A Study of Collaborative Work Practices in a Joint Military Setting

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Introduction

- Large-Scale Joint Operations
- Distributed Operations
  - Participants physically remote
- Dynamic Nature
  - Requires collaboration tools beyond telephone, email
- Collaborative Work Practices
  - Management of requirements, needs, prioritization, synchronization

The Joint Military Setting

- The Joint Expeditionary Force Experiment
  - Fourth in a series of experiments
  - Help prepare for challenges of 21st Century
  - Brings together people, processes and technologies
  - Experiments with emerging systems, concepts and procedures
  - Speed development of capabilities

Collaboration Tools

- Telephone, VOIP, email
- SharePoint Portal Server
- Specialized Air Operations portal
- Custom assessment tool
- Info Work Space – collaboration tool set
  - Office metaphor – buildings, rooms, etc
    - File storage
    - Bulletin/white boards
  - Text chat, Audio chat, Shared View

Collaborative Work Practices

- How do operators work collaboratively
  - Beyond looking at a single tool
- What collaboration methods do operators prefer
  - Under what circumstances
    - Priority
    - Time criticality
  - Environment constraints
  - Current techniques and procedures
    - Are they sufficient
    - How does toolset support operators in their collaborations

Contextual Inquiry

- Data gathering technique (Holtzblatt and Jones 1993).
  - Quiet observation, brief interactive interviews
  - Success based on partnership
  - Danger of disrupting work practices
    - Ground rules established in advance

Data Collection

- Document relevant characteristics of collaboration on a number of dimensions

- Collaborator
- Time
- Media
- Timeliness
- Info type
- Intent
- Comment

Collabor-ator ID	Time	Media	Time-liness	Info Type	Intent	Results/ Comment
A.	0554	FTF	Took too long	target nominations	Provide target information	May have to have a private GAT for these. Marine tgt noms were 12 hrs late
G.	0557	IWS audio	Good	IWS connection check	Ensure comms working	
G.	0600	IWS audio	Good	target nom-inations	Provide target information	Late target noms; SOLE could not log on earlier
O.	0608	FTF		problem notification	Explain JF's absence	JF. can't get on server
G.	0611	FTF		problem notification	Explain that problem was noted	Lost slideshow, kept audio: 'what the hell was that'
G.	0614			problem explanation	Postulate possible source of problem	Lost slideshow momentarily: 'that might have been operator error'
JF.	0620	IWS audio		problem resolution	problem resolved	JF. on line now
JM.	0624	IWS audio	Took too long			JM sent slides in 2 mins ago, could not show during GAT

LEGEND:
MEDIA - E-MAIL (E), IWS TEXT CHAT (ITC), IWS AUDIO CHAT (IWS AUDIO), FACE TO FACE (FTF), PHONE (P)
Intent - What AOC subtask is being worked?   What info was being sought?
Results - Results of attempt to collaborate: Satisfactory Collaboration (SC), Unsatisfactory (US)

Work Flow

- Transform component nominations into the Joint Prioritized Target List based on Air Operations Directive
  - Nomination considered in context of AOD
  - Nomination considered in context of Rules of Engagement
  - ⭐ Nominations requiring more supporting information identified
  - ⭐ Prioritization and "cut line" established

Meeting Characteristics
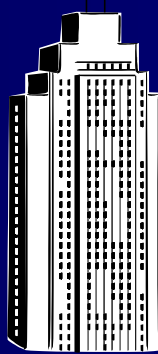
- Approximately 25 attendees - distributed
  - JAG, Intelligence, Weather, Special Ops, Liaison Officers, etc
- Two prepared Briefings
  - Weather, Intelligence
- Nomination Discussions and Prioritization
  - Customized Spreadsheet – IWS Shared View
  - Meeting conductor controlled subject and pace
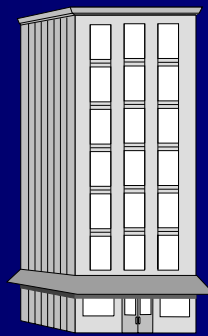
Virtual Places
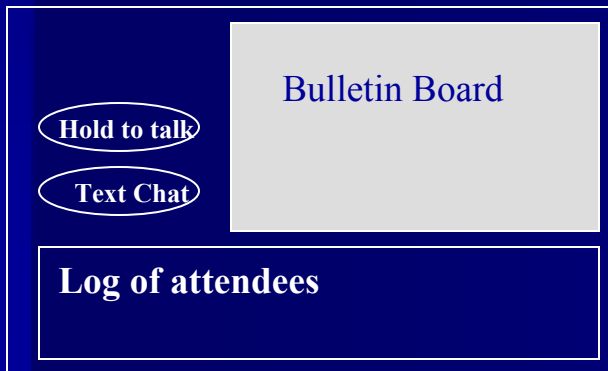# Room Metaphor Example
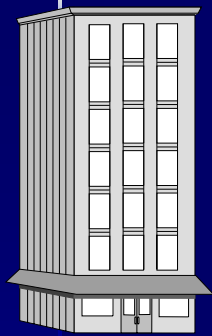
Army Commander

