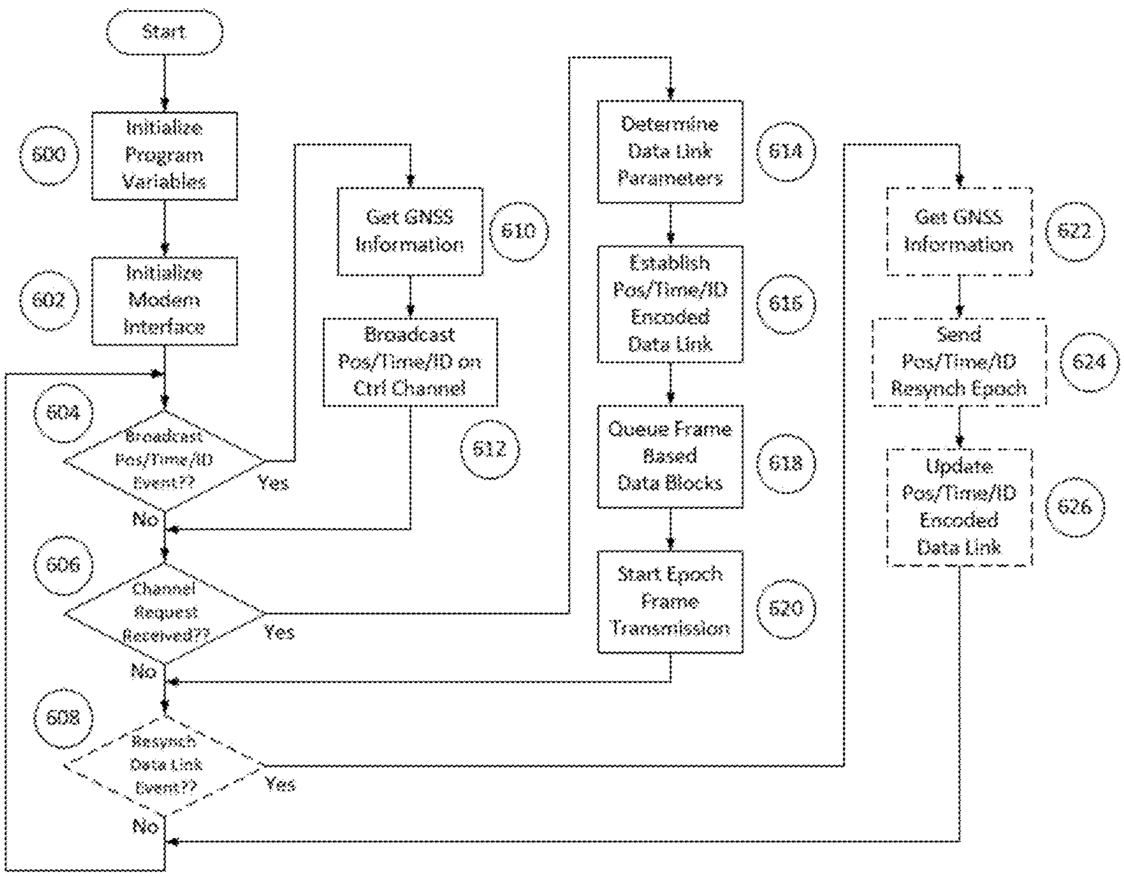


FIG. 6 – Service Provider Station Example Software Flow Chart

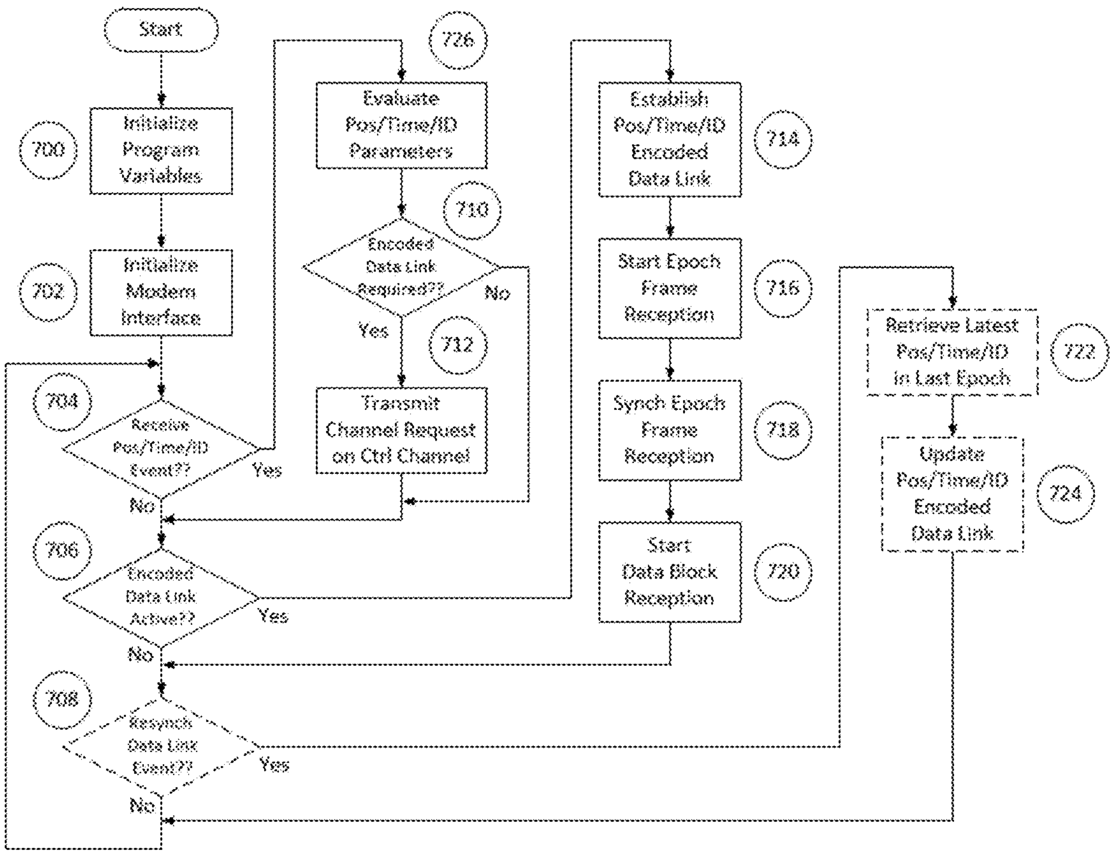


FIG. 7 – Service User Station Example Software Flow Chart

NETWORK STATION IDENTIFICATION BASED ON GEODETIC DATUM

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] Not Applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

REFERENCES CITED

U.S. Patent Documents

[0003] U.S. Pat. No. 9,140,782 B2 September 2015 Alberth

Foreign Patent Documents

[0004] Not Applicable

OTHER PUBLICATIONS

[0005] Not Applicable

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0006] This invention relates to the field of providing a unique network identification or address for network communicators based on their geodetic datum parameters. Based on real time global navigation satellite system (GNSS) data, each communicator will have a unique set of geodetic datum parameters representing a precise location at an instant in time. These parameters are used to derive a communicator network identification having the properties of uniqueness, temporary persistence and one-time usage. Communicator identification can be used to uniquely encode/access a data link or channel to insure a secure paired communication path between network communicators. The invention is compatible with current methods of communications but in most cases will serve to simplify mobile network overhead management.

2. Description of the Related Art

[0007] Providing secure data communications between non stationary users presents a difficult situation due to the operational environment dynamics. Channels need to be dynamically allocated based on proximity and interaction requirements possibly forming multiple overlapping competing local networks. Additionally, secure data transmission adds in the need for cryptographic key content management outside of network channel management. These areas are being currently being investigated as part of an industry standard mobile network configuration. The present invention is a system and method to address these unmet needs.

