



SENSORS

INS Integration of an Inertial Navigation System and Dynamic Positioning

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Converteam/IXSEA

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Integration of INS and DP

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CONVERTEAM
THE POWER CONVERSION COMPANY



Integration of an inertial navigation system and DP



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OUTLINE

INS and acoustics

INS and GPS

Outages

DP architecture



MOTIVATION: ACOUSTICS

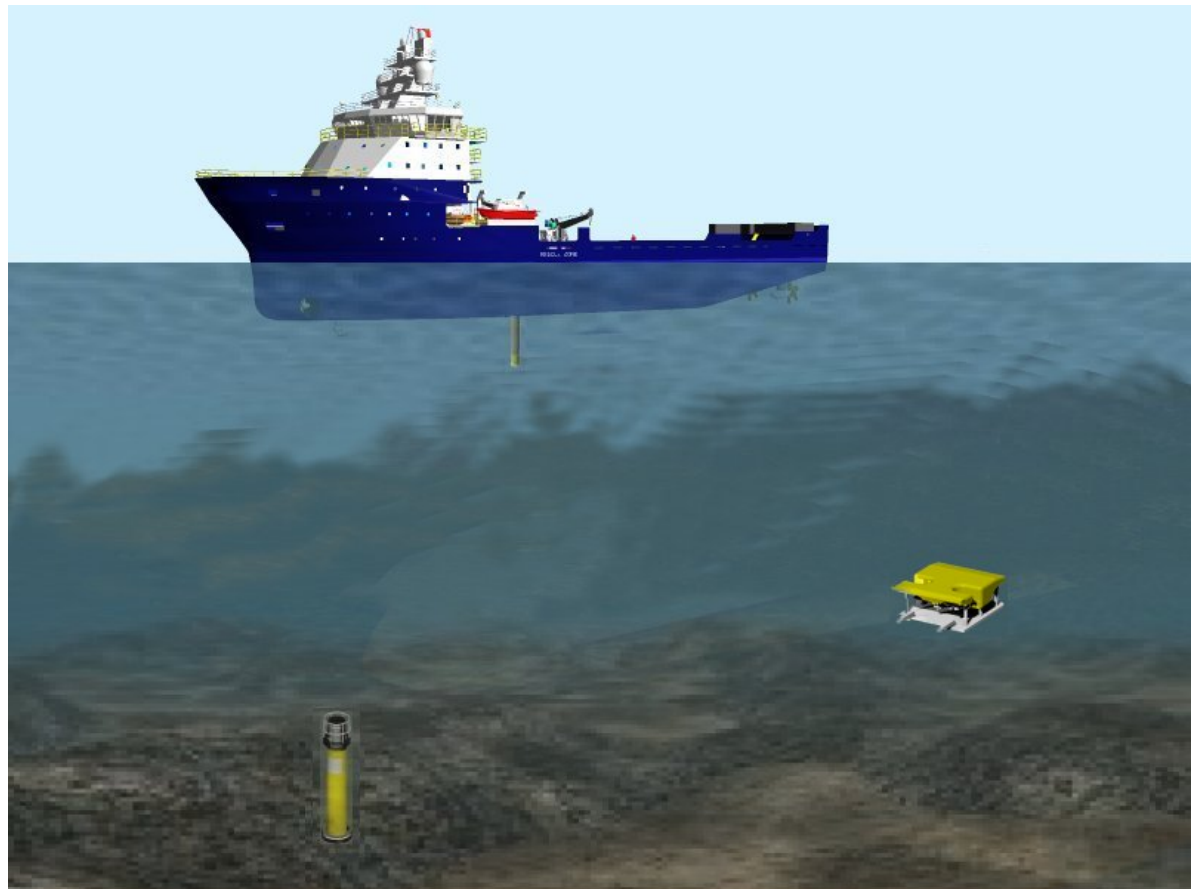
Deep or shallow

Noise

Ping rates

Battery life

Outages



GAPS AND PHINS UNITS

Easy to use

Plug and play

Marinized

Quality IMU

Replace 1 gyro
and 1 VRU



SEA TRIALS INS + ACOUSTICS



ACOUSTICS TRIALS

Shallow water

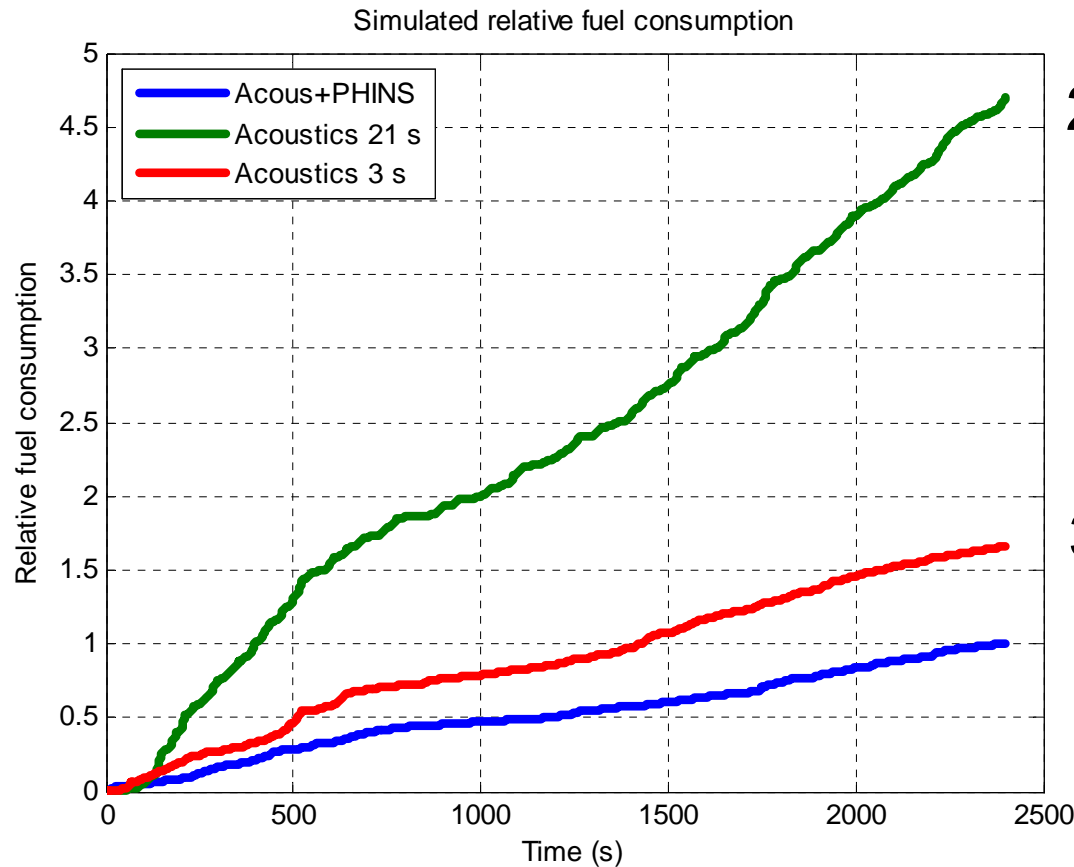
- 15 m depth
- 2000 m horizontal
- 89.5° from vertical

Deep water

- 1000 m depth
- 3 sec minimum ping time
- 21 sec ping time into INS



DP ON ACOUSTICS ONLY: POWER



21 s ping time

3 s ping time

INS

INS + ACOUSTICS

Save 85 % of battery replacements

...even more?

