

# The “Intelligent Listener” in Collaborative Planning

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Acknowledgements

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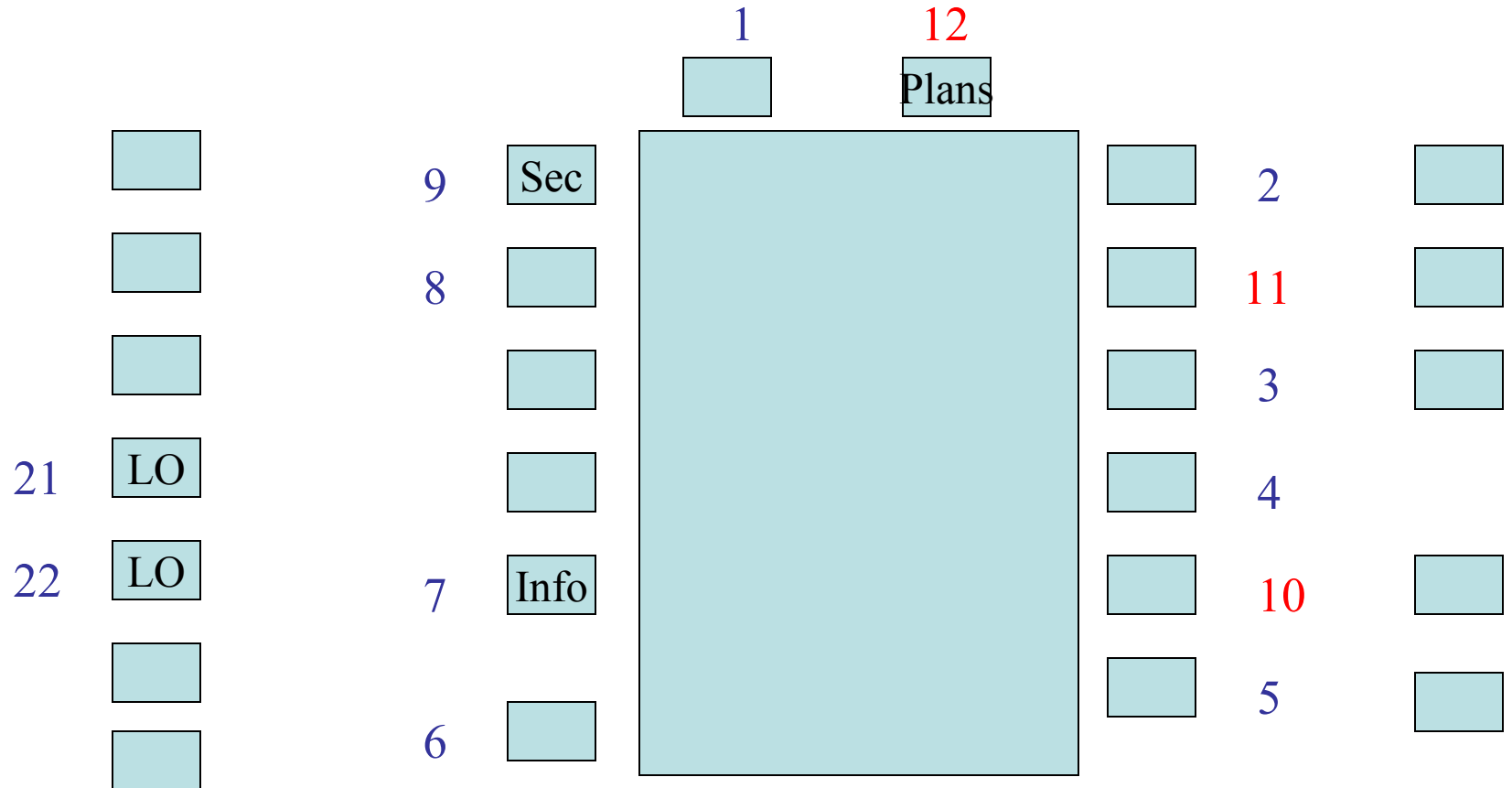
# Outline

## Capture and analysis of group planning

1. Experiment without automation
2. Experiment with automatic speech recognition



# Planning Meeting



- P7 gives overview
- P12 comments, clarifies
- P7 responds, expands
- P12 agrees
- 1005 P1 opens meeting
- 1041 P12 enters meeting
- 1056 P12 leaves
- 1130 P12 re-enters