[0008] Current industry acceptance of IEEE 802.11p and IEEE 1609 define a WAVE (Wireless Access in Vehicular Environments) network protocol stack specialized for vehicle communications. Further, SAE J2735 defines the specific messaging formats and structure for vehicle/vehicle (V2V) or vehicle/infrastructure (V2I) applications. These applications, as described in SAE J2945, are mainly centered on vehicle safety and interaction within traffic situations to provide a method to exchange information. The SAE J2735 protocol is built around a core message type called the "Basic Safety Message" openly broadcast by each vehicle. This message is broadcast by vehicles to provide situational data including location, heading, speed, etc to surrounding vehicles. Being an open broadcast with no security provisions, the messages are non-secure being susceptible to bad actor spoofing. Local V2V type continuous data transactions over an IEEE 801.11p network are provided by the Non-IP based the CALM-FAST protocol. Although Non-IP based, the protocol is based on MAC addressing whereby each network participant is identified by a unique static 48 bit MAC address. The present invention teaches a system whereby each network participant is identified by their unique real time geodetic (position/time) datum. Network identification derived from ever changing geodetic information has deterministic properties of being unique, usable for a temporary period and one time generation based the fact two communicators cannot occupy the same physical space at the same time. Geodetic datum can be propagated in position, time or both to provide dynamically updating network identification for any participant. Periodically changing or updating of each network participant's identification information based on the latest geodetic datum provides a secure method for network data communications.

[0009] Ad-hoc V2V communication systems have been proposed in the art most notably by Alberth in U.S. Pat. No. 9,140,782 titled "Inter-Vehicle Alert System with Nagable Video Look Ahead". The system of Alberth utilizes millimeter wave radar sensors mounted front/rear to send video data between vehicles for collision avoidance. Communication between vehicles is simply based on "addressing information" whereby no further description is provided. This is different from the generalized geodetic based network identification data links proposed by the present invention whereby the system of Alberth is specialized to radar sensors and video type data.

BRIEF SUMMARY OF THE INVENTION

[0010] The present invention comprises a communications system whereby network communicators such as service providers and service users are accessed using network identification based on geodetic datum. Service providers can broadcast geodetic based network identification information on a common control channel for reception by local proximity service users. Each service user evaluates received broadcasts and determines if a secure paired network connection is required. The encoded data link is negotiated between user/provider for secure data transmission based on current geodetic network identification information. Geodetic information, being temporary in nature, can be propagated in position, time or both to provide dynamically updating network identification for any participant.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1** is a system block diagram for the preferred embodiment of the present invention.

[0012] FIG. **2** is a communication block diagram for the preferred embodiment of the present invention.

[0013] FIG. **3** is an example process diagram detailing the establishment of an encoded channel.

[0014] FIG. **4** is an example block diagram detailing the encoder hardware circuit.

[0015] FIG. **5** is an example block diagram detailing the decoder hardware circuit.

[0016] FIG. **6** is an example software flow chart detailing a service provider station control software processing steps.

[0017] FIG. **7** is an example software flow chart detailing the service user station control software processing steps.

