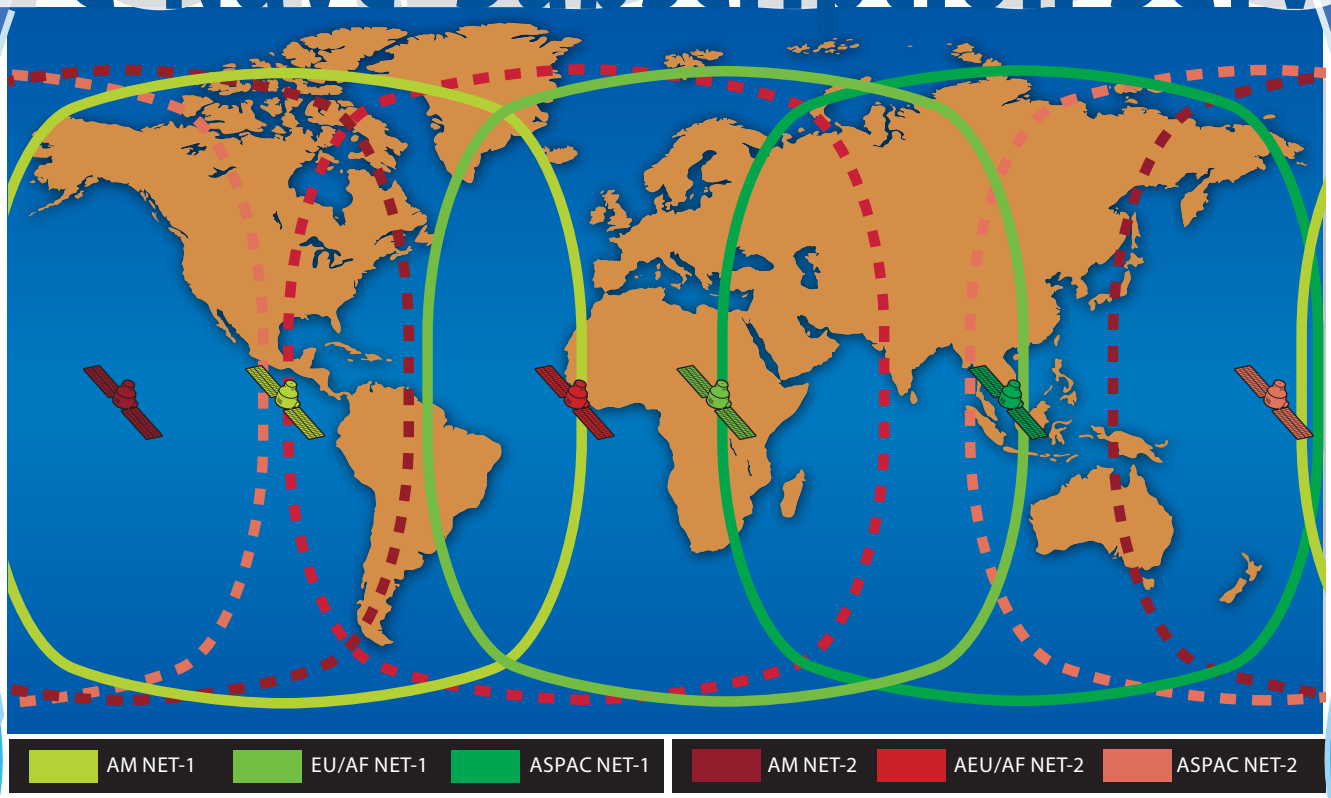
C-Nav®
WORLD DGNSS

C-NavC^2 Subscription Service



TAKE A CLOSER LOOK AT C-Nav:

C-NAV IS THE LATEST GENERATION OF POSITIONING SERVICES INCORPORATING CUTTING EDGE TECHNOLOGIES TO ACHIEVE SATELLITE BASED PRECISE POSITIONING WITH STATE OF THE ART USER EQUIPMENT.

C-NAV CUSTOMERS NOW HAVE THE CHOICE OF TWO INDEPENDENT CLOCK AND ORBIT CORRECTION MESSAGES **C-NAVC^1** AND **C-NAVC^2**, GENERATED IN TWO INDEPENDENT SATELLITE CORRECTION BROADCAST SERVICES, **NET-1** AND **NET-2**.