Or 40 % thruster power on acoustics only

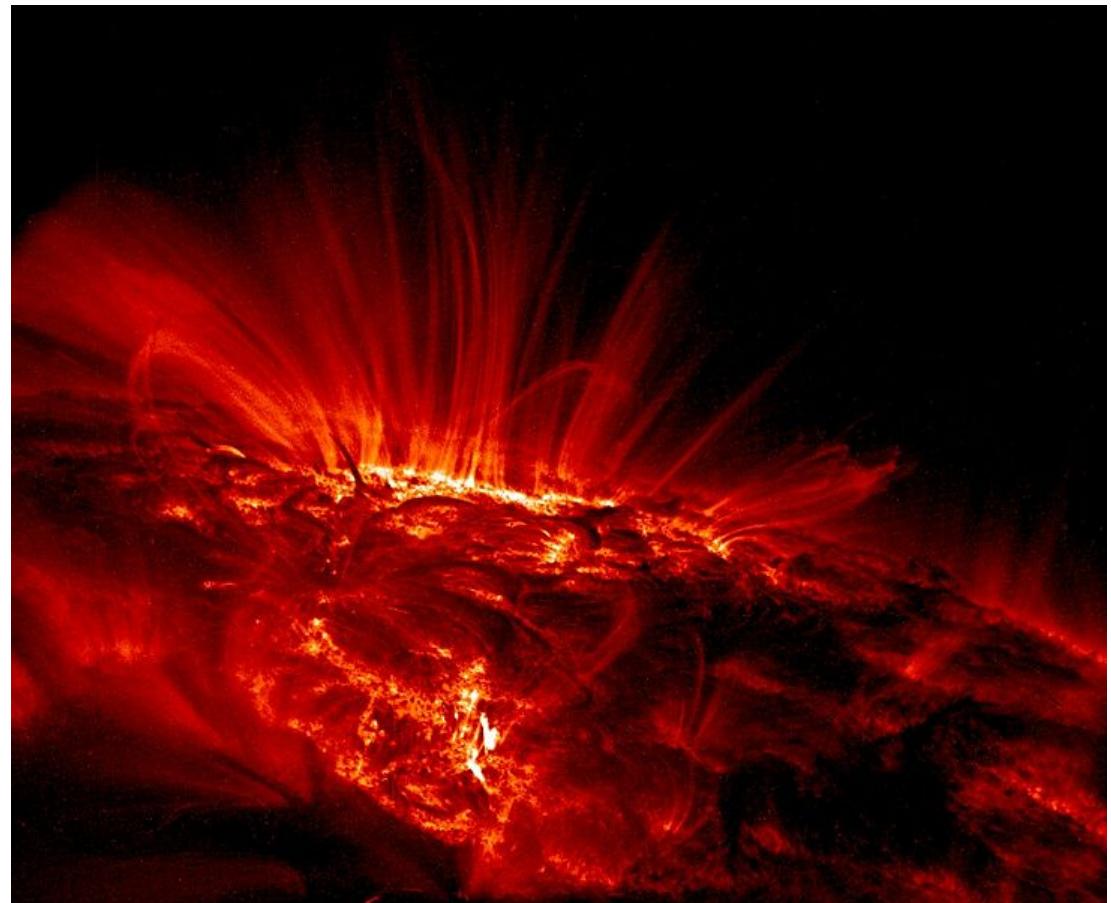


MOTIVATION: (D)GPS

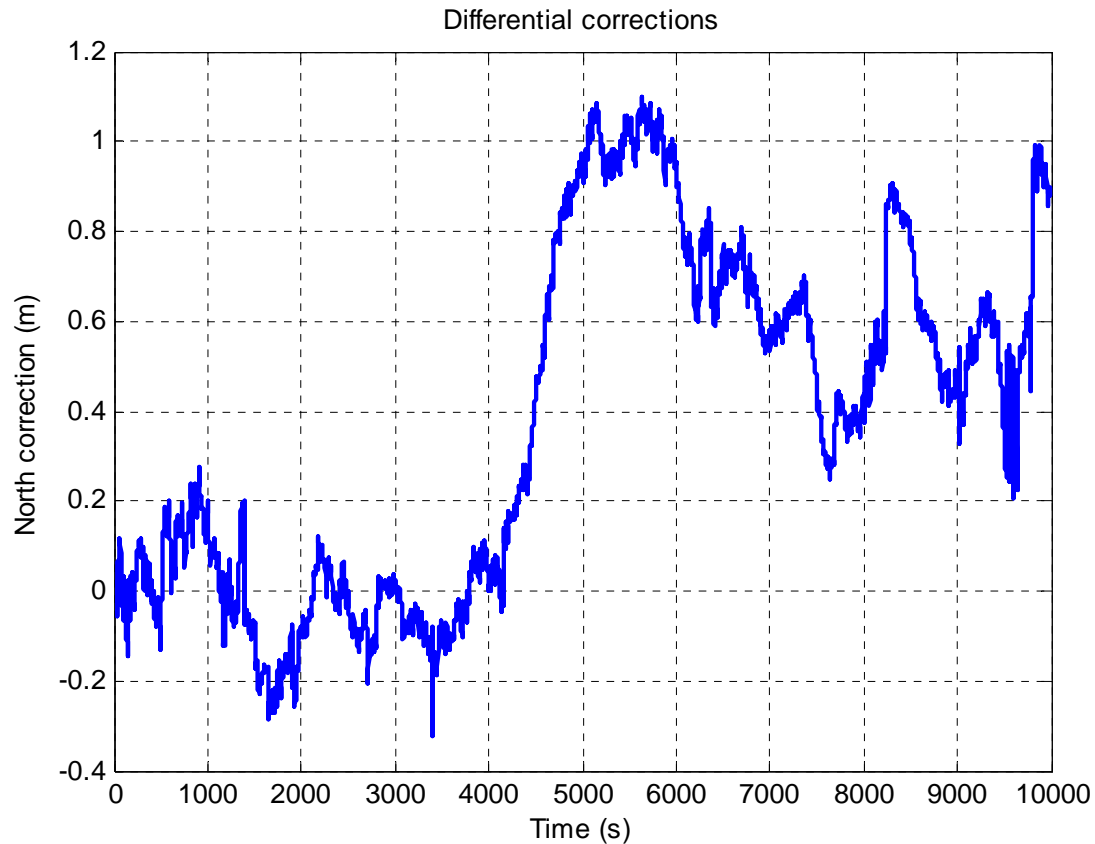
