C2020 New Technologies and Directions

Some examples of current developments

CRC :Broad areas of research

- Technolog
- S Development
- Property & Construction Business Management and Economics

The driving force to encourage change and facilitate progress

A new paradigm for decision making

Response to these forces /paradigms

Management & Process


Complexity is the issue
How do we simplify and yet allow for flexibility?

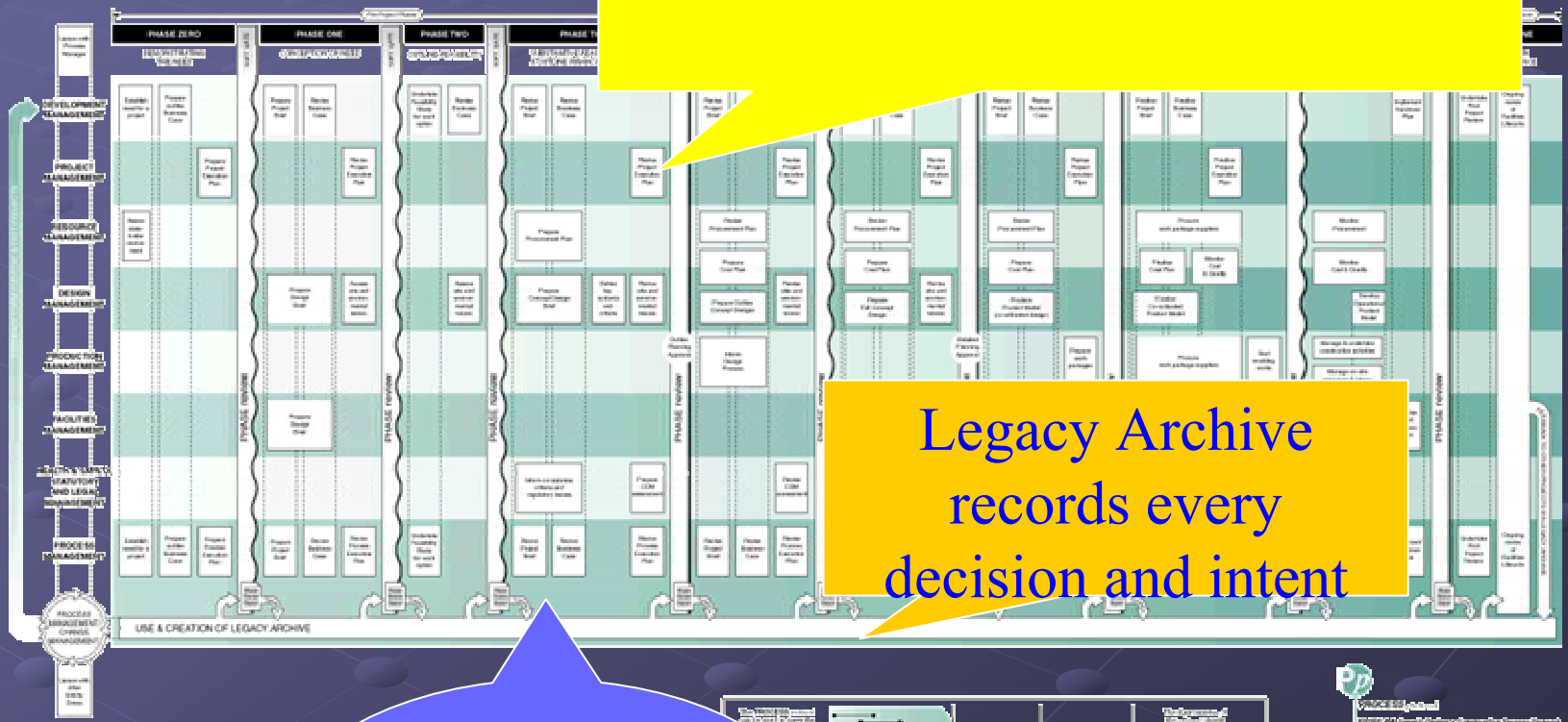
The basic assumption ...

Process improvement is probably the best way of increasing construction productivity and performance

Process Protocol Model

Process F

You can ‘drill down’ to lower levels of information which will describe various decisions that have to be made



Legacy Archive records every decision and intent

IT Support for whole protocol

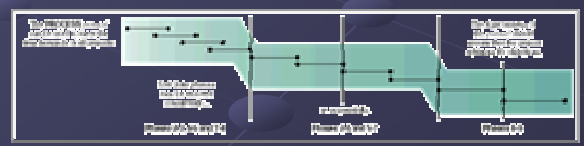
Process Protocol

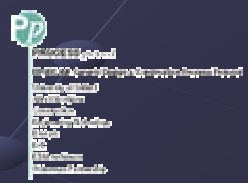
- Provides a base from which we can all develop
- Tested by a number of organisations
- Adopted by other countries
- Can be adapted to the changes arising from technological developments
- Avoids us re-inventing the wheel

Process Protocol

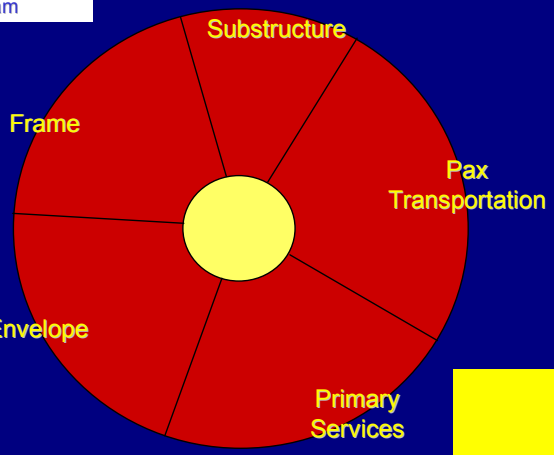
Whole Model adaptable to a particular firms requirements

