CTX-P Contextual Software

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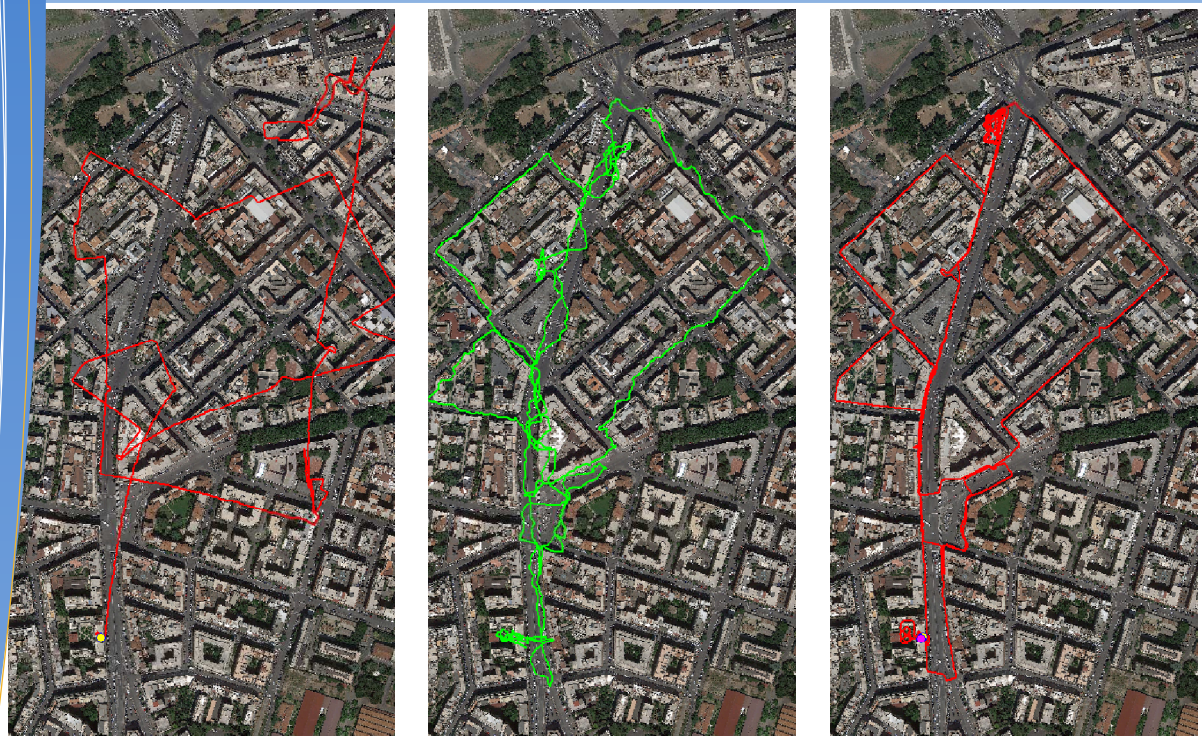
Pedestrian accurate positioning and mapping

Pedestrian localization

A number of inertial tracking solutions are presently adopted for the localization of human operators in GPS-denied environments. However all of them are affected by significant residual mismatches and drifts, so to make the estimated position useless just after a few tens of minutes.

DUNE ARIANNA system provides a first-level boost in inertial tracking by providing a seamless integration between inertial sensors, GPS, Compass and altimeter.

DUNE CTX-P (ConTeXtual Processing) software tool provides a topmost level of track refinement by exploiting the “behavioural information” relevant to the walked path.



Inertial track | GPS fixes | CTX-P track (no GPS employed)

APPLICATIONS

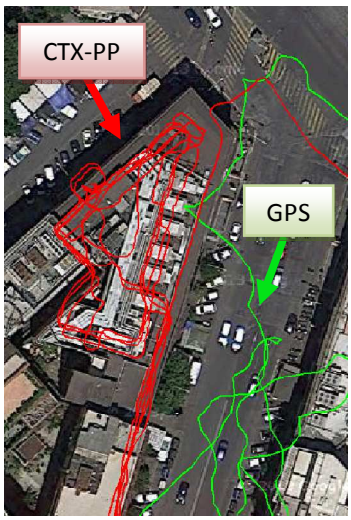
- Accurate localisation
- Off-line operations
- Training and debriefing
- Map estimation of unknown environments
- Protection of critical infrastructures

ADVANTAGES

- Accuracy independent of the walked distance
- No need for external, ad-hoc infrastructures
- No floorplan or calibration are needed
- No need for site characterization (e,g, fingerprinting)

CONTEXTUAL TRACK ESTIMATION

The contextual information is always related to points or elements of the path crossed again after some time. Each time a contextual point is detected, the DUNE proprietary Contextual Processing (CTX-P) software estimates the (many) mismatches and drift factors, providing a backward compensation of the estimated path and, at the same time, a superior compensation of the forthcoming track, still to be walked.