Differential corrections

Jumps

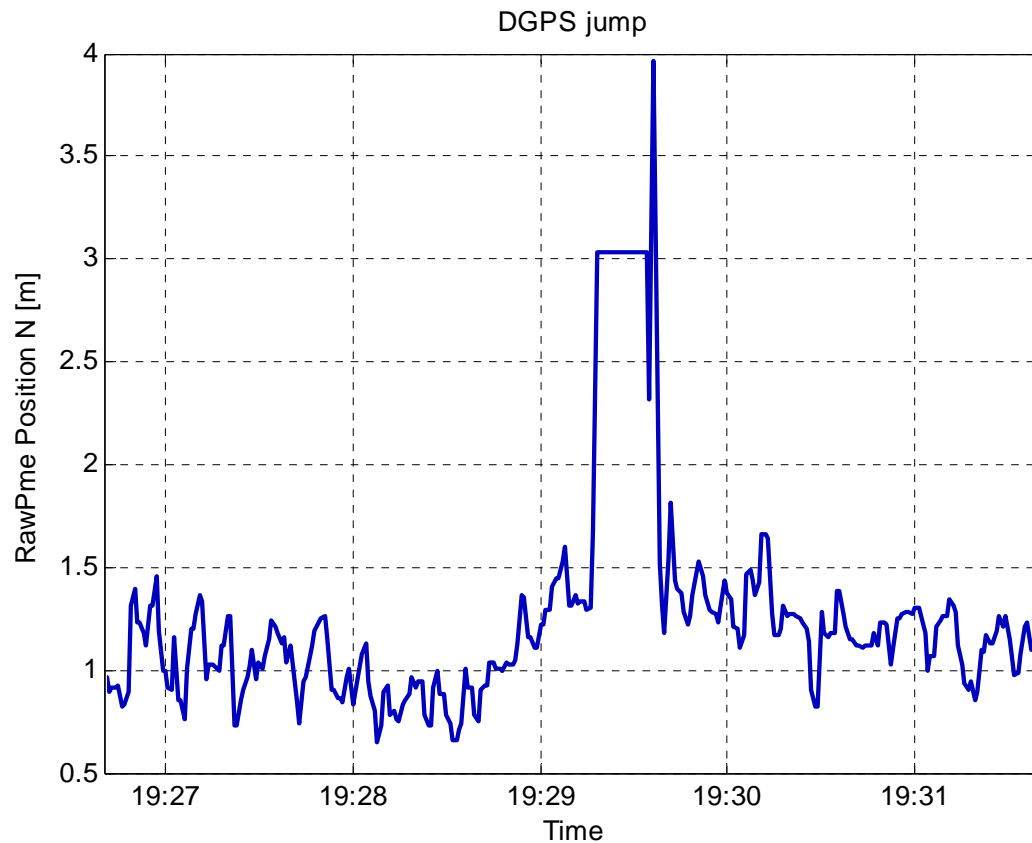
Outages



DIFFERENTIAL CORRECTIONS



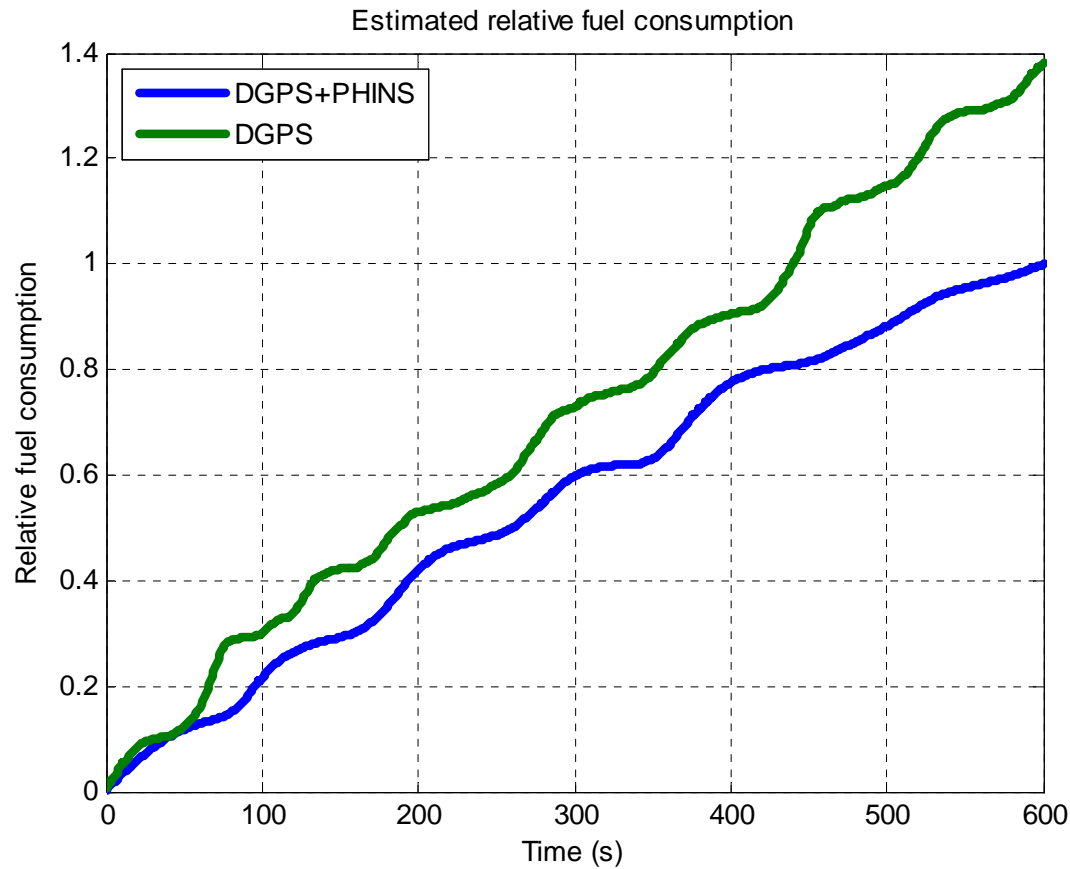
DGPS JUMP



SEA TRIALS INS + GPS



DP ON GPS WITH/WITHOUT INS: POWER



OUTAGES

How long can INS fill-in for?

...in bad weather?