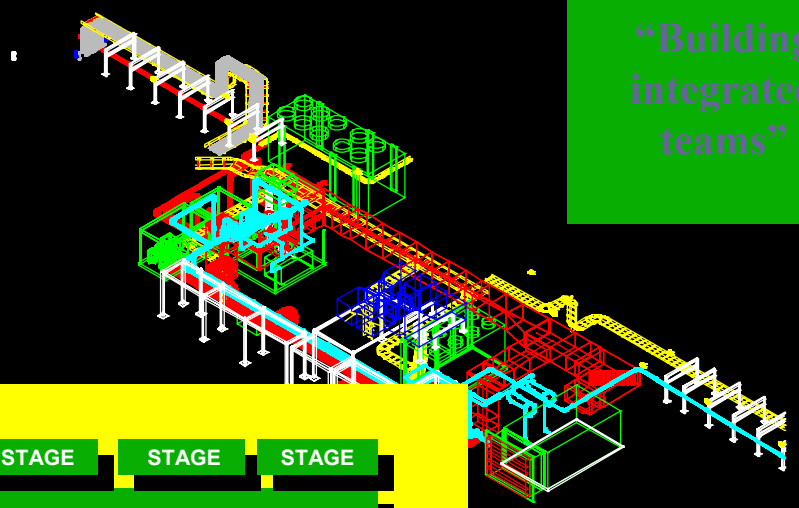
You can overlay new activities on top, retaining the basic model e.g. risk Management





Group wide
Shell and Core
Delivery Team



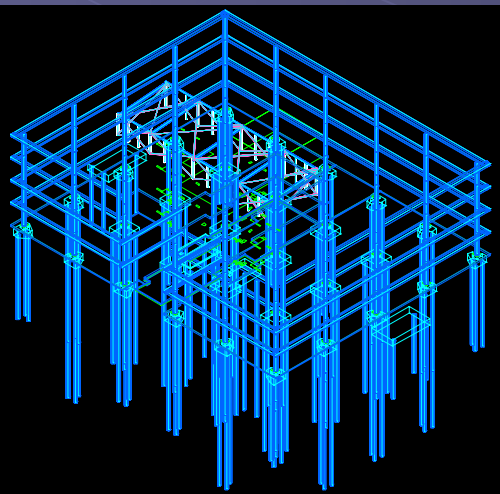


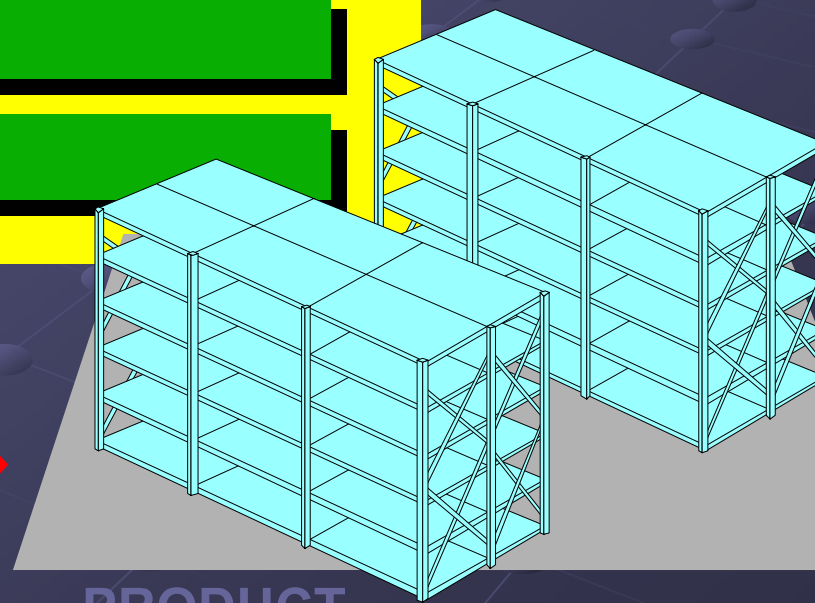
"Building integrated teams"

ORGANISATION

	STAGE	STAGE	STAGE	STAGE
PLAN				
IMPLEMENT				
CONTROL				

PROCESS





PRODUCT

"A language of processes"

Conventions

Process Templates

Process Attributes

Level 1 Directorate

Level 2 Airport Project Team

Level 3 Delivery Team

BAA PROCESS CONVENTIONS

teams can use the integrated process and scheduling tool to draw their processes. the tool contains all the templates needed to implement this standard

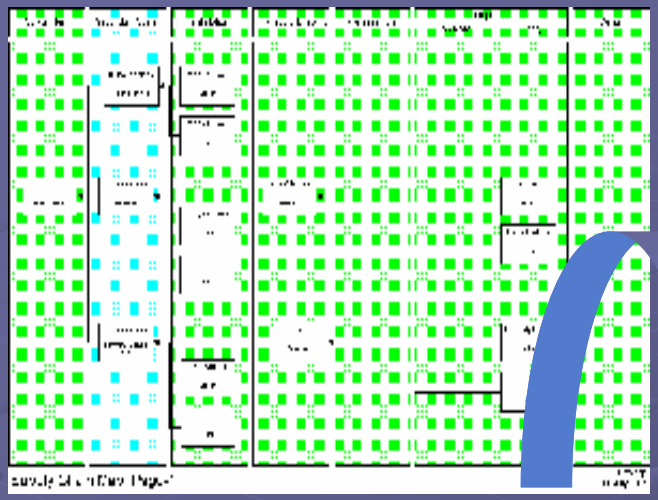
For advice on the use of Visio - the development of processes, or the interpretation of this standard please contact - Matthew Bacon on JBH 5598 or matthew_bacon@baa.co.uk