REFERENCE NUMERALS IN THE DRAWINGS

100	Vehicle #1 Communicator	102	Fixed Station Communicator
104	Vehicle #2 Communicator	106	Vehicle #3 Communicator
108	Vehicle #1 Control Channel Broadcast	110	Vehicle #1 to Fixed Station Encoded Data Link
112	Vehicle #1 to Vehicle #2 Encoded Data Link	114	Vehicle #1 to Vehicle #3 Encoded Data Link
116	Vehicle #2 to Vehicle #3 Encoded Data Link	118	Vehicle #2 to Fixed Station Encoded Data Link
120	Fixed Station Control Channel Broadcast	122	Vehicle #2 Control Channel Broadcast
124	Vehicle #3 Control Channel Broadcast	126	Vehicle #3 to Fixed Station Encoded Data Link
128	GNSS Signal		
200	Vehicle #1 Communicator	202	Fixed Station Communicator
204	Remote Vehicle #3 Communicator	206	Remote Vehicle #2 Communicator
208	Fixed Station GNSS Signal	210	Remote Vehicle #2 GNSS Signal
212	Remote Vehicle #3 GNSS Signal	214	Remote Vehicle #2 Pos/Time/ID Control Channel Broadcast
216	Vehicle #1 to Fixed Station Encoded Data Channel	218	Remote Vehicle #2 to Vehicle #1 Encoded Data Channel
220	Remote Vehicle #3 to Vehicle #1 Encoded Data Channel	222	Fixed Station to Vehicle #1 Data Link Request Control Channel Transmission
224	Vehicle #1 Pos/Time/ID Control Channel Broadcast	226	Vehicle #1 to Remote Vehicle #3 Data Link Request Control Channel Transmission
228	Remote Vehicle #3 Pos/Time/ID Control Channel Broadcast	230	Vehicle #1 to Remote Vehicle #2 Data Link Request Control Channel Transmission
232	Vehicle #1 GNSS Signal		
300	Service Provider Out Going Event	302	Determine Current Pos/Time/Id Information
304	Public Cryptographic Key	306	Data Encryption
308	Broadcast Pos/Time/ID On Control Channel	310	Re-Transmit Delay Period Timer
312	Service User In Coming Event	314	Receive Pos/Time/ID Info Broadcast
316	Private Cryptographic Key	318	Data Decryption
320	Determine Data Link Parameters	322	Transmit Data Link Request On Control Channel
324	Service Provider In Coming Event	326	Receive Data Link Request Transmission
328	Establish Pos/Time Encoded Data Link	330	Queue Data Link Frame Based Data Blocks
332	Start Epoch Frame Transmission	334	Service User In Coming Event
336	Establish Pos/Time Encoded Data Link	338	Start Epoch Frame Reception
340	Synchronize Epoch Frame Reception	342	Start Data Block Reception
400	GNSS Receiver	402	Control Channel Modem
404	Control Channel Transmitter	406	Control Channel Receiver
408	Encoded Data Link Transmitter	410	Processor
412	Latitudinal Based PRN Seed	414	Pseudo Random Binary Sequence Generator
416	Longitudinal Based PRN Seed	418	Pseudo Random Binary Sequence Generator
420	Temporal Based PRN Seed	422	Pseudo Random Binary Sequence Generator
424	Self ID Based PRN Seed	426	Pseudo Random Binary Sequence Generator
428	PRBS Output Combiner	430	PRBS Data Stream Combiner
432	Control Software	434	Encoded Data Stream
500	GNSS Receiver	502	Control Channel Modem
504	Control Channel Transmitter	506	Control Channel Receiver
508	Processor	510	Latitudinal Based PRN Seed
512	PRBS Output Combiner	514	PRBS Remover
516	Pseudo Random Binary Sequence Generator	518	Longitudinal Based PRN Seed
520	Encoded Data Link Receive	522	Pseudo Random Binary Sequence Generator
524	Temporal Based PRN Seed	526	Pseudo Random Binary Sequence Generator
528	Self ID Based PRN Seed	530	Pseudo Random Binary Sequence Generator
532	Control Software	534	Encoded Data Stream
600	Initialize Program Variables Process Step	602	Initialize Modem Interface Process Step
604	Broadcast Pos/Time/ID Event Decision Block	606	Channel Request Received Decision Block
608	Re-synch Data Link Event Decision Block	610	Get GNSS Information Process Step
612	Broadcast Pos/Time/ID On Control Channel Process Step	614	Determine Data Link Parameters Process Step
616	Establish Pos/Time/ID Encoded Data Link Process Step	618	Queue Link Frame Based Data Blocks Process Step
620	Start Epoch Frame Transmission Process Step	622	Get GNSS Information Process Step
624	Insert Pos/Time/ID In Last Epoch Process Step	626	Update Pos/Time/ID Encoded Data Link Process Step
700	Initialize Program Variables Process Step	702	Initialize Modem Interface Process Step

