

# ***Embedding a Software GPS Application within a JTRS Software Defined Radio Architecture***

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# NAVSYS Corporation

*Founded in 1986*



## Mission Statement

*To provide specialized GPS products & services for our customers by leveraging our core technologies, unique technical expertise, innovative engineering, strong work ethic, and high standards of excellence.*

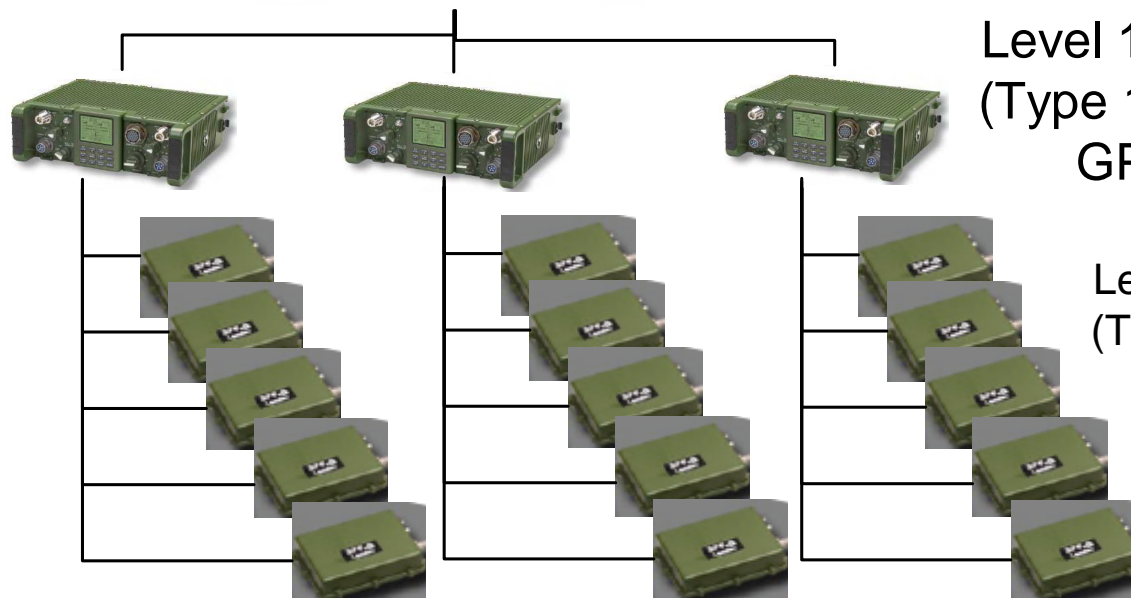
# *Summary of the Problem*

- JTRS-HMS requires GPS position and time for networking and waveform initialization
- SAASM is mandated for DoD GPS operations to provide Precise Positioning Service
- Adding SAASM to small form factor JTRS-HMS would exceed size, weight, power budget
- Unattended sensors for Future Combat System (FCS) architecture require accurate GPS position
- Security policy dictates that SAASM devices cannot be left unrecoverable and unattended in UGS sensors

# Multi-Level Network Assisted GPS SAASM Architecture



Level 0 Master Unit  
(JTRS-GMR with  
SAASM)



Level 1 Client Unit  
(Type 1 JTRS with  
GPS-Lite)

Level 2 Client Unit  
(Type 2 JTRS with  
GPS-Lite2)

# JTRS Network Assisted GPS (N08-198)

Level 0:  
JTRS with SAASM



Provides SAASM, NAV and  
DGPS Network Assisted  
GPS (NAG) Services



Level 1:  
JTRS with GPS-Lite  
Type 1 (Core Radio 2)



Computes SAASM assisted  
PPS solution and provides  
PY Network Assisted GPS  
(NAG) Services



Level 2:  
JTRS with GPS-Lite2  
Type 2 (Core Radio 1)



