COPS

Communication Profiling System

The Communication Profiling System COPS is a software package for monitoring, visualising and evaluating communication behaviour and network structures.

COPS provides three work perspectives:

History perspective provides options for examination of fundamental knowledge data and incoming communication events to reveal network structures or to track movements.

Online perspective displays the current event stream to the map and forwards the data into an incremental event list.

Notification perspective allows notifying the user of certain communication events and the maintenance of the notification triggers.

Each perspective has a geographical map and contains a table of numerically summarised events.

The software works independently from the kind of sensor data and is multi-sensor capable.

- Automatic evaluation of network structures
- Automated and interactive visualisation of communication
- Geographical visualisation
- Adjustable algorithms
- Online event streaming
- Evaluation of social networks
- Notification functions
- Tracking options
- Multidimensional filter options
- Sensor independency
- Multi sensor data merging

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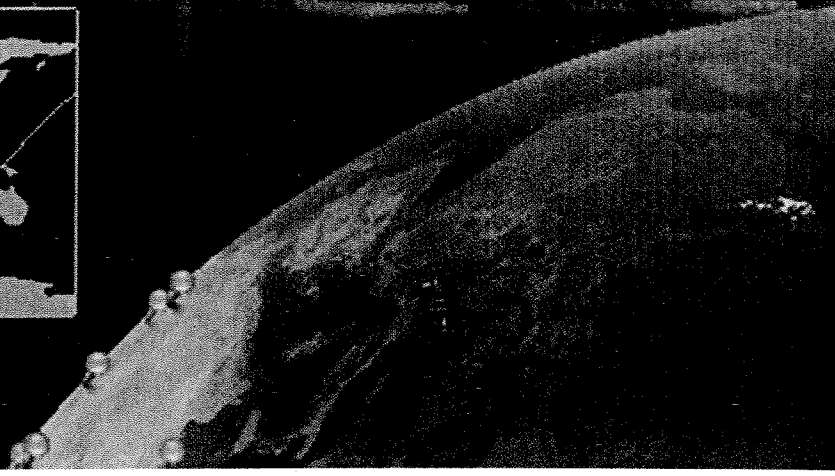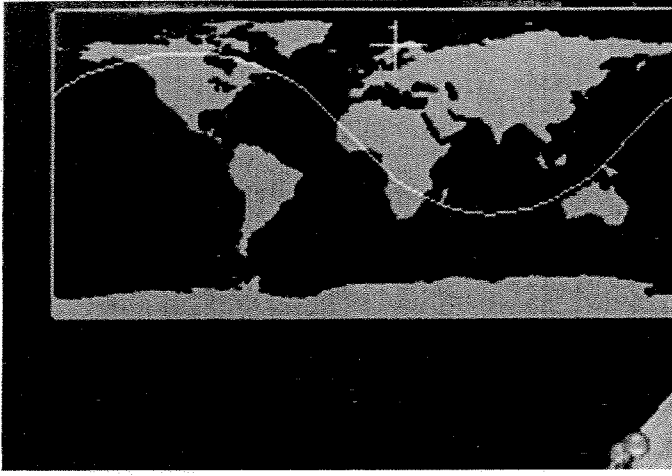
Usage requirements

Changing threat scenarios and fast pro-
gress of digital transmission technology
require the utilisation of all available infor-
mation sources in gathering communica-
tion intelligence. The vast number of data
generated by intelligence systems must
be processed and evaluated within fastest
possible time. Based on the evaluation of
a more extensive data basis the decision-
making process is enhanced and situatio-
nal awareness is increased.

The application of digital and analogue
transmission processes and the usage
of standard devices in conflict and threat
scenarios imply that no communication
channel should be disregarded.

The necessity of sensor independent and
multi-sensor capable solutions becomes
more apparent. The ability to process mass
data in near real-time and to merge data
originating from different sensors will cha-
racterise innovative solutions.