Slide

# Experiment 1

- Adopted approach successful in the analysis of casual conversation [Eggins, 1990; Eggins and Slade, 1997] - Speech Function Network (SFN)
- Techniques for analysing interactional patterns through which interactants jointly achieve the purposes of discourse
  - Purposes are to make decisions and progress planning
  - Based on the actual data of the exchanges not observers' impressions

# Decision Making Cycles

- Focus on the analysis of patterns of discourse structure
  - Potential for elucidating the cycles of decision making that observers believed typified the planning process
  - Analysis of patterns of discourse structure
    - would ‘standardise’ the data and assure higher levels of confidence in any results obtained
    - investigate the suitability of this type of method for military planning and decision making

# Example of Opening Move

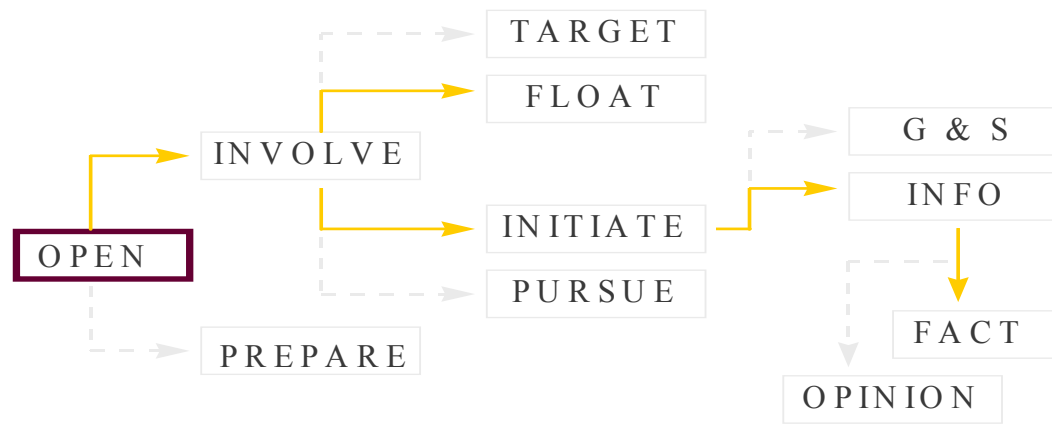
Excerpt: 4 moves, 3 speaker turns

Paul: 1. *Have there been any developments in X-land?*  
2. *I heard they are moving west.*

Joan: 3. *Yes, that's correct.*

Bob: 4. *Why is this important at this stage?*

**First Move 1: OPEN; INVOLVE; FLOAT: INITIATE; INFO; FACT**



# Summary Experiment 1

## Decision Cycles

- Decision closure was typically marked by ‘accordance’ or ‘complying’ moves:
  - Paul: *Yes, okay, that's great...excellent choice*
- Decision cycles not closed by accordance or complying moves were invariably re-visited later.

# Decision Cycle Micro Cycles

- Decision cycles tended to contain smaller, 'micro-cycles'
- Micro-cycles contributed to construction of the overall decision cycle
- Micro-cycles were organised into clear, but short accounts of topic opening, discussion and closure



# Data Limitations

- Extract manually transcribed one observer
- Other observations did not satisfactorily yield close to verbatim accounts
- Extract being a 'best shot' at manually recording the verbal progression of a planning session
- Between-rater reliability, the extract was categorised in terms of the Speech Function Network by two observers
- Results are represented by extracts from small worked examples with generalisations derived from more extensive analyses of the data

# Experiment 2

- Use of Automation: accuracy, reliability & workload
- Automatic Transcription of Meetings
  - integrate current systems for speech recognition and transcription
- Extracting and Retrieving Information from Recorded Interactions
  - Build upon the research already being conducted in intelligent environments (e.g. the Stanford Interactive Workspaces, or the MIT Intelligent Room)
  - Application of topic extraction and summarisation tools
- Organising and Visualising Retrieved Information

# “Intelligent Listening”

1. the ability to recognise and understand communicative intents and speech acts in planning sessions or meetings;
2. the ability to extract and retrieve information from recorded interactions during such sessions or meetings;
3. the ability to organise this information to present it in a useful fashion.