Computes SAASM assisted  
PPS solution using NAG  
Services in Type 2 Radio

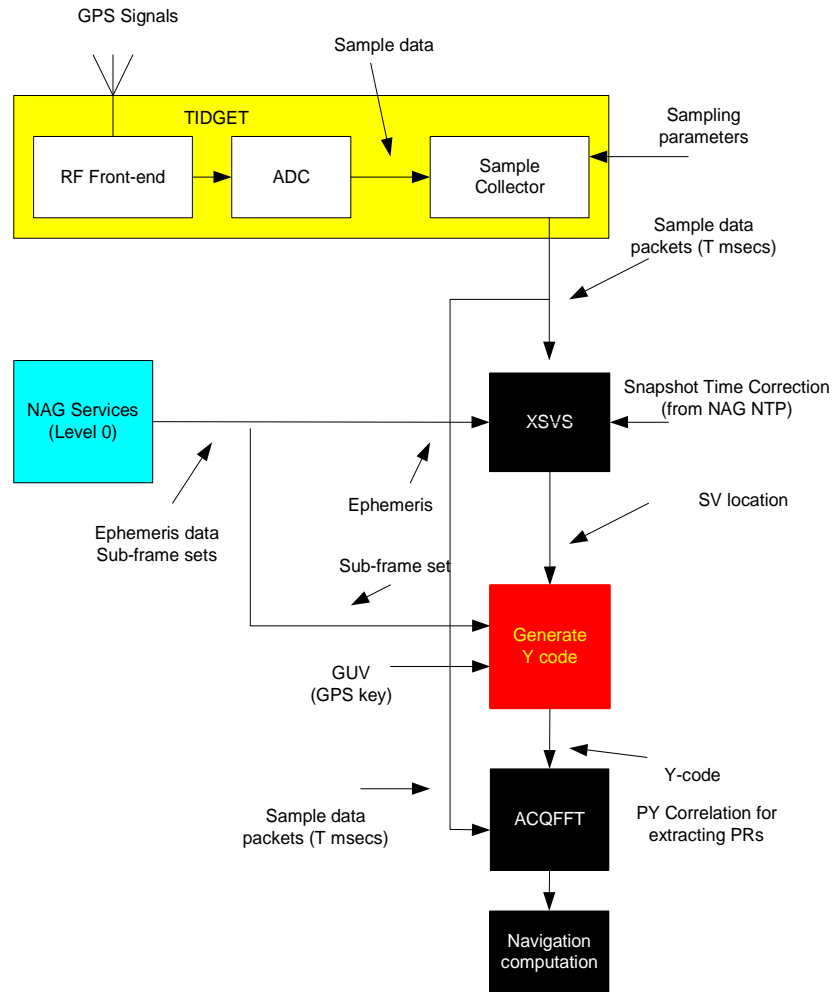
# TIDGET Ultra Low Power GPS



Commercial components can collect PPS snapshots if they cover GPS 20 MHz bandwidth

- RF front-end takes GPS snapshot (Patented)
- Small size < 13 gms
- Lithium battery supports 12 fixes/hr for 1 year
- GPS solution computed in external processor
- Can be adapted for integration with JTRS radio