-continued

REFERENCE NUMERALS IN THE DRAWINGS

704	Receive Pos/Time/ID Event Decision Block	706	Encoded Channel Active Decision Block
708	Re-synch Data Link Event Decision Block	710	Encoded Channel Required Decision Block
712	Transmit Channel Request on Control Channel Process Step	714	Establish Pos/Time/ID Encoded Data Link Process Step
716	Start Epoch Frame Reception Process Step	718	Synch Epoch Frame Reception Process Step
720	Start Data Block Reception Process Step	722	Retrieve Latest Pos/Time/ID In Last Epoch Process Step
724	Update Pos/Time/ID Encoded Data Link Process Step	726	Evaluate Pos/Time/ID Parameters Process Step

DETAILED DESCRIPTION OF THE INVENTION

[0018] The preferred embodiment system block diagram of the present invention is shown in FIG. **1** as three mobile vehicle communicator stations and a fixed position communicator station. In the context of this preferred embodiment the terms pos/time/ID and identification information are used interchangeably. Each communicator station is equipped to receive GNSS information **128**. Vehicle communicator station **100** accesses common control channel **108** to initially broadcast a data packet representing network identification information to include for example current position, time and self identification. The common control channel is available to all network communicators for open broadcasts or other type data transactions. Network identification information is analogous to an address uniquely identifying the communicator on the network. The self identification can further comprise a cryptographic key to allow encryption/decryption of network communications. FIG. **1** shows other local proximity communicator stations as vehicle **104**, vehicle **106** and fixed station **102** whereby each receive the vehicle **100** network identification information broadcast. Common control channel access points for each is of the local communicator are identified by vehicle **104** as node **122**, vehicle **106** as node **124** and fixed station **102** as node **120**. Based on the vehicle **100** broadcast, each local communicator will determine if an encoded data link is required. An encoded data link for example can be a uniquely paired communications path or channel between communicators only accessible by knowing the current network identification information. Determination of a required data link can be based on such parameters but not limited to: distance, direction, link integrity, interaction, coordination, data transfer, etc. Setup of an encoded data link is performed using the control channel whereby each local communicator (service user) sends control information including a channel request back to the network identification information broadcaster (service provider). Based on this transaction, encoded channels are initiated between the service user and provider as shown in FIG. **1**. Vehicle **100** communicates with vehicle **104** via encoded data link **112**, vehicle **106** via link **114** and fixed station **102** via link **110**. Similarly, vehicle **104** communicates with vehicle **106** via link **116** and fixed station **102** via link **118**. Finally, vehicle **106** communicates with fixed station **102** via link **126**.

[0019] The present invention preferred embodiment as shown in FIG. **2** provides more detail into the communication between four local proximity communicator stations. In this figure, each communicator station transmits or receives control or encoded data information using sensor equipment built into each vehicle or fixed position station. Example industry standard sensors found in the art capable of information transfer include but are not limited to: RF transceiver types such as Cellular, Dedicated short range communications (DSCR), Mobile wireless broadband (MWB), Satellite and other sensor types such as Millimeter wave radar, Infrared. Vehicle **200** acts as both a service user/provider; while remote vehicle **206** and vehicle **204** are service providers; and fixed station **202** is a service user. An example application could have vehicle **200** streaming sensor data from vehicles **206** and **204** while interacting with fixed station **202** for a billing service. In setting up the encoded data channels, vehicle **200** receives GNSS information **232** and then broadcasts pos/time/ID derived identification information **224** onto the control channel. Similarly, vehicle **206** also receives GNSS information **210** and broadcasts pos/time/ID derived identification information **214** onto the control channel while vehicle **204** receives GNSS information **212** and broadcasts pos/time/ID derived identification information **228** on the control channel. Vehicle **200** receives pos/time/ID derived identification information **214** and sends control information data link request **230** to vehicle **206** to initiate encoded data channel **218**. Vehicle **200** also receives pos/time/ID derived identification information **228** and sends control information data link request **226** to initiate encoded data channel **220**. Fixed station **202** receives pos/time/ID derived identification information **224** and sends control information data link request **222** to initiate encoded data channel **216**. Each of the encoded data channels **218**, **220** and **222** between service user and provider are unique being based on the pos/time/ID derived identification information sent by the service provider. The encoding of each encoded data channel **218**, **220** and **222** can be changed at anytime by transferring updated pos/time/ID derived identification information from service provider to user. This allows secure communications between communicators based on the encoding constantly changing thereby being difficult to intercept.