As a high-end and future-proof concept,
COPS fits to these requirements and repre-
sents an innovative solution for traffic ana-
lysis, network visualisation and evaluation.
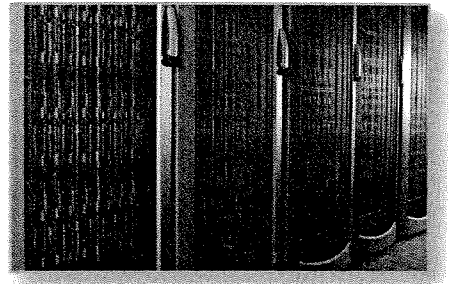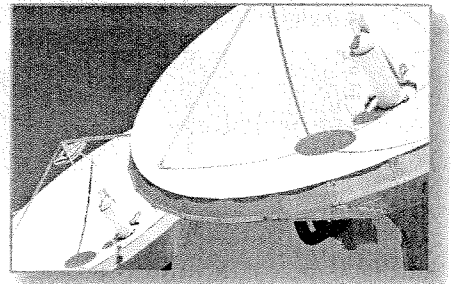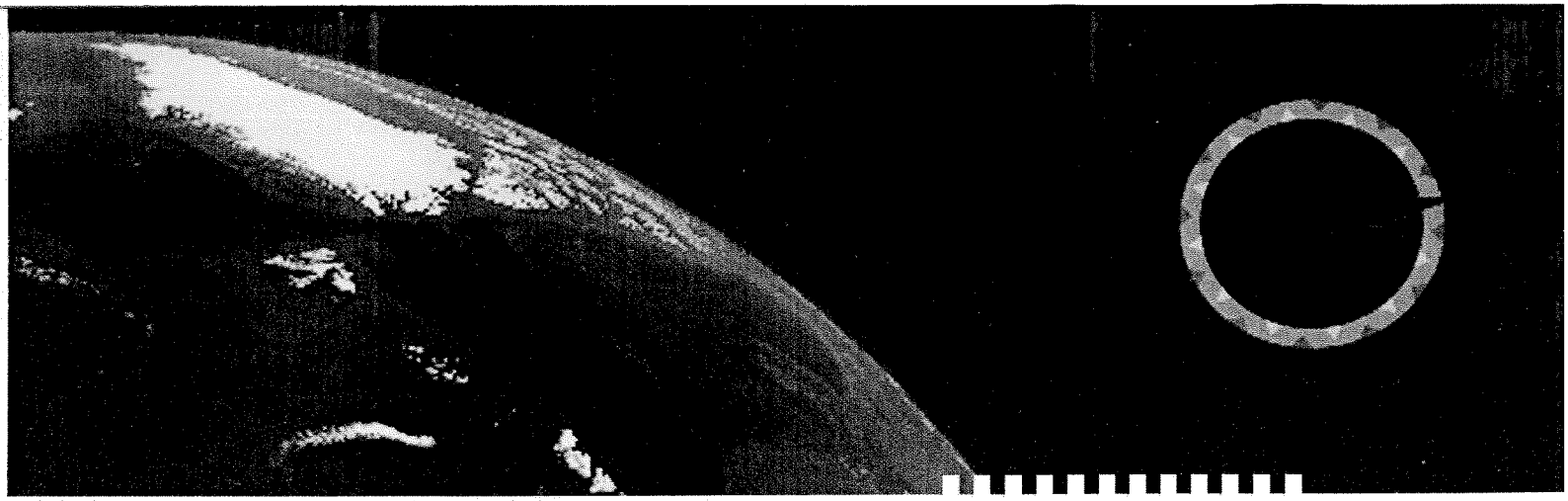
Topic-oriented work process

In a topic-oriented work process raw information material is extended with keywords to classify information by its context. Gathered information are evaluated and extended with relational thematic tags. The tag refers to a specific context, which is an issue of special interest or is connected to a special subject. Subject of interest can be the content (politics, weapons, terror, human trafficking etc.), an area of interest (town, region, land etc.) or an event (feast day, official holiday, anniversary etc.). A detailed description of the subject is advisable.

Object of the topic-oriented data processing is to generate thematic relations between information from different sources or sensors. This corresponds to the requests for data fusion and sensor independency.

Purpose of the topic-oriented work process is the enhancement of evaluation proceedings by knowledge and intelligence merging. This allows establishing evaluation groups or task forces for thematic priorities. These groups can promptly be provided with comprehensive information and hence, can provide a situational report earlier. This saves precious resources like time or manpower and increases situational awareness.