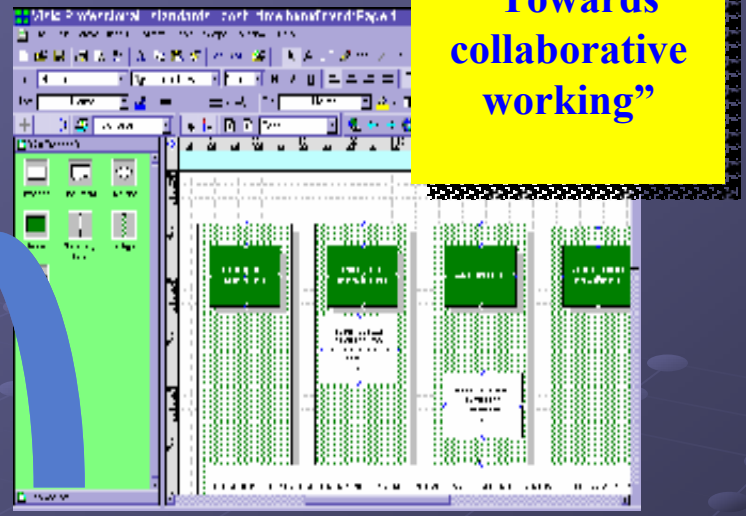
level one delivery process

level 2 - airport project team - CONCEPT DESIGN STAGE

level 3 - SHELL/ CORE team - CONCEPT DESIGN STAGE

BAA Standard for Process Modelling

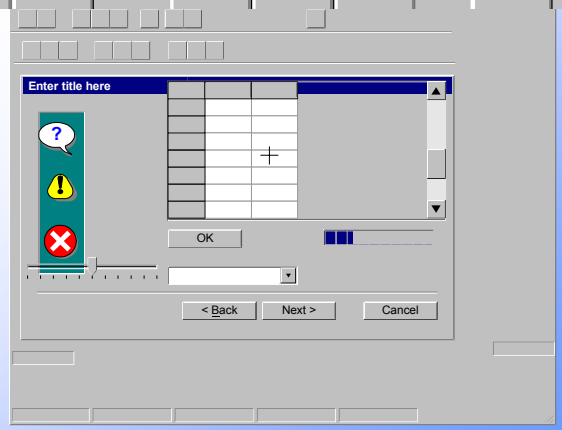




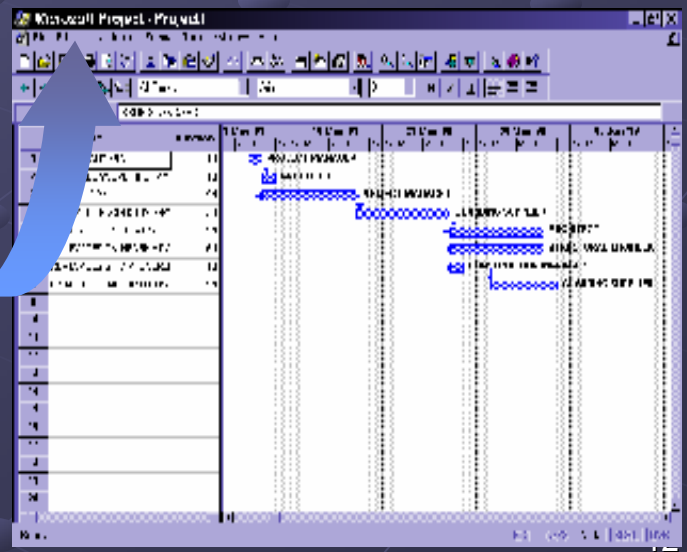
"Towards collaborative working"

