In this paper we propose a programme for research and development on a CSCW framework for improvised meetings. Although improvised meetings are prevalent everywhere in working life it is still not possible to establish a CSCW-based improvised meeting as easily as e.g. a conference call using telephone. This is partly a matter of technological immaturity and partly an organizational problem - at many levels, and in many respects. We therefore propose to study the feasibility of improving the quality and efficiency of decision making in administrations and bureaucracies by Improvised Meetings through Computer Mediated Communication - IM/CMC.

The specific application domain proposed as a testing ground is case processing, in particular physical planning.

The main concerns to be focused are those encountered by individuals wanting to set up or participate in improvised distributed meetings in order to get or provide information and views deemed necessary for command and control in e.g. crisis and emergency management. The need for diverse information, with maps and their metadata as a dominant medium, and the capabilities of CMC in combination with GIS for providing access to heterogeneous information services and sources are some of the reasons for choosing command and control situations as the specific domain.

The wider management and organizational matters of introducing such capabilities will also be analysed but the emphasis is on establishing a user and issue oriented technical and organizational framework for experiments that enable a study and analysis of the questions arising from the facilitation of IM/CMC.
1.0 Introduction

Most CSCW-systems are still dedicated in various senses of the word. Cooperation facilities should, however, in the general case be available at any time. One of the consequences of this is that there is a need for cooperation facilities that are as available and easy to use as the telephone, but with added capabilities.

Each person is usually a member of many groups, within as well as outside the main employing organization. There might moreover, at any time, be several concurrent meetings in progress for any of these groups. Some of these groups are established others are formed ad-hoc, as needed. For all groups there is often a need for improvised meetings, i.e. meetings that have not been planned beforehand. We thus have, from the point of view of an individual two distinct types of improvised meetings:

- with people that belong to some more or less defined and established group, and
- with people that are congregated only for one specific meeting (although some of them might have been or will be congregated for similar meetings.)

In this proposal it is the latter case that is the intended object of study.

2.0 C² and IM/CMC

The context of the proposed programme is case processing in administrations and bureaucracies, commercial as well as official - governmental/regional/local. When a staff member feels a need to consult with one or more other people that might have views, evidence, information etc. on the case at hand (s)he should at least have the capability to try to congregate them, or other, available, people for an improvised meeting. Some of the problems in this situation are:

- to find out, for the improvised meeting, who the desirable people are, in terms of e.g. competence, position, need-to-know, access to information sources, etc.
- to find out which of the desired people or officials are, or can at short notice make themselves, available for an improvised meeting,
- to find out what kind of cooperation capabilities are available to them at that time, and,
- given such knowledge, to agree on the preferred forms of cooperation between participants and for the sub-group as a whole,
- taking into account that some of the meeting participants (with their cooperation facilities) might “arrive” late, “leave” early, or only be able to “drop in” at an unspecified time, and

Selective Bibliography:

Below is a select list of references relevant to the proposed research programme. A review of the CSCW literature has revealed that neither improvised (ad-hoc) meetings, nor case processing, nor integration of GIS into CSCW have so far been the subject of studies, as proposed in this paper.


allowing some participants to monitor, participate as passive “lurkers”, as a background task while engaged in other tasks,

recording (in a suitable manner) the transactions of the meeting for those not present.

There are thus four main meeting management tasks from the point of view of individuals:

1. keeping track of people, groups and their meetings,
2. setting up, or accepting to participate in, a meeting,
3. the (personal) administration of a meeting in progress, and
4. recording all or parts of the meeting for own later use.

Meeting leaders also have to attend to all of these tasks, as well as some other ones, e.g. monitoring progress and participation, deciding on what to record for absentee members. (One subset of the questions to be investigated concerns the need for allocating specific tasks/roles/positions in these contexts, e.g. chair, secretary, etc. as distinct from e.g. collaboration managers and technicians who are concerned with resources used and needed.)

One of the main reasons for congregating the IM/CMC will in many cases be the access each participant has to specialized information systems and resources, and which usually are available only in/through their office, and which largely are not available when the participants are brought together physically in one place, viz. a traditional meeting-room.

The integration of evidence/information from such heterogeneous systems, sources and resources into the case documentation, as the basis for a decision raises a number of interesting issues in the legal, organizational, technical domains.

The application domain chosen and proposed for the programme is physical planning at the local/regional level. Contacts, and preliminary agreements, have been established with some of the targeted participant organizations but formal agreements have not been

3.0 C2

IM/CMC in physical planning is supposed to be efficiently used in complex, dynamic, distributed environments as a kind of decision support system. Improvised meetings could be set up for several reasons, for instance in order to:

- validate previously given information
- collect data
- customize information
- reach consensus about something of mutual interest
- refine design proposals
- make quick-and-dirty enquires

(Compares laboratory and field research in the study of electronic meetings.)

Fowler, G. D. and M. E. Wackerbarth (1980).
Audio teleconferencing versus face-to-face conferencing: A synthesis of the literature.
Western Journal of Speech Communication 44 (XX), 236-252.
(Studies audio teleconferencing in comparison with FTF conferencing.)

Enhancing computer-mediated communication: an experimental investigation into the use of a group decision support system for face-to-face versus remote meetings.
Information and Management 18, 1-13.
(Investigates use of decision support systems for face-to-face versus remote meetings.)

Teleconferencing, concern for face, and organizational culture.

Experiments in group decision making: Communication process and outcome in face-to-face versus computerized conferences.
Human Communications Research 13 (2), 225-252.

Electronic Meetings: Technical Alternatives and Social Choices.
(Presents how electronic meetings can extend communication.)

Computer conferencing in the context of the evolution of media.
In Harasim, L. M. (Ed.), Online educa-


- support subdivisions of the organization
- provide management support etc.