Key features

Key function of COPS is evaluation and visualisation of signal related information. Integrated into a monitoring system for communication systems (e.g. satellite), it extracts and applies the signal related information such as connection build-ups, subscriber identifications or location information. COPS itemises each individual information and keeps it in a detailed list. With this clearly structured communication meta data, COPS facilitates automated and manual evaluation proceedings.
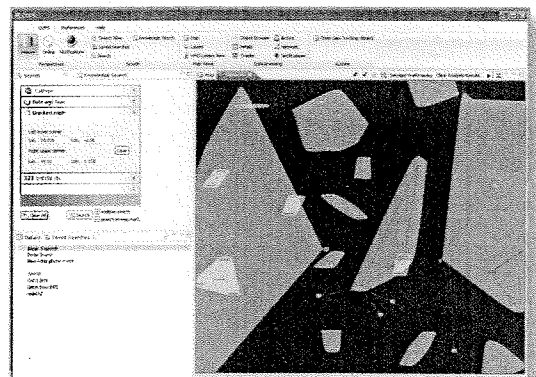
History perspective

The history perspective is the main work perspective in COPS. It comprises different layers with detailed information about each individual event, extensive search- and filter options and two ways of event visualisation.

The geographical map displays the extracted GPS-position of mobile equipment. This allows determining the position of the caller at the connection build-up. The map is fitted with a time slider function, which allows replaying the communication events in chronological order. Active phones are highlighted on the map and suspect movements can be monitored by a signal tracking mode. The network view is a dynamic visualisation of the relations between phones, actors or groups. These information are extracted by calculation of the communications meta data.
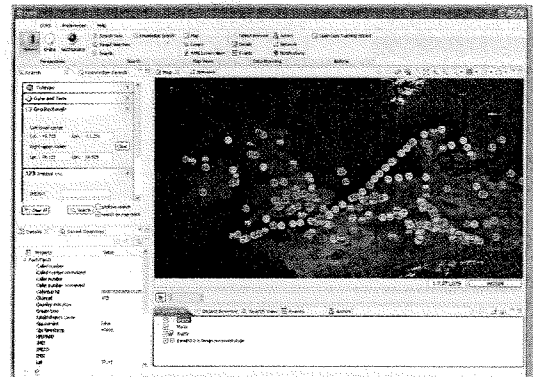
History view: map

History view: network
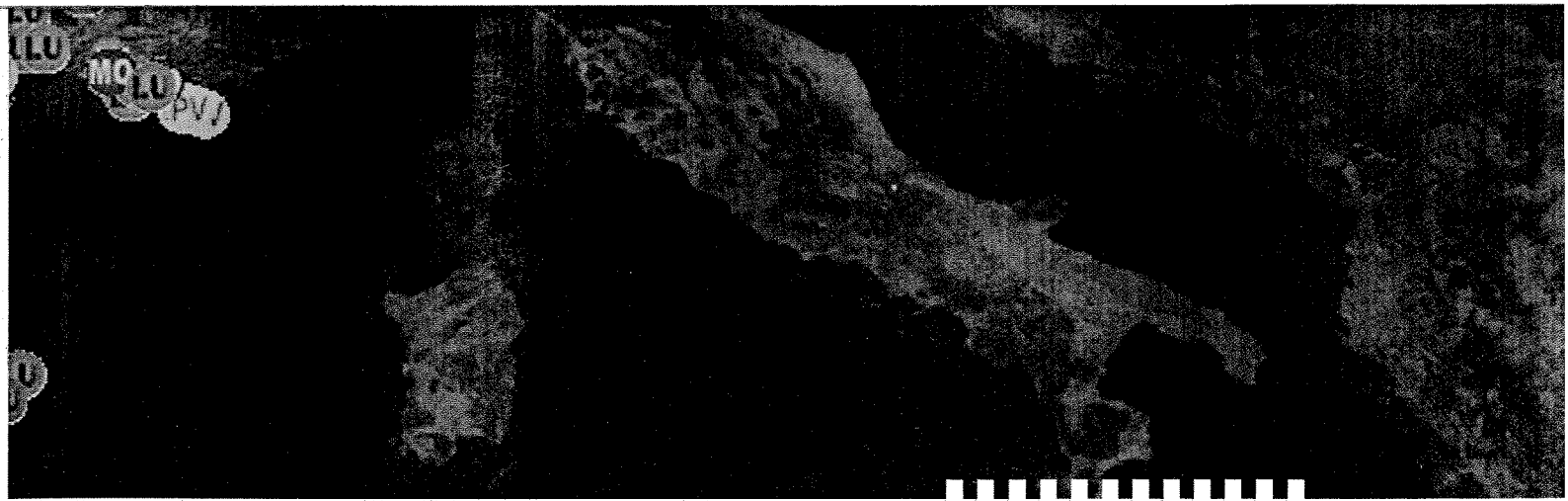
Online perspective