BAA CHANGE MANAGER

PROCESS DATABASE



DATABASE TOOLS



Sustainable Development

Progress Towards a Sustainable Information City

Greater Vancouver's long term plans for ICT systems

Sebastian Moffatt
University of Karlsruhe

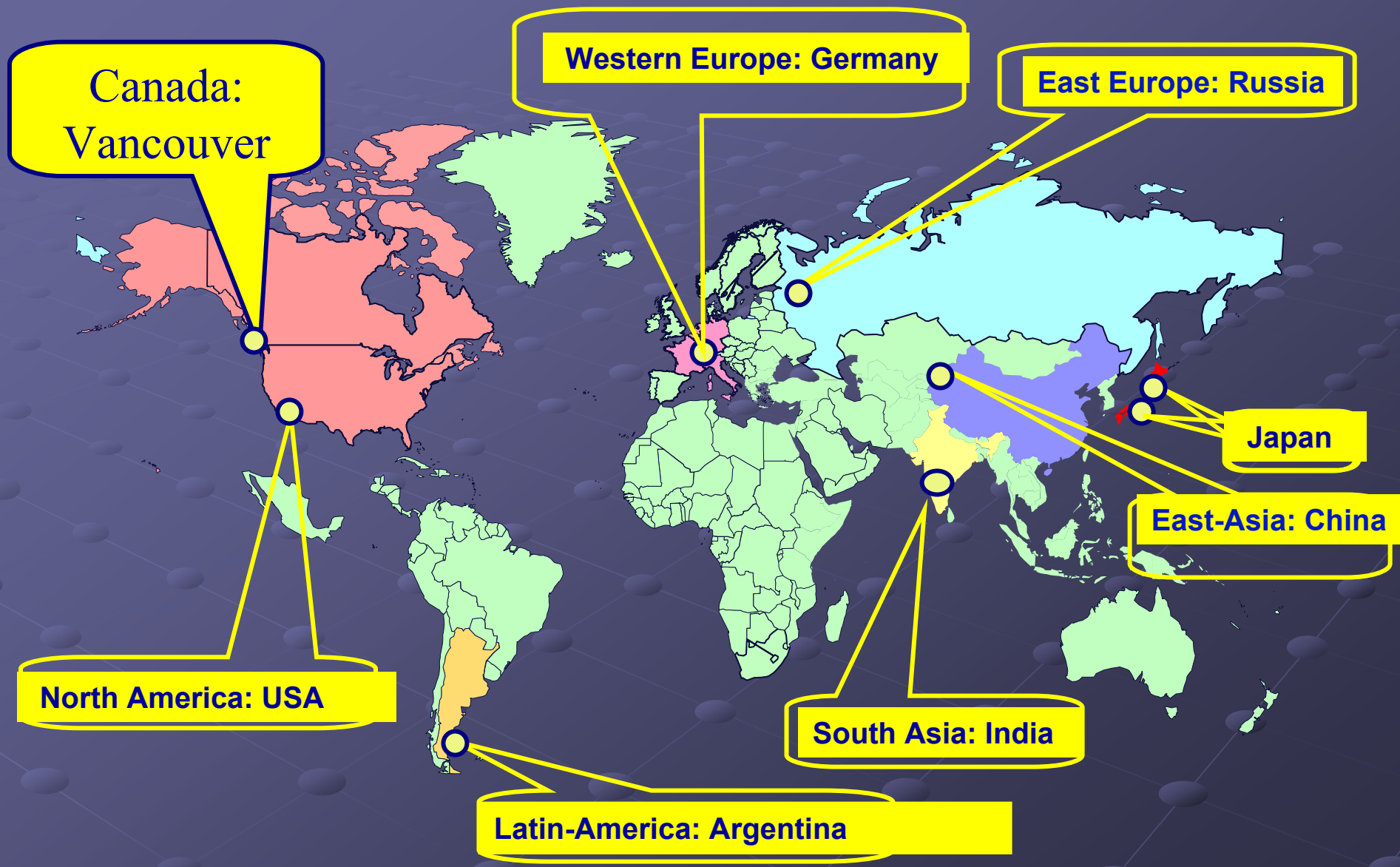
Context

International Gas Union

Sustainable Urban Systems Design Competition

- Existing metropolitan area
- 100 year plans
- Staged

Context


Canada: Vancouver
Western Europe: Germany
East Europe: Russia
Japan
East-Asia: China
North America: USA
South Asia: India
Latin-America: Argentina

Context

International Gas Union

Sustainable Urban Syste… …ative Design Competition

- Existing metropolitan area
- 100 year plans
- Staged

Greater Vancouver is a federation of 21 municipalities. (Photo credit: GVRD)

Sebastian Moffat : Sheltair.com

Planning Methods

1. A Collaborative Process…..

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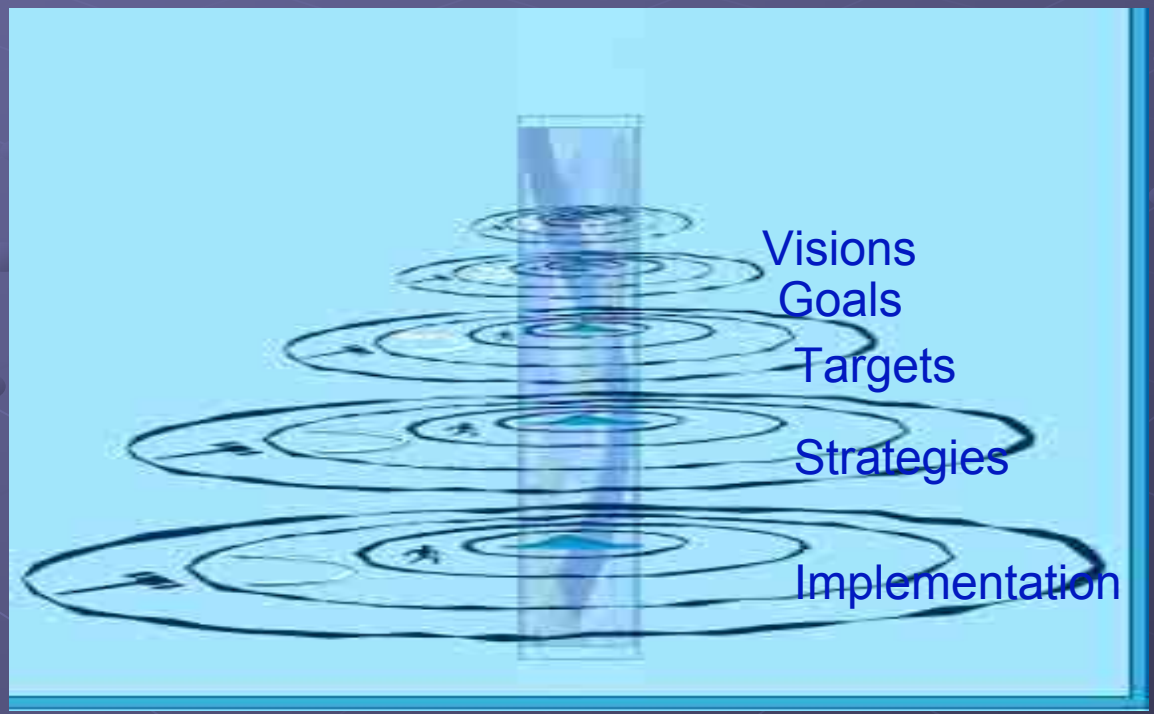
2. The ‘One-systems’ Approach



1. Decision Support Systems: GOALS & TARGETS

End-state goals

1. **The Virtual Region:** Urban systems and their users are served by an interconnected knowledge network with the capacity to integrate wide arrays of data, expert knowledge, public values, beliefs, and preferences.
2. **Auto-Pilot for Urban Systems**: Decision Support Systems are capable of making decisions on their own, where convenient, satisfying the needs of residents in ways that complement the region's long term goals.
3. **Choices and Consequences**: Decision Support Systems allow residents and decision-makers to manage change by observing how past choices have affected urban and ecological systems and how choices might affect future urban and ecological systems.
4. **Empowering and Engaging**: Decision Support Systems enliven participatory processes and foster group learning and group simulation by integrating opposing viewpoints and exposing the interconnects and indirect impacts associated with decisions.
5. **Scalable**: Decision Support Systems allow for strategic and operational analysis at various levels, including different time periods, locations, and systems.
6. **Accessible and Equitable**: Residents and decision makers have affordable access to a basic level of modeling capabilities that allows them to self-inform and contribute to community life.
7. **The Region's Pulse**: Decision Support Systems can analyze and synthesize information to provide real time information on the performance of urban systems.

1. Decision Support Systems: GOALS & TARGETS

The Virtual Region: Urban systems and their users are served by an interconnected knowledge network with the capacity to integrate wide arrays of data, expert knowledge, public values, beliefs, and preferences.