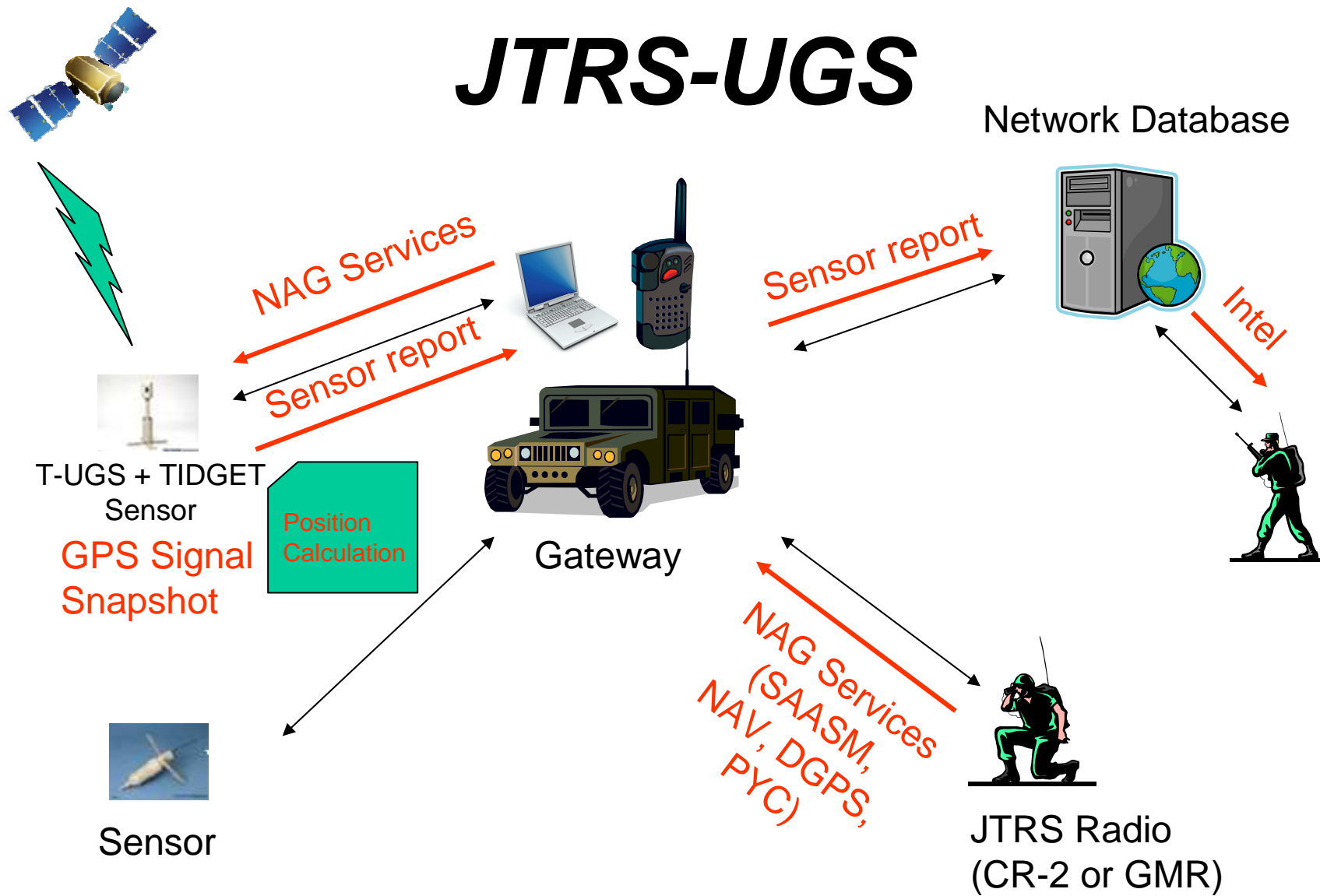
# GPS-Lite JTRS-PPS Approach



TIDGET  
snapshot  
module add-  
on to JTRS-HMS

- GPS-Lite in JTRS-HMS
- NAG services speed TTF
- Snapshot GPS enables low power per fix
- Direct-Y code acquisition supported

# JTRS-UGS





# *Benefits of JTRS-PPS Approach*

- Provides equivalent performance to SAASM using Network Assistance
  - Direct P(Y) code acquisition
  - Extended functions
- Low Power Operation
  - Takes 1/6<sup>th</sup> power of a DAGR under low dynamic scenarios
  - Power per Fix improved further when using FPGAs
  - Reduces size, weight, and cost for small form factor radios
  - Avoids need for embedded SAASM in every JTRS-HMS form factor
- High Sensitivity
  - Improved operation in GPS degraded environment