[0020] FIG. **3** shows an example of process steps used to establish the encoded data link between a service provider and service user. Service provider event **300** initiates the sequence to broadcast pos/time/ID derived identification information. The current pos/time/ID identification information is derived from GNSS information in step **302**. Encryption step **306** using public key **304** is an optional step to encrypt the identification information broadcast on the common control channel. Broadcast of pos/time/ID derived identification information on the common control channel is performed in step **308** whereby a period delay **310** is started to schedule a later broadcast event **300**. Service user event **312** is initiated upon reception of pos/time/ID derived identification information **314** from the common control channel. Decryption step **318** using private key **316** is an optional step to decrypt the identification information received on the common control channel. Step **320** determines the data link parameters for the control information data link request transmitted on the common control channel **322**. Service provider event **324** is initiated upon reception of a control information data link request **326** on the common control channel. The data link parameters determined in step **320** is used to establish a pos/time/ID encoded data link **328**. Step **330** forms a queue of frame based data blocks to be transmitted on the encoded data link. Step **332** starts an epoch based frame transmission of data across the encoded data link. Service user event **334** is initiated upon transmission of the data link request to start encoded channel data reception. Step **336** uses the data link parameters determined in step **320** to establish a pos/time/ID encoded data link. Epoch data frame reception of the encoded data channel is started **338** and synchronized **340** prior to data block reception **342**. Termination of the encoded data channel can be initiated by the service provider based on the service being completed.

[0021] An example channel encoder circuit based on position, time and ID network identification information for the preferred embodiment is presented in FIG. **4**. This example based on Code Division Multiple Access (CDMA) may be replaced with any channel multiplexing method including but not limited to: Time Division Multiple Access (TDMA) and Frequency Division Multiple Access (FDMA). Additionally, this encoder example is shown based on a horizontal datum coordinate system (Latitude/Longitude) but can be simply modified to include a vertical datum (altitude) component. GNSS receiver **400** provides the communicator's current geodetic datum information. An example GNSS receiver reporting geodetic datum information could utilize NEMA 183 messages. In these messages, strings representing latitude (ddmm.mmmm plus N/S indicator), longitude (dddmmm.mmmm plus E/W indicator) and time (hhmmss.ss) can all be converted to a 32-bit fixed point format. These three 32-bit numbers plus a 32-bit self ID field can be used as seed values (FIG. **4** **412**, **416**, **420**, **424** and FIG. **5** **510**, **518**, **524**, **528**) for the PRBS generators. Control channel modem **402** provides processor **410** access to the common control channel in conjunction with transmitter **404** and receiver **406**. Control software **432** executes on processor **410** to operationally control the encoder circuit. Latitudinal seed **412**, longitudinal seed **416**, temporal seed **420** and self ID seed **424** are calculated by control software **432** based on identification information received from the control channel. The seed values are loaded into PRBS generator circuits **414**, **418**, **422** and **426** to create multiple pseudo random bit streams. Logic element **428** combines the multiple PRBS into a single PRBS used to encode the data link. Finally, logic element **430** creates an encoded data stream **434** from a non-encoded data stream provided by control software **432**. The encoded data stream **434** is transmitted on the data link by transmitter **408**.