TARGET: 100% of cities using DSS tools by 2020

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TARGET: 100% of cities with real-time State of the Environment

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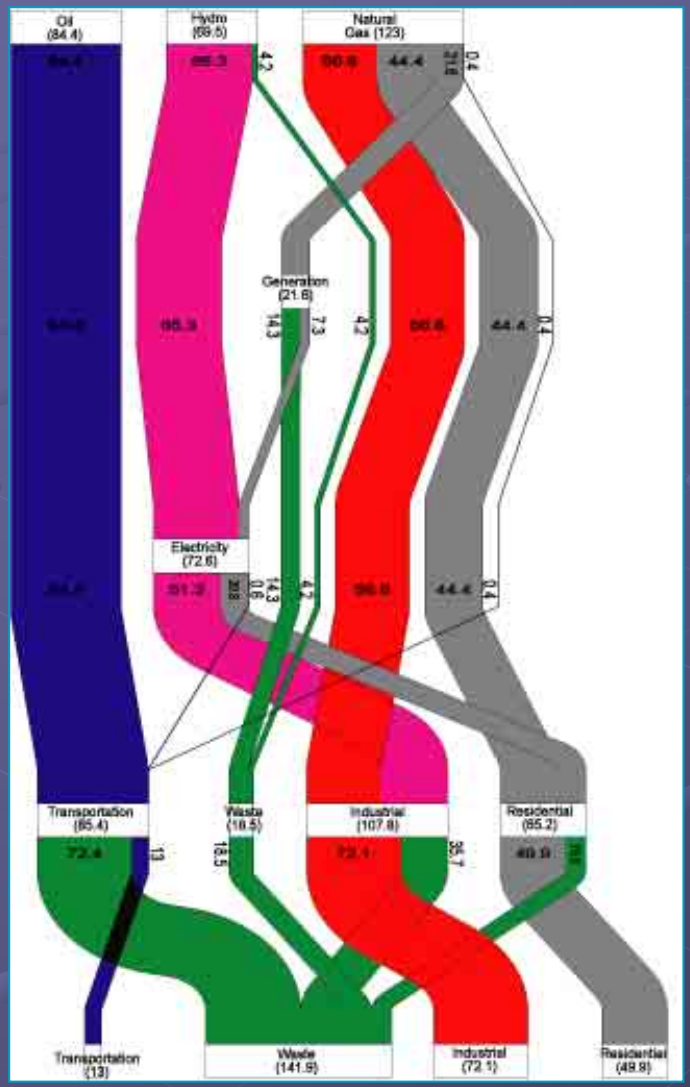
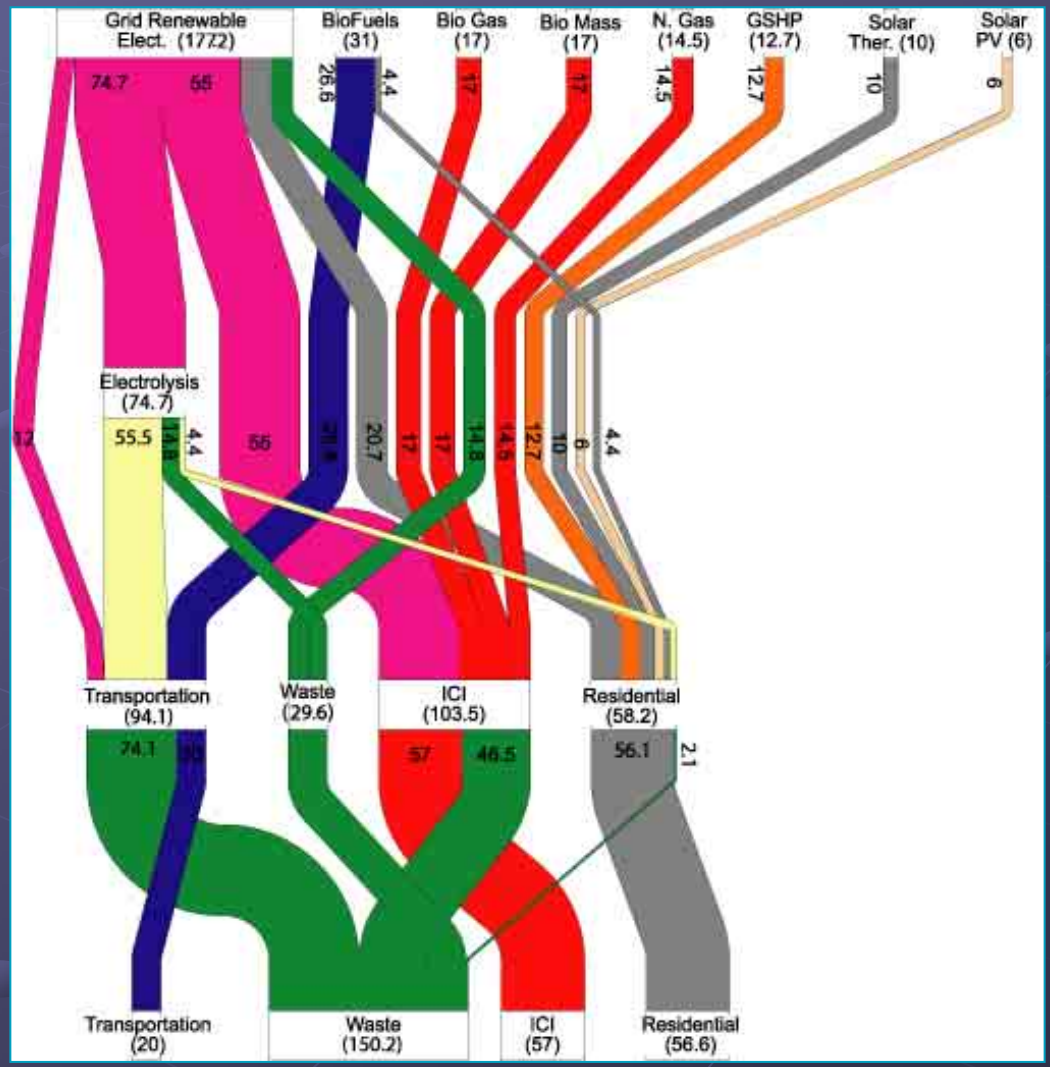
1. Decision Support Systems: DELIVERING