# Automatic Transcriber of Meeting (AuTM)

Time Stamp

Meeting event

Headphones

+Recording

Speaker

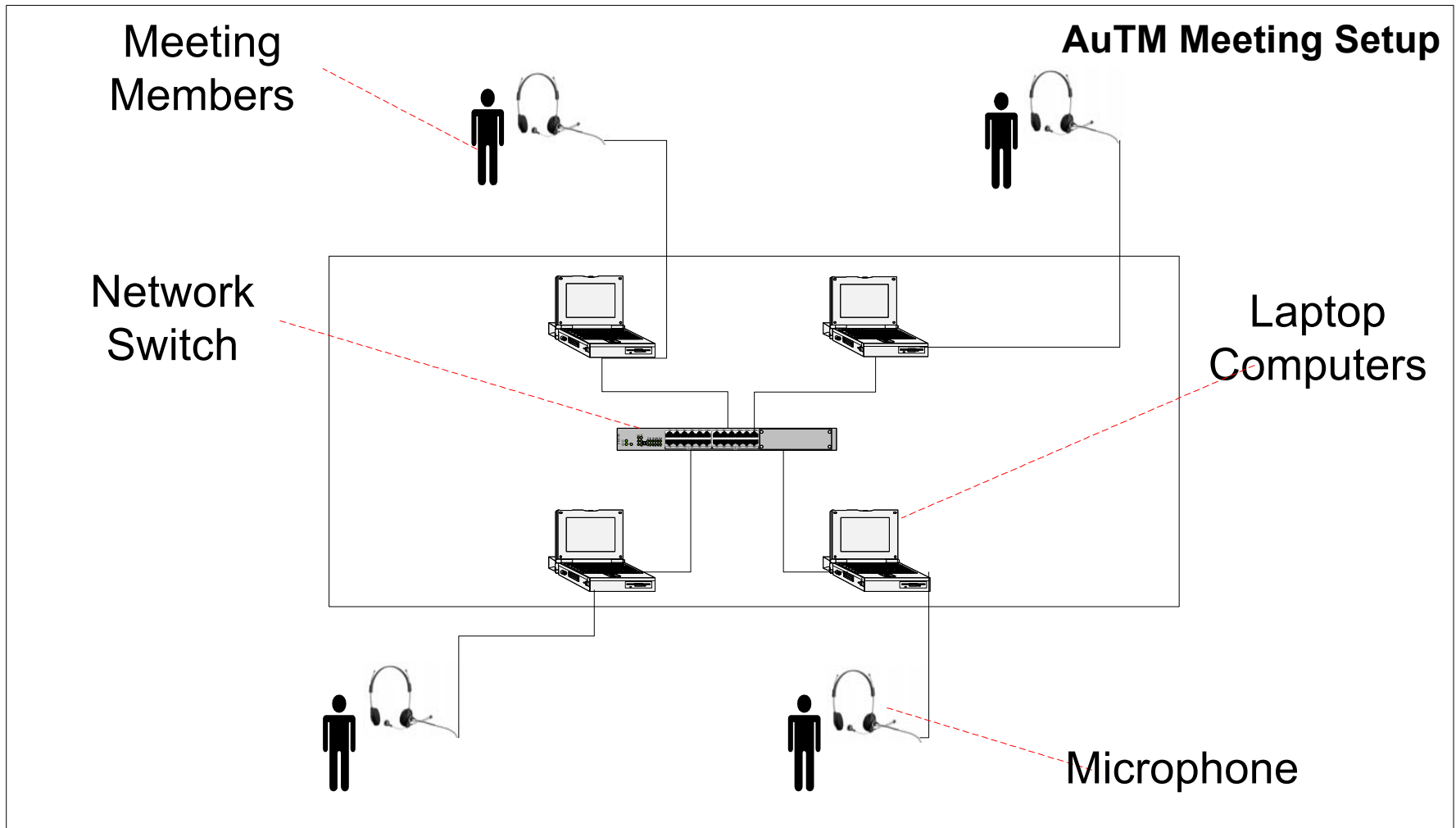
The screenshot shows the AuTM Meeting Moderator interface. The main window is titled "AuTM Meeting Moderator - Human Systems Integration Group Meeting - 1:52PM 21 March 2003". It features a menu bar (File, Session, Video, Help) and a central transcript area. The transcript is a table with columns for Attendee, Time, and Transcription. A yellow arrow points to the "Time" column, labeled "Time Stamp". Another yellow arrow points to the "Transcription" column, labeled "Meeting event". Below the transcript is a "Recording" section with a red microphone icon and a "+Recording" label. To the left of the transcript is a calendar for January 2003, with a yellow arrow pointing to the date "Today: 3/21/2003", labeled "Date". To the right of the transcript is a video feed of a man wearing a headset, with a yellow arrow pointing to it, labeled "Headphones". Below the video feed is an "Attendees" list with names in colored boxes, with a yellow arrow pointing to "Jason Littlefield", labeled "Speaker". At the bottom of the transcript area, there is a section for "Annotations" with a yellow arrow pointing to it, labeled "Annotation".