- Two independent subscription services: **C-NavC^1 AND C-NavC^2**
- Precise point positioning (10cm horizontal and 25cm vertical) based on propitiatory PPP solution for both GPS and GLONASS
- Global coverage using six geostationary communication satellites
- Redundancy in ground infrastructure
- User equipment that is compact, rugged, easy to install and simple to operate
- Global 24/7 customer service when and where you need it

GSA Contract Holder
FSS Contract GS-07F-5671P

C-NavC² Subscription Service

QC CONFIDENCE - WITHOUT THE INCONVENIENCE

C&C Technologies' **C-NavC²** global positioning service offers robust Quality Control through independent solutions and inbuilt duality.

C-NavC² features:

- Full constellation - GPS and GLONASS (Galileo and COMPASS planned)
- Worldwide Precise Point Positioning
- Duality and independence built in
- 2D decimeter level dynamic accuracy
- Mutually compatible generation and application software
- Confidence through real-time user access to the C-Nav worldwide monitor network
- Regular GNSS status updates and notices by email
- 24 hour service on-call backup
- Automatic backup with **C-NavC¹**
- Compliance with the OGP/IMCA "Guidelines for GNSS Positioning in the Oil and Gas industry" QC parameters

REAL-TIME PRECISE POINT POSITIONING (PPP)

The real-time proprietary PPP solution used by **C-NavC²** is the very latest generation in GNSS accuracy enhancements, addressing GNSS uncertainties where they occur - at source.

- Completely independent of **C-NavC¹**
- Proprietary Starfire PPP algorithms
- Orbit correctors for each GPS and GLONASS satellite
- Clock offset correctors for each GNSS satellite
- Dual frequency C-Nav receivers for ionospheric correctors
- Up to 20% reduction in GNSS receiver cold-start pull-in time
- Patented multi-path mitigation software and antenna technology at each **C-NavC²** reference station
- Sinko's Earth tides model incorporated

GROUND SEGMENT

Each **C-NavC²** satellite tracking station includes a minimum of two active receivers with quality controlled feedback loops ensuring performance metrics are maintained.

- Worldwide network of dedicated sites
- Independent A and B dual-frequency engines at each site.
- Real-time comparison of position, accuracy, and precision.
- Simultaneous observations to each GNSS satellite from typically seven stations.
- Secure and robust multi-routed communication links backed up by VSAT and ISDN.

CONTROL SEGMENT

Two independent, geographically separated Processing Centers interconnected by high-speed, high-capacity frame-relay feeds.

Each Processing Center:

- Receives the full complement of **C-NavC²** reference station data (both A and B receivers).
- Two independent production layers - Primary and Secondary.
- Compares the observables from each A and B receiver and independently selects the optimum solution.
- Handles the data cloud completely independently of the other, producing two independent sets of PPP corrections.
- Continuously monitors PPP correctors to ensure there are no errors.
- Resilient and spatially diversified communication routing
- Sends correctors independently to the Land Earth Station network for uplink to the C-Nav **NET-1** and **NET-2** satellites.

SPACE SEGMENT: NET-1 & NET-2

The C-Nav space segment is comprised of six geostationary communication satellites providing global hipower L-Band distribution. Uplinked through six Land Earth Stations (LES), configured as **NET-1** or **NET-2**, a minimum of two satellites are visible to every **C-NavC²** user.

- Each LES is equipped with Primary and Secondary equipment layers.
- Each layer receives **C-NavC²** corrections from both Control Centers with the Primary layer comparing the two correction data sets for integrity then, independently selecting the optimum data set for uplink.
- Secure high-speed cable and VSAT with ISDN backups for data flow between the Control Centers and the Land Earth Stations.
- Communication satellites are constantly monitored to ensure service continuity and quality.
- Backup channel capacity available on adjacent satellites over the same regions.
- Ground station network monitors L-Band signal strength, veracity, and precision of received data in a continuous baseline comparison process.
- Since the inception of NET2 (over five years ago), the uptime of the combined system has been 100%

USER SEGMENT RECEIVER TECHNOLOGY

The international **C-NavC²** subscription service is accessible using the latest Sapphire® powered C-Nav3050 GNSS receiver and C-Nav7000 configurable multi-correction source GNSS receiver.

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