Vancouver 2001

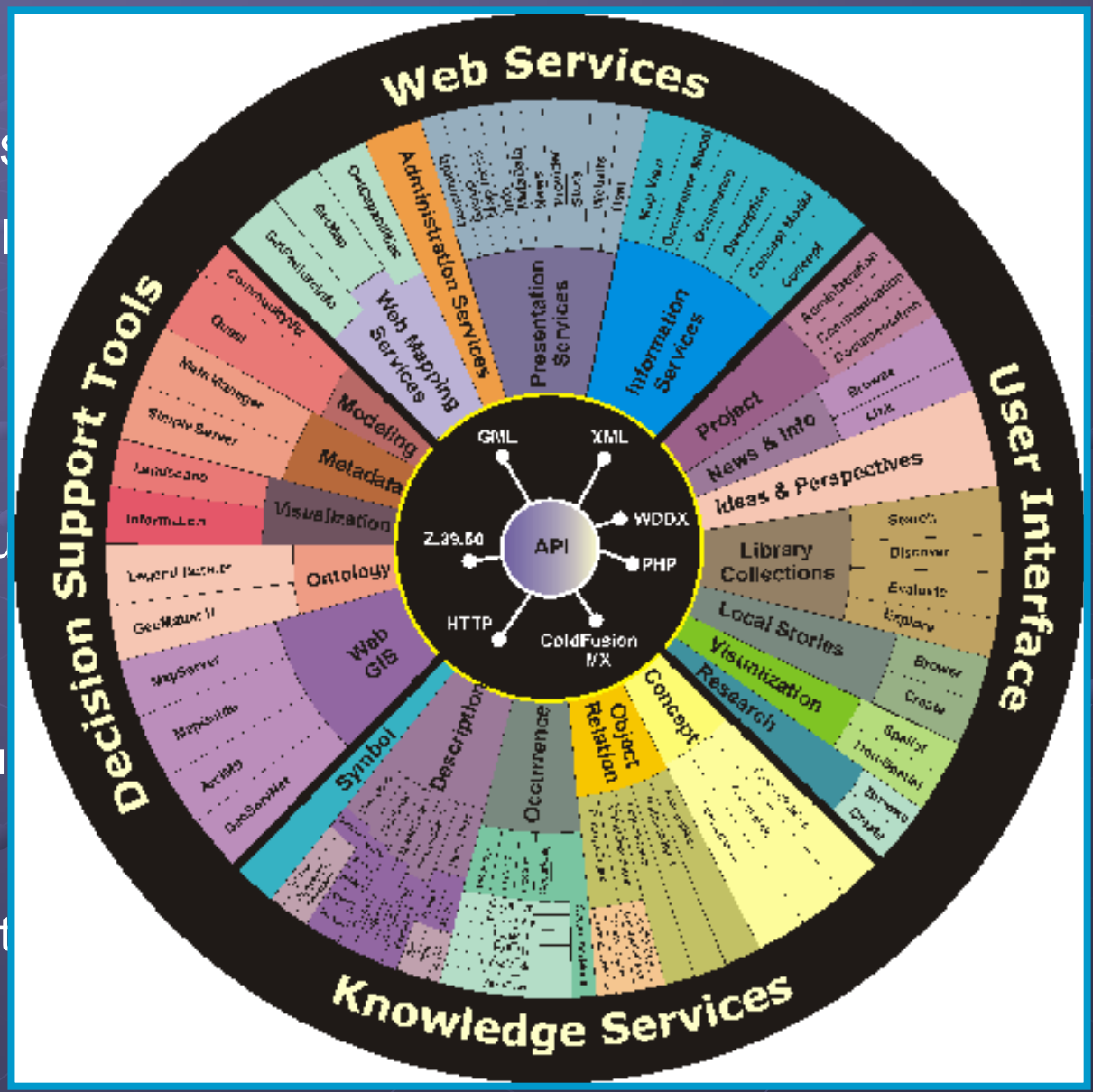


Vancouver 2101

1. Decision Support Systems:

Strategic Insights

- System model
- Scenarios mu
- Each tool mu
- Interoperabilit



GOALS & TARGETS

1. **Accessibility and Choice:** All residents have the ability to easily and quickly communicate over distances in a variety of formats (voice, text, sound, image, and instant messages).
2. **Secure Communications:** Personal confidential information transmitted or exchanged over distances is secure and protected from usage by commercial or special interest groups.
3. **A Network of People, not Places**: Information and Communications Technology facilitates on-going connections between people in all fields of life, is used to build and maintain rich relationships, and to improve cooperation in human interactions.
4. **Balancing Privacy and Planning**: Data and information required for effective management and planning of urban systems is made accessible to planners without compromising the privacy of individuals.
5. **Informed Decision-Making**: Timely access to information assists residents in using time efficiently and in making efficient use of the region's scarce resources.
6. **Dematerialization**: Information and Communications Technology provides an effective alternative, where appropriate, to the transportation of both people and materials.
7. **Direct Democracy**: Information and Communications Technology enriches governance processes by providing residents with opportunities for engagement, creative thinking, and exchange of information.
8. **Personal Development**: Information and Communications Technology provides all residents with conditions that enable opportunities for life-long learning and skills training.
8. **Technology Transfer for City States**: Information and Communications Technology-linked networks exchange knowledge between urban regions and support sharing of best practices for sustainable cities.
9. **Don't Touch My CBC or My Shared ICT:** Interaction between residents through Information and Communications Technology informs residents about their community and region and reinforces a common sense of local identity and pride.
10. **Canaries in Every Household:** Information and Communications Technology provides technological solutions that assist in alerting residents to potential hazards and in instructing residents as to how best to respond to crises.
11. **An Information Commons**: Regional regulation of the communications infrastructure allows for both the efficient allocation of scarce public goods and a largely self-managed marketplace of service providers.
12. **Adaptation and Resiliency**: Throughout the region, the built environment is planned and designed in ways that facilitate rapid adoption of innovations in Information and Communications Technology.
13. **Infrastructure that Fits**: Physical structures associated with Information and Communications Technology aesthetically complement the form and function of buildings and neighbourhoods.
14. **Fail-Safe Communications**: Redundant systems and contingency planning ensure that Information and Communications Technology provides basic functionality at the parcel and block scale even when urban networks are temporarily unavailable.
15. **Healthy ICT:** The construction and operation of Information and Communications Technology systems are compatible with the long-term health of both human beings and ecological systems.