Attendee	Time	Transcription
Jarrah Sladek	13:54:33	Thanks for that this meeting is closed
Jason Littlefield	13:54:31	Sounds good to me
Jarrah Sladek	13:54:26	Can we have the next meeting on the first of April at 9 AM
Jarrah Sladek	13:54:23	Okay that motion is carried
Jason Littlefield	13:54:20	I second that
Jarrah Sladek	13:54:14	Okay I move we transfer 10k from the travel budget to the software installation budget
Jason Littlefield	13:54:08	Yes. 10k is required to meet cost of installing new software
Jarrah Sladek	13:54:05	Great are there large expenditure items we should know about
Jason Littlefield	13:54:00	Task expenditure is in line with the budget forecast for this year
Jarrah Sladek	13:53:55	Are there matters to discuss other finance
Jason Littlefield	13:53:52	Nothing to report here
Jarrah Sladek	13:53:46	Okays if there is nothing else to report lets go onto security

Date

Annotation

# AuTM Schematic Diagram of Meeting Room Setup



# Feasibility Experiment at HQJOC

Opportunity to experiment in a live HQ:

1. analytical assessment
2. **assessment and management of security**
3. assessment and management of ethical concerns
4. **assessment of technology for capture**
5. **assessment of processing requirements for captured information**

# Technical set-up

- AuTM (version 1.7) configuration:
  - one computer and microphone per participant
  - one participant running a *moderator* program per meeting
  - remaining participants running a *client* program each
- Hardware:
  - laptops for 16 users and 1 server, headsets, USB sound cards
- Organisation
  - installing software on the machines
  - networking the machines
  - placing the equipment on the planning room table

# Recording sessions

- initial training
- difficulties during recording:
  - people taking off their headsets
  - networking
  - acoustics of the room
  - users using the experiment equipment or looking at the output
  - some users had not trained with the system (generic profiles)
- positive aspects:
  - kept going for 5 days
  - users got used to the technology (even the headsets)
  - solutions for the difficulties were identified
  - recordings and transcripts for more than half the sessions
  - confirmed planned improvements to system configuration



# Lessons Learned

- technical aspects
  - architecture of the system (changed in AuTM version 2.0)
  - networking issues (solved in AuTM version 2.0)
  - user profile management
  - availability of machines to participants
  - importance of improving the speech signal quality
- people aspects
  - accepting the technology
  - awareness of benefits
  - tolerance of inconvenience
- organisational aspects
  - support from end users, support from the hierarchy
  - help from colleagues
- financial aspects
- expect the unexpected!

# Example of Automatic Transcription

“Two missions that have **come out of the** two AOCs”

*Automatically transcribed as:*

*Shows are **come out of the** twoway overseas*

*Automatic recognition 4/10 words*

# Experiment Outcomes

- Understood how the technology can be made to work in the Theatre Planning Group
- Identified improvements to be made to the current AuTM system
- Users realised the utility of the technology
- Assessed the user acceptance of the technology
- **Obtained data for analysis**
- Sowed seeds benefits for Collocated Headquarters

# Conclusion

- Future of “Intelligent Listener”:
  - development of AUTM (version 2.0, iScribe and iListen)
- Transcription will provide rich source of data
- Sociolinguistic Analysis of the data
  - Tip of the Iceberg
  - Inform Tool Building



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# QUESTIONS