Navy Commander

Air Force Commander's Building

Combat Operations floor

Air Mobility Division floor

Combat Plans floor

Floors in virtual Air Force Commander's buildling

Rooms on virtual Combat Operations floor

Meeting Room Window

Bulletin Board

Hold to talk

Text Chat

Log of attendees
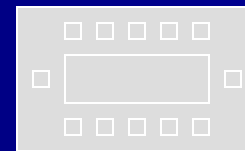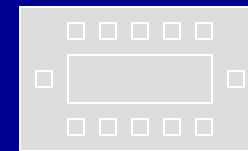
Seats around conference tables change color when a member is present in the room
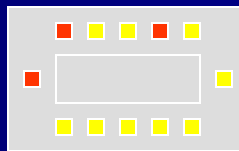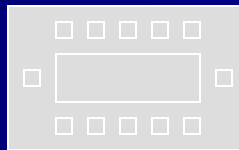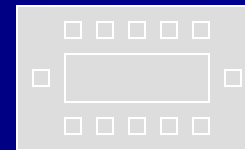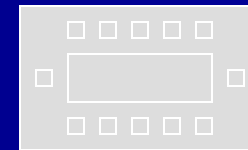
Strategy Room

GAT Room

Meeting Room 3

Meeting Room 4

Meeting Room 5

Meeting Room 6

Face to Face Comparison Opportunity Knocks…

- Deputy inserted comments for clarification
- More requests for clarification
- Unpopular stands for shorter time periods
- Participants remained engaged
- Caucuses split off and merged easily

Awareness

- Awareness
  - Given two participants p1 and p2 who are collaborating via a synchronous collaborative application, awareness is the understanding that p1 has of the identity and activities of p2.

- Awareness Support
  - When an application provides p1 with information about the identity and activities of p2 without p1 having to request the information or p2 having to explicitly transmit it.
    [Drury and Williams 2002]

Virtual environment vs. Face to face

- Participants not always aware of who was speaking for each agency (identity awareness)
- Participants not aware if another participant was actively listening (presence)
- Participants not aware of other participants' frustration (activity)
- Participants not aware of when an agreement was completed (activity)

Group Meeting Characteristics vs Tempo of Relevant Information

Information exchange flow structure		Tempo of relevant information flow from attendees' points of view		
Flow type/direction	**Typical example**	**Intermittent at predictable intervals**	**Intermittent at unpredictable intervals**	**Constant**
one-to-one/ bidirectional	meeting chair addresses comment or question to individual attendees in turn with others listening in	polling each attendee in order on a known topic; usually structured	directing a question to individual attendees in an unpredictable order; e.g., one that depends upon answers to preceding questions (topic not necessarily known in advance); usually fluid	not applicable
one-to-many/ unidirectional	one person presents information to the group	formal presentation of information in a pre-established order, where each attendee is interested in certain portions; usually structured	informal presentation of information, where each attendee may be interested in portions but the exact content or order is not known in advance; usually fluid	information presentation is of vital interest to attendee; usually structured
many-to-many/ multi-directional	group discussion of a topic of common interest; group may splinter to discuss several topics simultaneously	not applicable	brainstorming or free-form discussion session; usually fluid	discussion topic is of vital interest to attendee; usually fluid

Format for Typical GAT Meeting

Time	Flow type/ direction	Meeting component	Media	Tempo of relevant information flow
0600 – 0610	One-to-many/ unidirectional	Weather update, intell update	IWS Shared View + audio	High (structured, formal presentations)
0610 – 0700 except for occasional one-to-many	One-to-one/ bidirectional	Target nomination and prioritization	IWS audio + Shared View	Low except for short periods at unpredictable intervals (polling of attendees in unpredictable order)
0610 – 0700 occasionally	One-to many/ unidirectional	Target nomination and prioritization	IWS audio + Shared View	Low except for short periods at unpredictable intervals (informal presentation of information on particular issue(s))
0610 – 0700 concurrent with above	Many-to-many/ multidirectional	Backchannel for various purposes	IWS text chat	Low except for short periods at unpredictable intervals (informal, multithreaded chat comments that are often humorous, editorial, or off-topic)

Recommendations

- Meeting Format
- Information/Knowledge Management
- Awareness Support
  - Identity
  - Presence
  - Activity
- Training

Summary

- Better understanding of what is required of the tools to support virtual meeting environment
  - Work in a virtual environment becoming more commonplace
- Different skills required than those needed in face to face environment
- Manage tempo of relevant information
  - High performance, Prepared participants