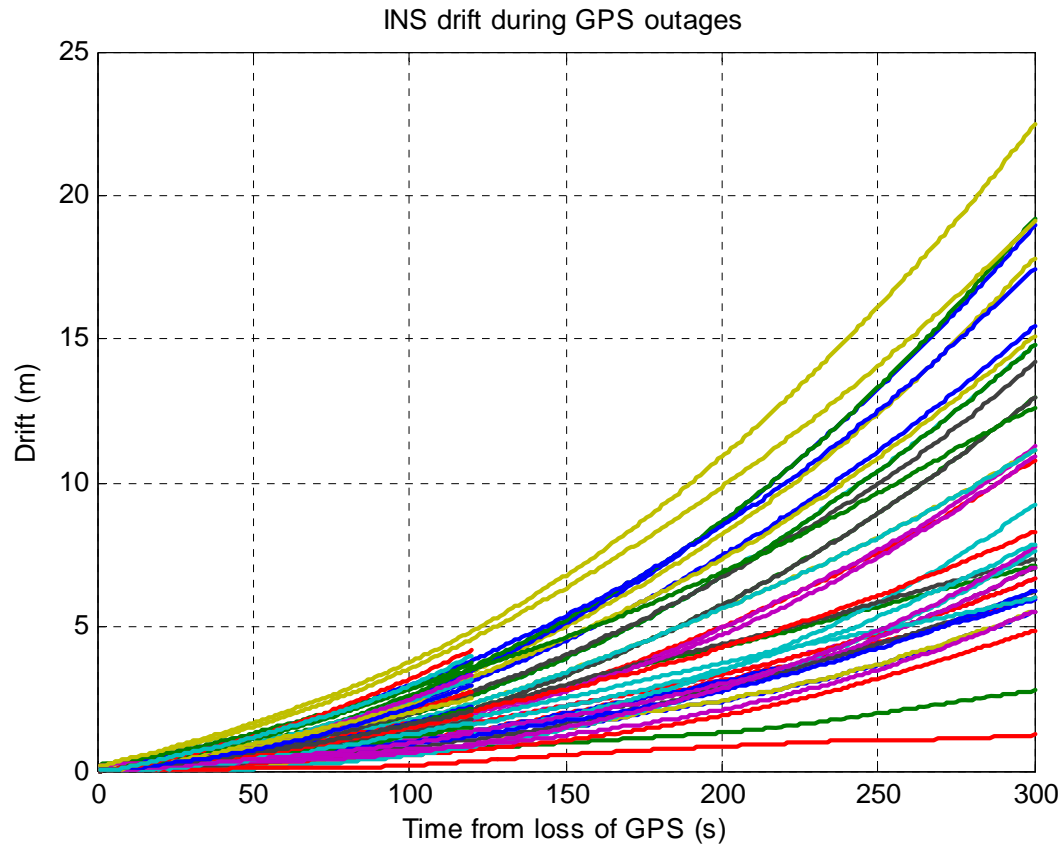
'C' TRIALS



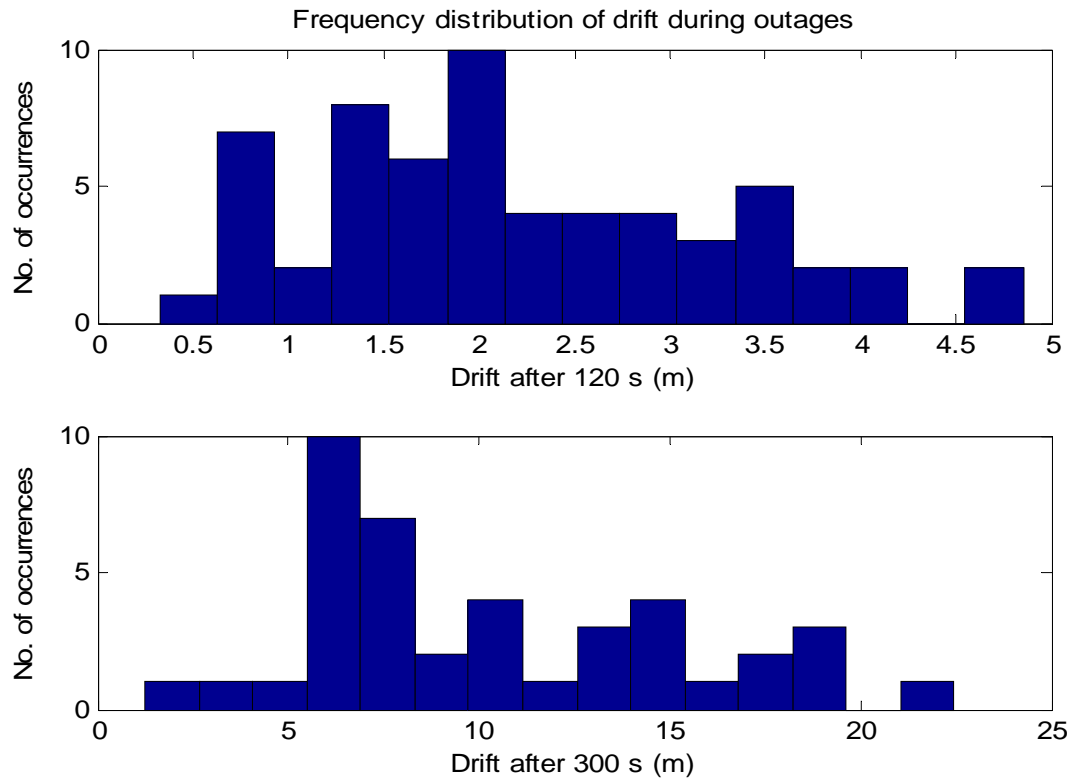
SUPERVISORY FUNCTION



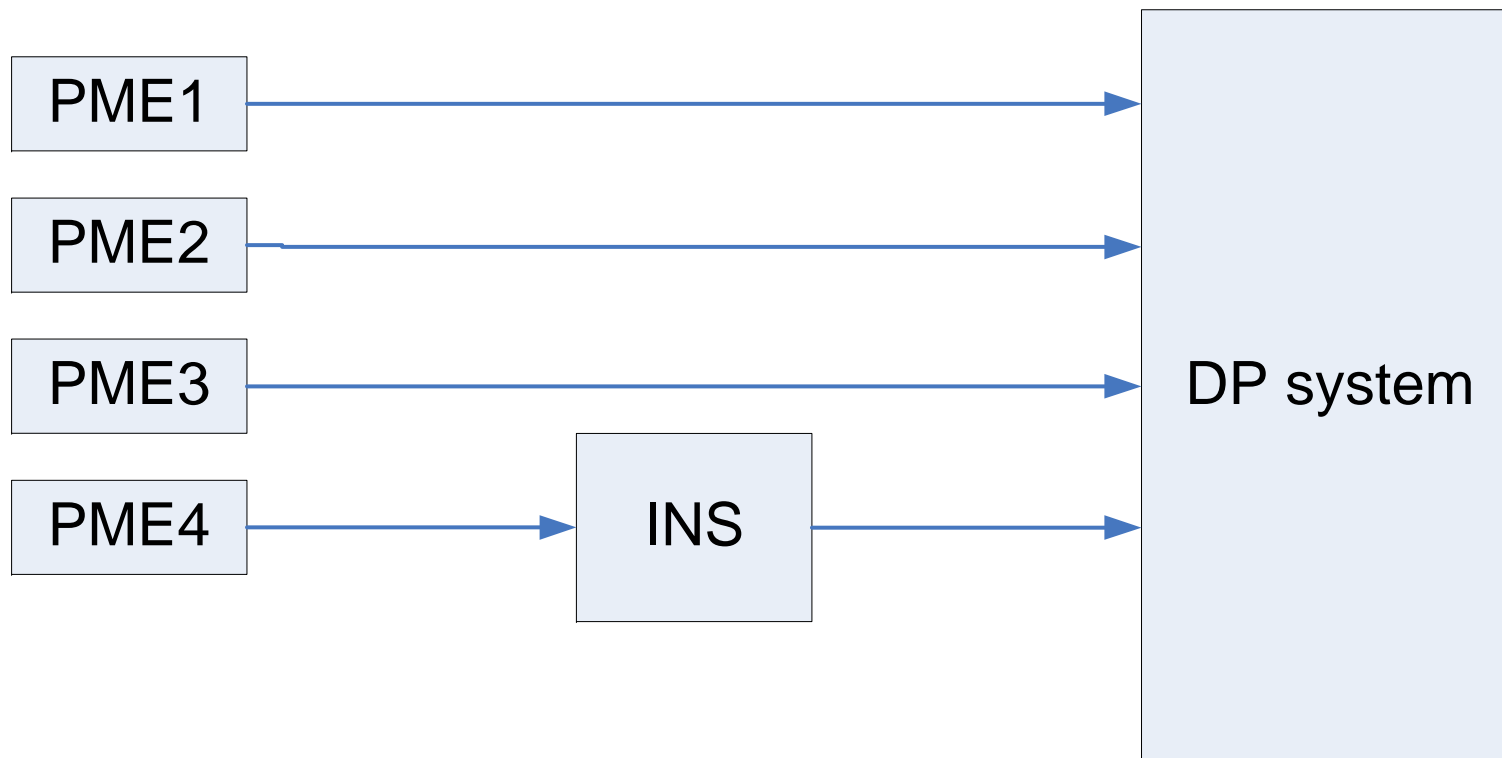