[0022] An example channel decoder circuit based on position, time and ID network identification information for the preferred embodiment is presented in FIG. **5**. This example based on Code Division Multiple Access (CDMA) may be replaced with any channel multiplexing method including but not limited to: Time Division Multiple Access (TDMA) and Frequency Division Multiple Access (FDMA). Additionally, this encoder example is shown based on a horizontal datum coordinate system (Latitude/Longitude) but can be simply modified to include a vertical datum (altitude) component. GNSS receiver **500** provides the communicator's current geodetic datum information. Control channel modem **502** provides processor **508** access to the common control channel in conjunction with transmitter **504** and receiver **506**. Control software **532** executes on processor **508** to operationally control the decoder circuit. Latitudinal seed **510**, longitudinal seed **518**, temporal seed **524** and self ID seed **528** are calculated by control software **532** based on identification information received from the control channel. The seed values are loaded into PRBS generator circuits **510**, **518**, **524** and **530** to create multiple pseudo random bit streams. Logic element **512** combines the multiple PRBS into a single PRBS used to decode the data link. Finally, logic element **514** removes the PRBS to create a decoded data stream as based on encoded data stream **534** provided by data link receiver **520**. The decoded data stream is sent to control software **532**.

[0023] FIG. **6** shows an example software flow chart for the service provider control software **432** of the preferred embodiment. Execution begins at the "Start" label first initializing program variables **600** and initializing the modem interface **602**. Decision block **604** determines if a pos/time/ID broadcast event has been scheduled. If so, the latest GNSS information is retrieved **610** and broadcast as pos/time/ID on the control channel **612**. If not, decision block **606** determines if a channel request has been received on the control channel from a service user. If so, the data link parameters are determined **614** and the pos/time/ID encoded data link is established **616** by seeding PRBS generators **414**, **418**, **422** and **426**. Data blocks are then queued into frames **618** and the epoch frame transmission is started **620**. If no channel request has been received, decision block **608** determines if an optional data link resynchronization event has been scheduled. If so, the current GNSS information is retrieved **622** and sent as updated pos/time/ID control information in a resynchronization epoch **624** to the service user. Finally, the pos/time/ID encoded data link is updated **626** by reseeding PRBS generators **414**, **418**, **422** and **426**.

[0024] FIG. **7** shows an example software flow chart for the service user control software **532** of the preferred embodiment. Execution begins at the "Start" label first initializing program variables **700** and initializing the modem interface **702**. Decision block **704** determines if a pos/time/ID broadcast event has been received. If so, the pos/time/ID parameters are evaluated to determine if an encoded data link is required. This determination can be based on such parameters but not limited to: distance, direction, interaction, coordination, data transfer, etc. If an encoded channel is required **710**, a channel request is transmitted on the control channel **712**. Next, decision block **706** follows and determines if an encoded data link has been activated. If so, the pos/time/ID encoded data link is established **714** by seeding PRBS generators **516**, **522**, **526** and **530**. Epoch data frame reception of the encoded data channel is started **716** and synchronized **718** prior to data block reception **720**. Termination of the encoded data channel can be initiated by the service provider based on the service being completed. Decision block **708** determines if an optional data link resynchronization event has been received. If so, updated pos/time/ID control information is retrieved from a resynchronization epoch **722**. Finally, the pos/time/ID encoded data link is updated **724** by reseeding PRBS generators **516**, **522**, **526** and **530**.