By means of a system facilitating IM//CMC for physical planners we intentionally change their work at the operational level. Unintentionally, but by necessity, we also change their activity level by introducing new ways of communicating and an enrichment of activities. New personal and organisational ambitions will probably also, to some extent, change the whole enterprise over time. The division of labour might also be changed. New technology also implies a need for educational programs. A smooth implementation of new technology demands an ample configuration of the equipment used and a proper interface, possible to adapt to different tasks. A general man-machine-interface is considered as unprecedented in this particular case.

Before implementation of the prototype of the proposed equipment and software tools a "task analysis" should be performed in order to grasp the current work. Hence, an activity baseline will be compared to the changed conditions during the field experiment. New facilities will automatically provide opportunities to develop new working strategies, including new activities and simultaneously a loss of others. Work load in general and cognitive work load in particular should be assessed in connection to the field experiment.

The design of the man-machine-interface deserves a cognitively based analysis. This holds true both for a particular application in physical planning, but also from a generic point of view, in the creative design process of a more general flexible interface.

Finally, a general evaluation of the changing work, that requires new skills etc., will be of utmost importance for the project. Both advantages and disadvantages with the new technology will be scrutinized.

### 4.0 Integration of GIS and IM/CMC

Geographical Information systems (GIS) must in the future be adopted to applications where several users are cooperating in a network, i.e. for CSCW-applications. The motivation for this is of course that in the domains of use of spatial information, as well as, in other domains, there are needs for sharing and jointly using information systems. What distinguishes GIS-applications is not just that they deal with spatial information primarily corresponding to map information (and other types of coordinate related information, such as sensor data from e.g. satellites or other flying platforms, where the sensors can be radar, lidar and IR etc.). Equally significant is the importance of visualization. Maps and other two or three dimensional spatial data must be presented visually to be comprehended properly in most cases. Another important aspect in connection with shared use of GISs is concerned with how spatial data can be communicated across networks where the visualized spatial

Experiments with oval: A radically tailorable tool for cooperative work.

Is interaction the message? the effect of democratizing and non-democratizing interaction in video-conferencing small groups on social presence and quality of outcome.

Electronic meeting systems to support group work.
Communications Of The ACM 34 (7), 40-61.
(Presents experiences with group support systems for facilitating creativity.)

Pullinger, D. J. (1986).
Chit-chat to electronic journals: Computer conferencing supports scientific communication.
(Describes how computer conferencing supports scientific communication.)

New York: Wiley.

Communication networking in computer conferencing systems: a longitudinal study of group roles and system structure.
(Describes a longitudinal study of group roles and system structure for a Computer
information in itself is a means for communication. That is, the problem is not just a question of exchanging visualized sensor data but also of exchanging information carried by the transmitted 'images'. Therefore, at least, two different aspects must be dealt with, where the first one is fairly trivial while the other is more complicated.

The first problem is superfluous and is concerned with how to allow a user to handle spatial information in the shape of images that are available on a computerized 'billboard' where it is possible to make arbitrary drawings. This is not much different from what can be done in other CSCW-systems. The second aspect, however, is more complicated in that it is concerned with the internal aspect of the spatial information. Some examples may illustrate this. Assume that a user is dealing with a traffic accident that just has occurred along a specific road, then specific road information must be available and displayed in the image (map) in colour code directly in the image. This may sometimes correspond to generation of thematic maps but is not always the case. Hence, the system must have knowledge about the actual coordinates of the road and in particular about the attribute values at the position of the accident. This may not be too difficult if the image is a map but is clearly more difficult if the image comes from a sensor and requires registration of the sensor images. A user should, if need be, also be able to perform operations like adding an image to a map, for example, an aerial photo and a map covering the same area should be possible to overlay. Consequently, direct access to common databases would be desirable. This may, however, not always be possible since not all users will have a GIS available or in some cases they may have different systems at hand. A system integrating GIS and CSCW must have the capability to cover all the aspect from above.

In a homogeneous environment it is assumed that all users should be able to access the same information from shared databases. In a heterogeneous environment this may or may not always be possible while finally, in an environment where some users do not have a GIS available at all, it is not the case. The main problem is thus to allow shared use of available information, i.e. shared visualization of the spatial (geographical) information in a cooperative environment, but also in such a way that it will be possible to manipulate the information in the image or map in almost any arbitrary way. To make this possible there must be available verbal means for manipulation of the spatial information as well as meta-information so the users can manipulate the information. This cannot be done without new interactive methods, different from today's interactive languages and query techniques. Hence, other means for interaction in such systems must be developed and of special importance is new techniques including strong means for direct interaction with maps and images. Additionally, insertion of spatial data that subsequently will lead to update of the databases must also be allowed. This data could come from various kinds of sensing or measuring instrument, e.g. GPS.

An implementation of a system of the type that has been discussed by Rice, R. E. and D. Shook (1990a). Relationships of job categories and organizational levels to use of communication channels, including electronic mail: A metaanalysis and extension. Journal of Management Studies 27, 195-229.


Vin, H.M.; Rangan, P.V. & Chen, M.S. (1992) System support for computer mediated conferencing system.)
above must clearly be object oriented since it must allow encapsulation of the available spatial databases. To allow interaction of spatial information in the manner indicated above the user must furthermore have some conceptual way of perceiving the spatial information.

### 5.0 Project elaboration

The program is planned as a joint project of LIBLAB at the Department of Computer and Information Science at Linköping University, the Linköping branch of the Swedish Defense Research Establishment, and the Department of Human Working Sciences at Luleå University of Technology.

In the first phase of the programme it is proposed to elaborate the program proposal in terms of participating partners engaged in physical planning, equipment and software to be used, development needed, information systems and resources to be made available, the set-up of the experimental situations, and the studies and analyses to be performed.