INS DRIFT DURING OUTAGES



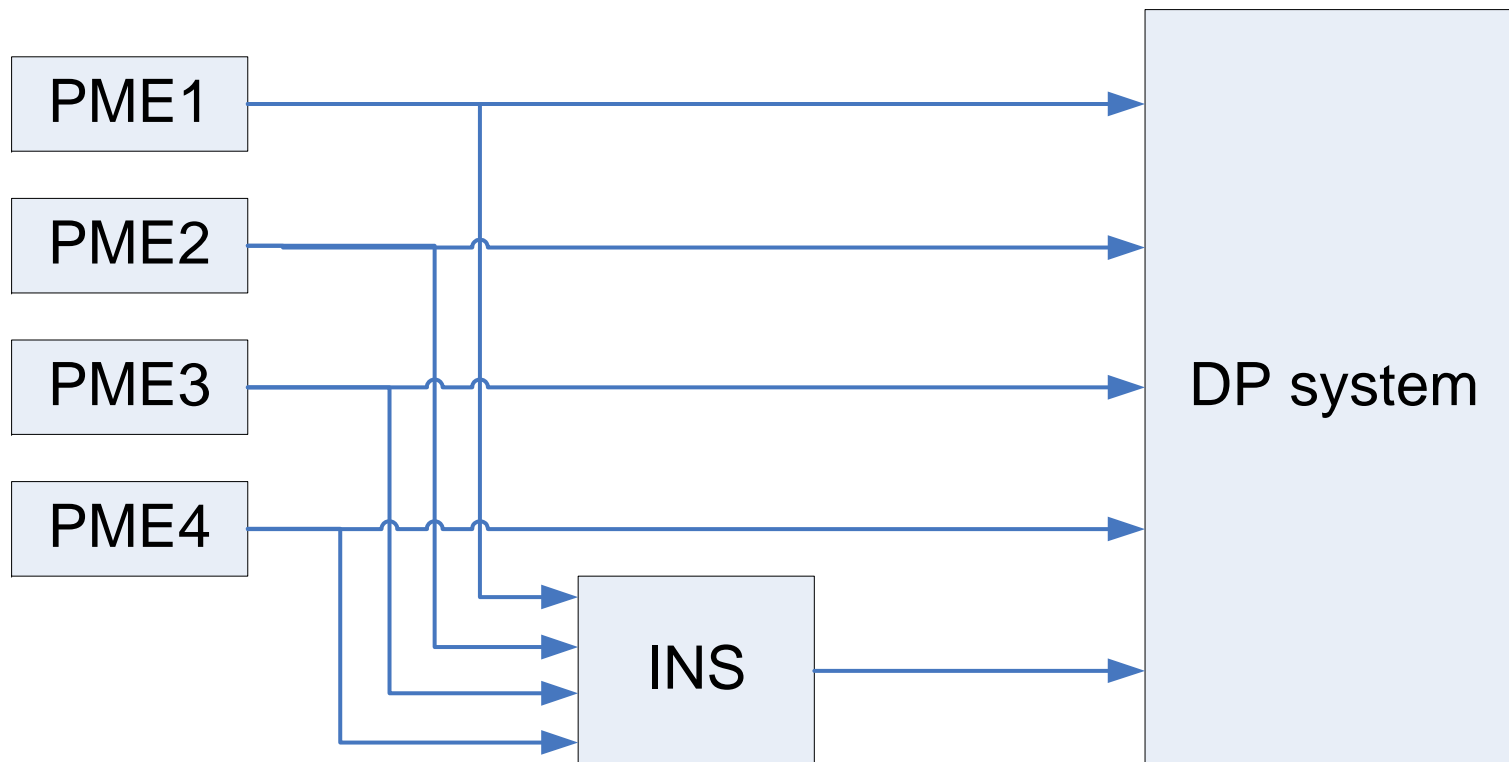
INS DRIFT DISTRIBUTION



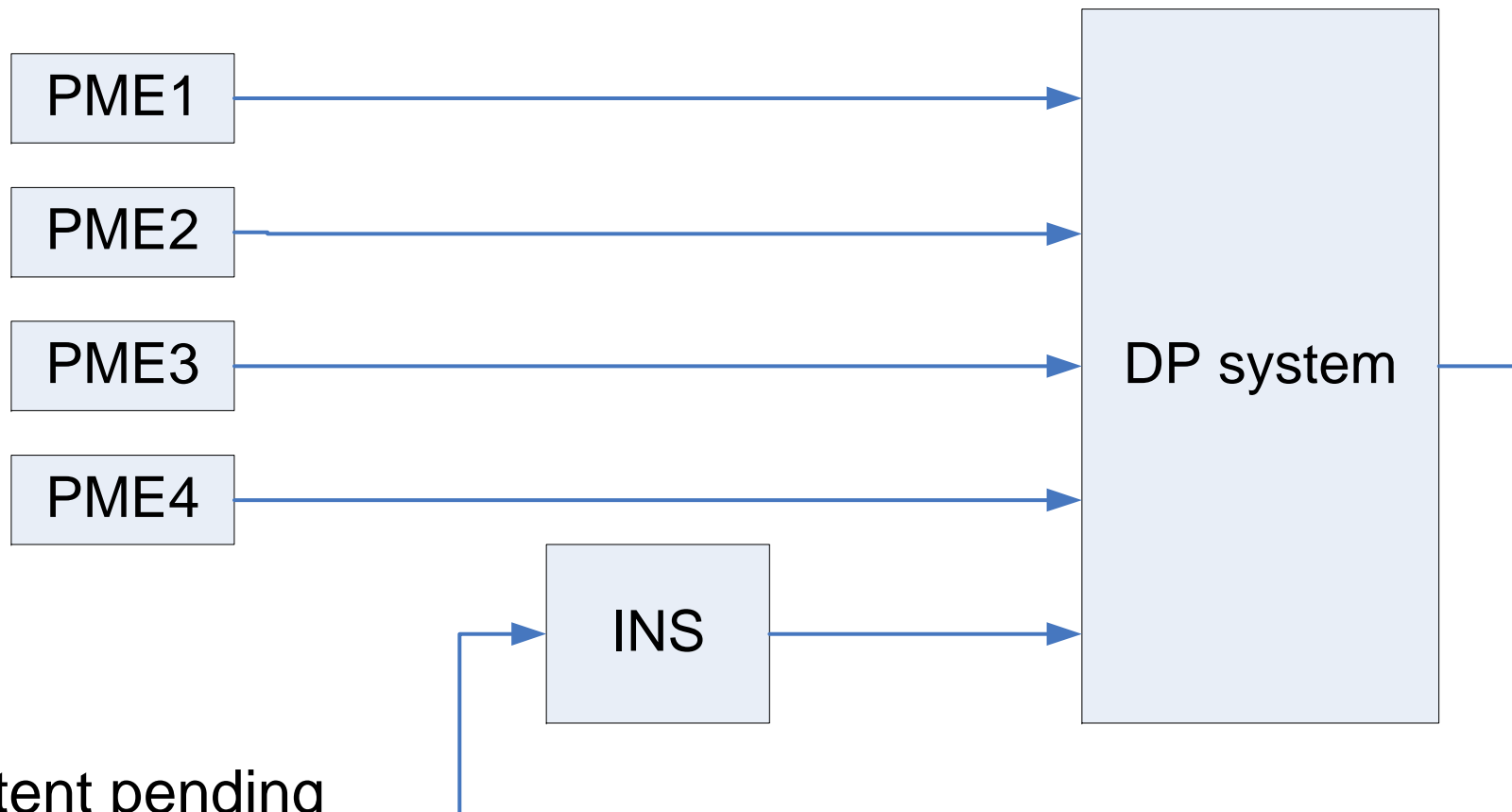
NORMAL DP ARCHITECTURE WITH INS



ALTERNATIVE DP ARCHITECTURE WITH INS



FLEXIBLE ARCHITECTURE



Patent pending

CONCLUSIONS

- Acoustics battery life
- GPS jumps
- Outages: < 5 metres in 2 mins
- Flexible architecture



Thank you for your attention

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