Using location reference data, the online perspective of COPS displays the position of the mobile equipment on an integrated geographical map. This gives an instant overview about the communication activities in an area of interest.
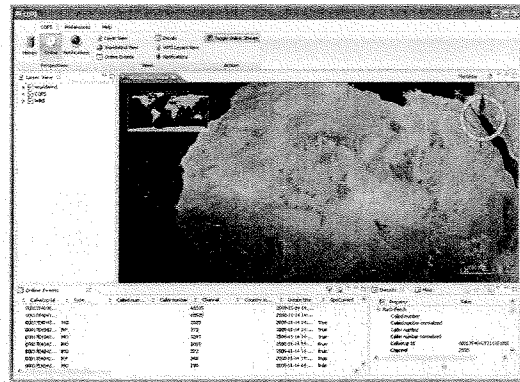
A detailed event list shows more information about individual events. The map and the list are corresponding: if the operator selects an event in the list, it is also highlighted on the map. When the operator changes to the history perspective, the selected event is consistently highlighted, too.

Online view

Notification perspective

The notification perspective allows administration and activation of notifications to the operator. A notification is an entry into a separate list, which shows events concerning to specifications of the operator. They are issued, if communication events, matching selected parameters are recognised. This allows the operator focussing on special actors, groups or areas of interest. They can also be used as alarming function for activities of actors or activities in a region of interest. Notifications can be activated persistently or temporarily.
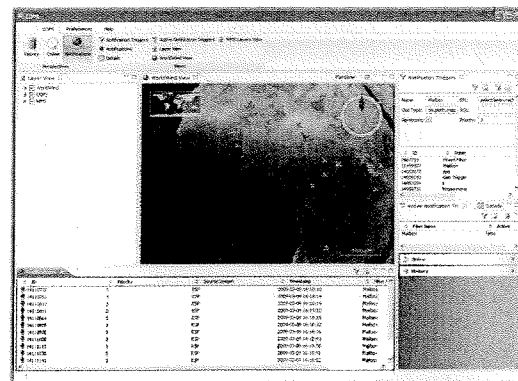
Notification view
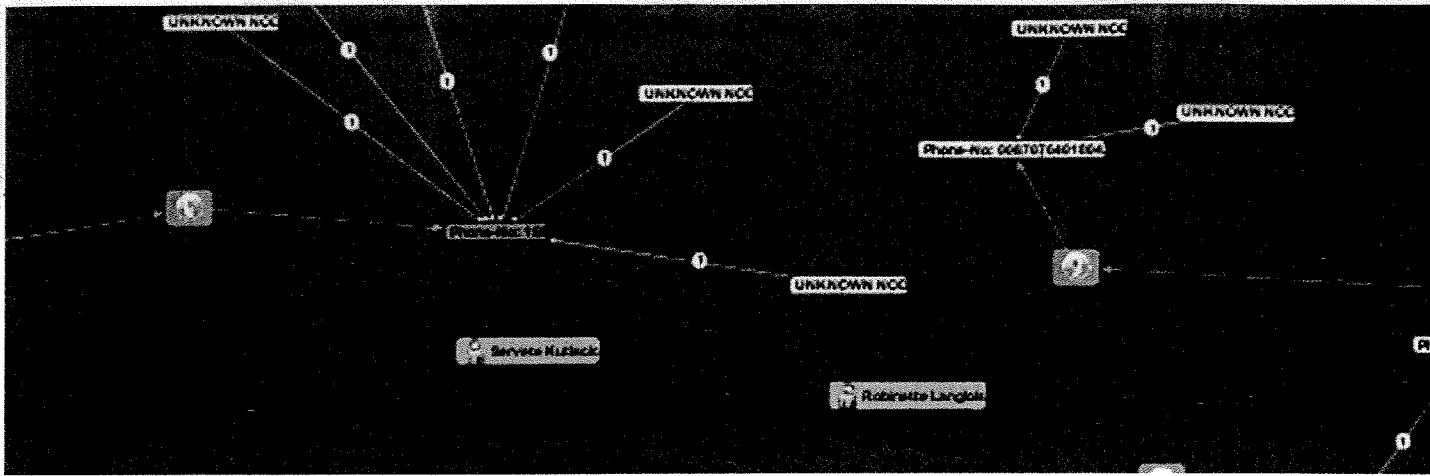
Application example

COPS provides the evaluation operator with various cluster-options to assess the relationships in communication networks. The relationships are revealed by the evaluation of the communication meta data.