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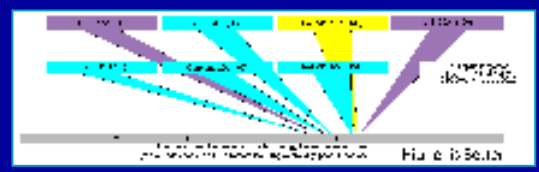
2020 Targets for Greater Vancouver Region:

Top 10% connectivity



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3. ICT & Economy:

1. Prosperity Through Livability: Partnerships between local governments and key industries coordinate capital investments, marketing and R&D for the purpose of attracting and retaining economic activity consistent with the region's vision of sustainability.

ital
the region's

uch and too

es, and to

ed or enhanced

as a result of econon

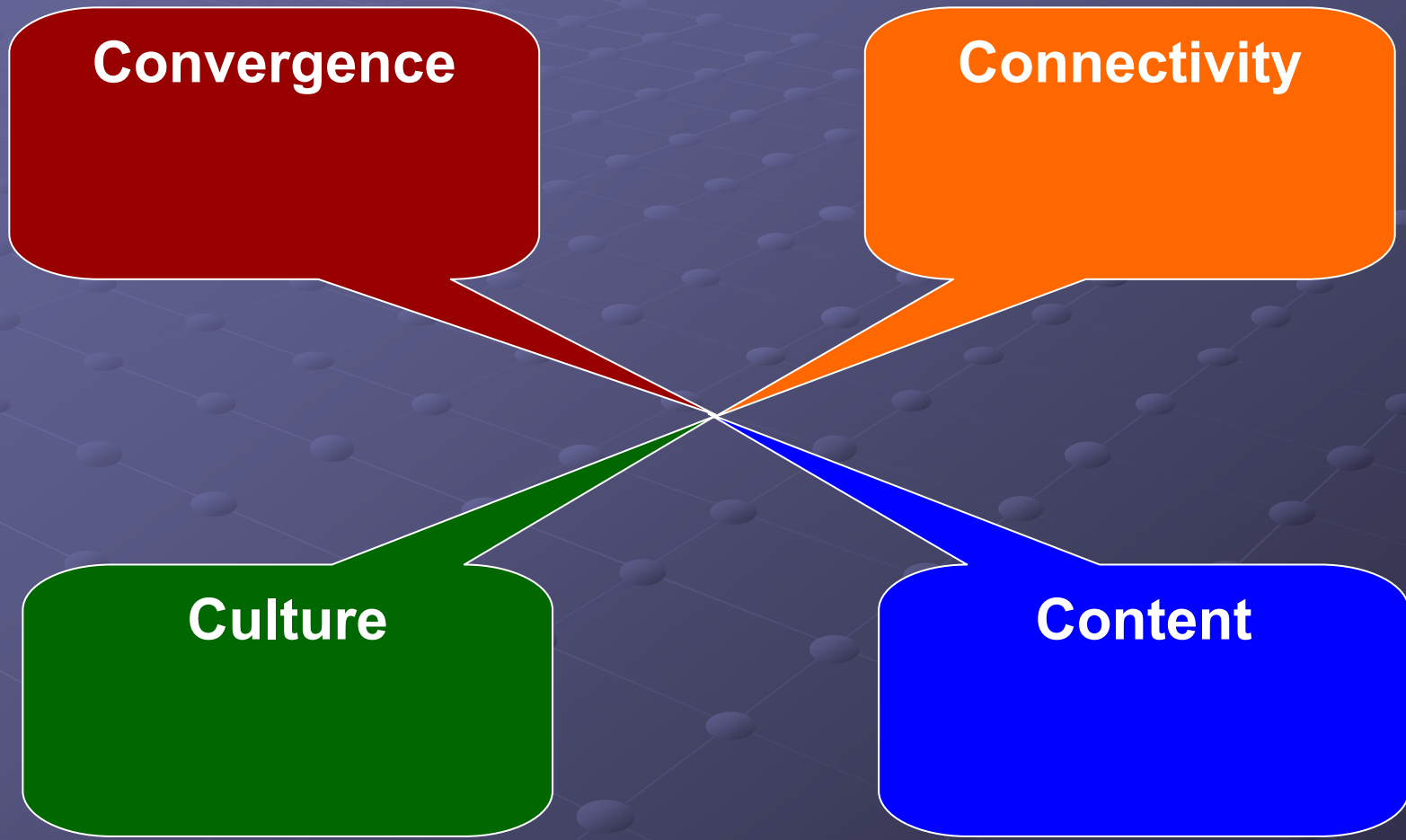
5. **Sustainable Employ** ide a high level of satisfaction, fulfillm
6. **Sustainable Busines** cribe to a sustainability ethic, a
7. **Conscientious Cons** ter the region's commitment to sustai
8. **Doing Well by Doing** of national and international export d
9. **Planned Eco-Efficie** nvestments between economic se r.
10. **Fair Play**: The marke y one group or interest over the mark
11. **Support for the Soc** esidents to make significant cont
12. **A Robust Region:** T vorked with organizations in surro