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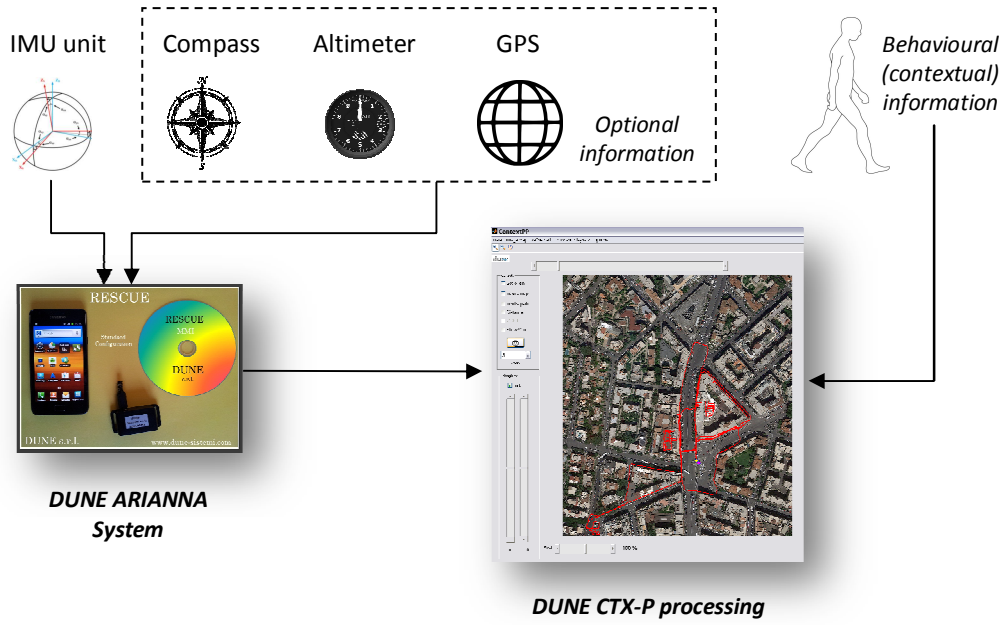
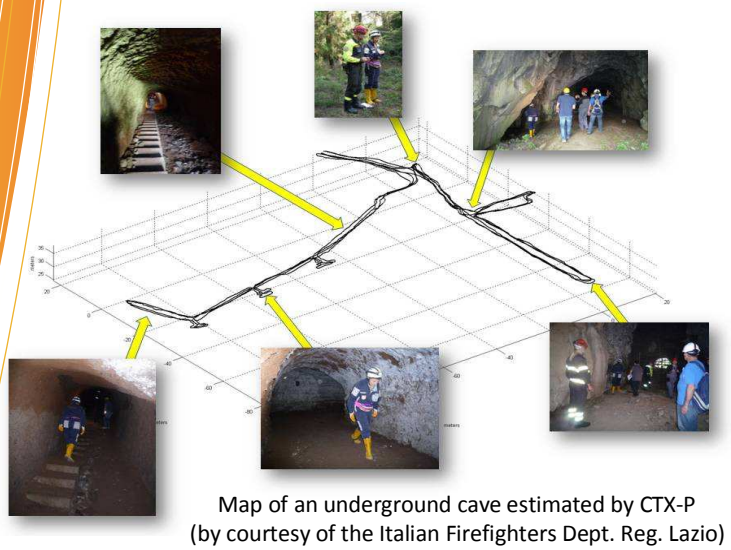
CTX-P working principle



Main Features of the CTX-P Software

- No need of location-aiding infrastructures in the operating environment
- Accuracy largely independent of the walked distance
- Inclusion of additional context and anchor points in offline operations
- Although designed to maximally exploit the features of DUNE ARIANNA system, it also accepts input tracks estimated by third parties
- Efficient modules for geo-location of tracks and maps (both W3C compliant and not)
- Saves still images and playback videos of the path dynamics, with timing control
- Includes tools such as: geo-located distance measurement, GPS fixes visualisation, customizable zoom factors and colours, geo-location of the track information inserted during the operations (e.g. written and audio notes, images, videos).



Map of an underground cave estimated by CTX-P
(by courtesy of the Italian Firefighters Dept. Reg. Lazio)

On-field operations

CTX-P has been extensively tested by Italian and International Agencies and industries in a widespread ensemble of scenarios (e.g. battleships, vessels, large industrial plants, malls) with experiments durations up to 3 hours and walked distance up to 6 km, always providing end-to-end results compliant with or exceeding the target requirements.

ENVIRONMENTS

GPS-denied

Magnetically polluted

EM shielded/jammed

Infrastructure-free

GRAPHICS

Powerful support of geo-referenced maps

WGS84-compliant

Google maps server online interface

2D and 3D maps

Playback and video production

OP. SYSTEM

Windows XP
Windows 8