Based on intelligence data and fundamental knowledge data, COPS uses different algorithms to submit an assessment of the relationships between the net subscribers. Using the frequency of occurrence and the mutuality of the communication within the network structure, relations can be assessed. By tagging Actors, phones or groups with keywords (e.g. Pirate, Rebel) event driven sear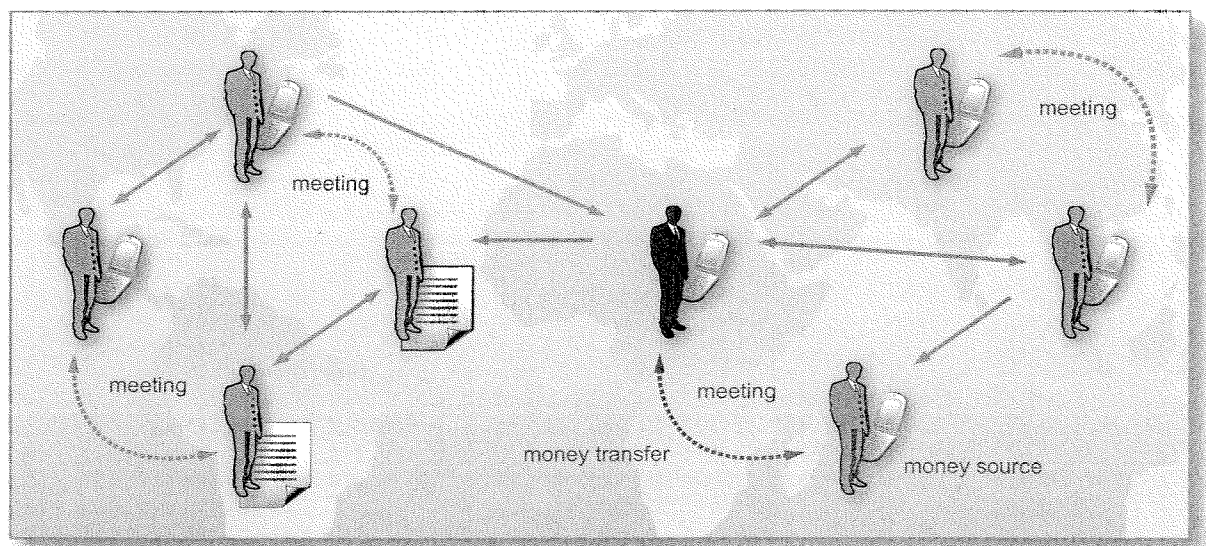ches are accelerated. The evaluation's focus on special issues of interest is sharpened and leading positions, roles and hierarchies are unveiled.

A tag can furthermore be used as advanced filter option or as trigger for notifications.

Due to the intuitive and comprehensive user interface it is possible to characterise a social network and the communication pattern within shortest time. The cluster options support the operator to assess the relationships between the network entities. The bidirectional interface to a content evaluation system provides the operator with the communications content. The gained knowledge of the content analysis can directly be considered in the current network evaluation. The integrated PLATH product SitMap (Situation Map Server) supplements the evaluation abilities with geographical visualisation capabilities.

tagged as pirates   intermediary   money source   tagged as rebels

Architecture and features

COPS was designed in Service-Oriented Architecture (SOA) to be flexible and scalable. The three-layered architecture reduces the calculation workload of the client and facilitates data processing.

Additional applications can be integrated; existing data storage systems can be accessed by the new system. Furthermore it is possible to integrate COPS into an existing workflow or to renew an existing system incrementally.

In the basic configuration COPS is provided with a bidirectional interface to a content evaluation system. This interface forwards filter and search parameter to a content analysis and report system to evaluate the corresponding contents. This allows accomplishing the whole evaluation process at one workstation.

COPS supports multi-screen capabilities and was developed with a flexible architecture. Additional applications can easily be added, additional data sources can be implemented with adaptors.

Current knowledge about communication networks, role models and peculiarities of objects can be forwarded for external uses, too. Knowledge of areas to interest can be integrated supplementary. This ascertains the retention of existing knowledge.

The scalability of COPS allows a downsized installation on a laptop or small system approach as well as the on-site integration in an operation centre.

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