[0025] An alternative embodiment of the present invention comprises replacing the static IEEE 801.11 defined MAC address with a dynamic or changing value based on geodetic datum. A dynamic value replacing the static network identifier is especially useful for securing Non-IP routed network communications. In this manner, the network identification of a network communicator could be changed dynamically providing a method of secure communications. The dynamic network identification for a communicator would be derived from a combination of their geodetic position, time and self ID as described with reference to FIG. **4**. As described, the resultant 128 bit network identification would need to be reduced down to a unique 48 bit sized representation to be compatible with existing systems. This reduction in the numerical size could be achieved by a hashing function or some other method.

[0026] An exemplary application of the present invention would consist of a fixed position communication station acting as the service user to moving vehicular communication stations providing a service. Various examples of a fixed position communication station include but are not limited to: toll collection station, parking lot entry/exit station, restaurant/store drive thru station, etc. In this example, an automated fixed position toll station receives network identification information broadcast by vehicles moving past the station. The toll station will request an encoded channel with each passing vehicle to procure a toll payment. Since each vehicle's pos/time/ID used within the current network identification will be different, each encoded channel will be uniquely and securely paired. The network identification information also has the properties of being temporary and of one time usage. In comparison, a static MAC address is permanently assigned to a communicator and used for every interaction. This opens the possibility of a bad actor cloning the MAC address of another network communicator and impersonating them on the network. The problem is magnified within open air systems whereby MAC address transmissions are freely accessible to any user within receiving range of the signal. For purpose of this toll station example, a bad actor could receive and clone the MAC address of another user. This would allow the bad actor to freely interact to toll station inquires using a cloned MAC address and cheat the system.

The claimed invention is:

1. A system comprising:

a. a communication network coupled to at least two communication stations, the communication network routing data in response to the communication stations;

b. a first communication station coupled to the communication network, the first communication station transmitting and receiving data in response to the communication network;

c. a second communication station coupled to the communication network, the second communication station transmitting and receiving data in response to the communication network;

d. wherein the first communication station is configured to receive GNSS information and derive first network identification information based on geodetic datum information; and

e. wherein the second communication station is configured to receive GNSS information and derive second network identification information based on geodetic datum information.

2. The system of claim **1**, wherein each communication station is configured to broadcast network identification information onto the communications network and receive broadcast network identification information from the communications network.

3. The system of claim **2**, wherein each communication station is configured to establish an encoded data link based on network identification information.

4. The system of claim **2**, wherein each communication station is configured to perform network communications using a RF transceiver sensor.

5. The system of claim **2**, wherein each communication station is configured to perform network communications using an infrared sensor.

6. The system of claim **2**, wherein each communication station is configured to perform network communications using a radar sensor.

7. A method comprising:

a. routing data on a communication network in response to at least two communication stations;

b. transmitting and receiving data by a first communication station in response to the communication network;

c. transmitting and receiving data by a second communication station in response to the communication network;

d. generating first communication station network identification information derived from geodetic data information in response to GNSS information; and

e. generating second communication station network identification information derived from geodetic data information in response to GNSS information.

8. The method of claim **7**, further comprising broadcasting network identification information by a communication station onto the communications network and receiving broadcast network identification information by a communication station from the communications network.

9. The method of claim **8**, further comprising establishing an encoded data link by a communication station based on network identification information.

10. A system comprising:

a. a fixed position communication station coupled to a communication network, the fixed position communication station transmitting and receiving data in response to the communication network;

b. a mobile communication station coupled to a communication network, the mobile communication station transmitting and receiving data in response to the communication network;

c. wherein the fixed position communication station is configured to receive geodetic datum derived network identification information from the mobile communication station, respond with network control information and establish an encoded data link with the mobile communication station; and

d. wherein the mobile communication station is configured to receive network control information from the fixed position communication station and establish an encoded data link with the fixed position communication station.

11. The system of claim **10**, wherein the fixed position communication station comprises a toll collection station.

12. The system of claim **10**, wherein the fixed position communication station comprises a parking lot entry/exit station.

13. The system of claim **10**, wherein the fixed position communication station comprises a restaurant/store drive thru station.

* * * * *