More Information

Sheltair.com

Sebastian Moffat

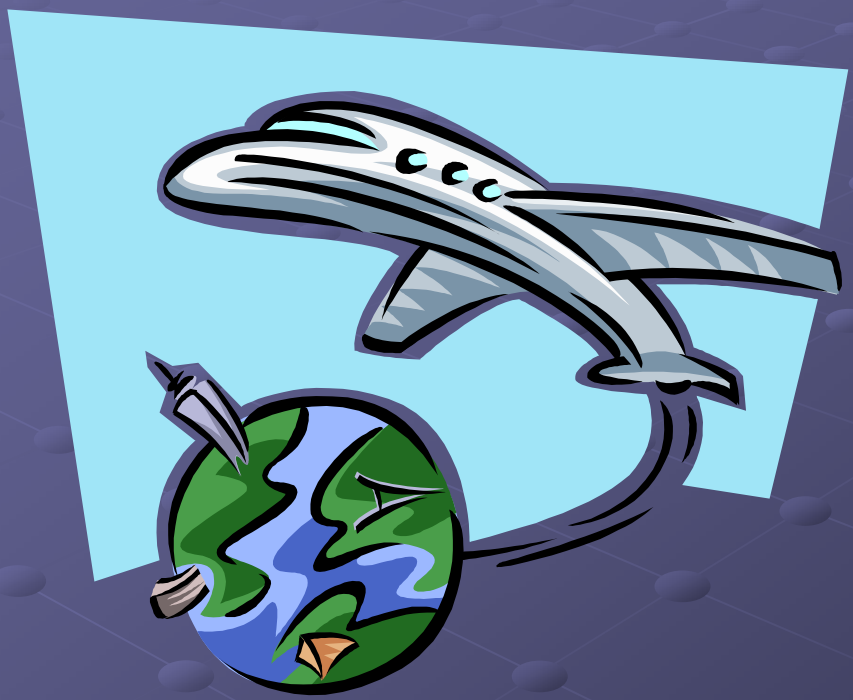
The trends



Technology push?

- **BANKING**
- Hole-in- the wall machines replace substantial numbers of white collar workers
- Banking services now far beyond what could be envisaged 20 years ago and can be operated from your living room.
- **92% reduction in transaction costs?**

Technology push?



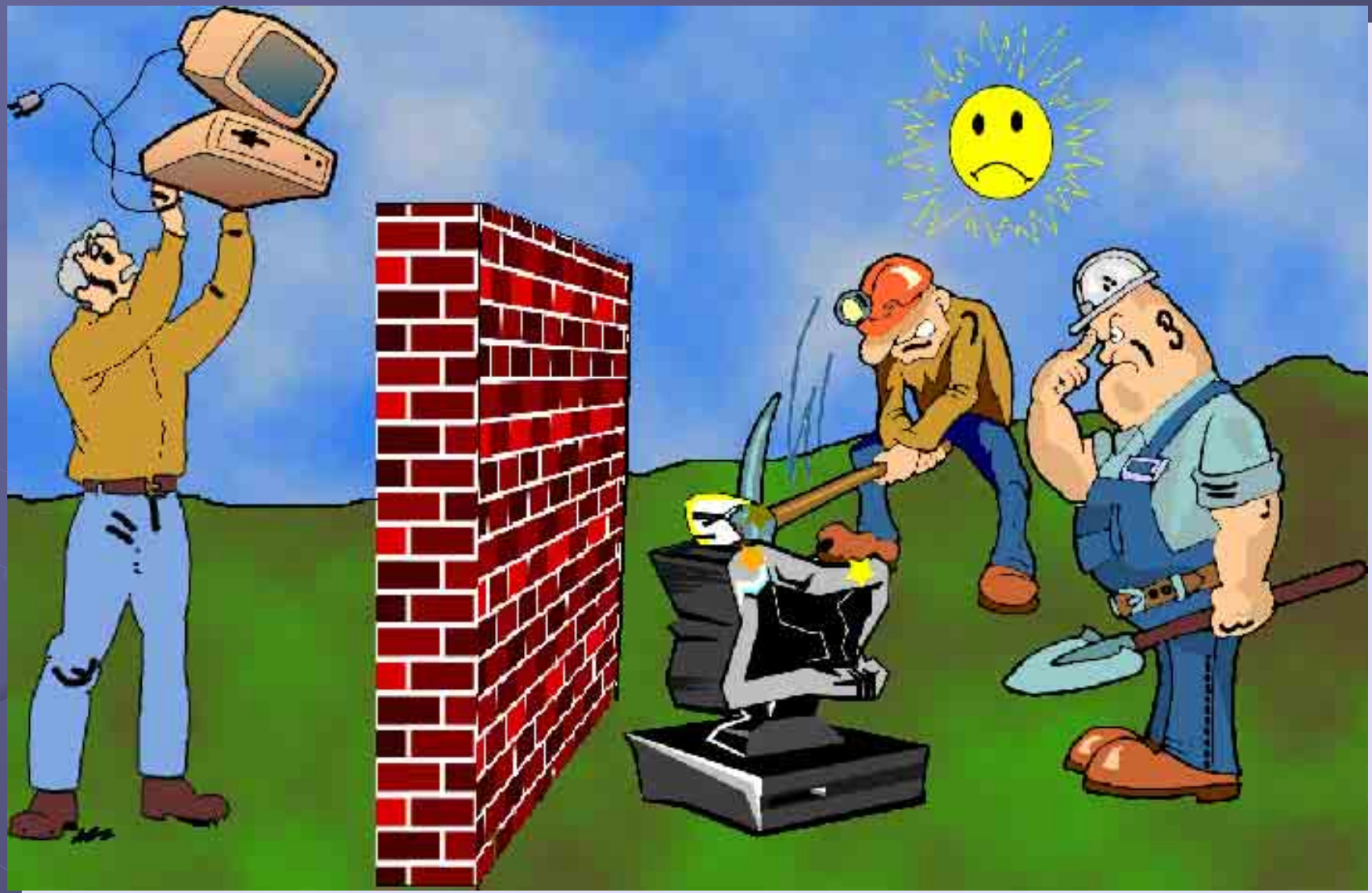
- **Travel**
- Integrated systems allow booking and seat reservations for aircraft from your local travel agent and home computer.
- **Intelligent systems can optimise your routes**

Technology push?

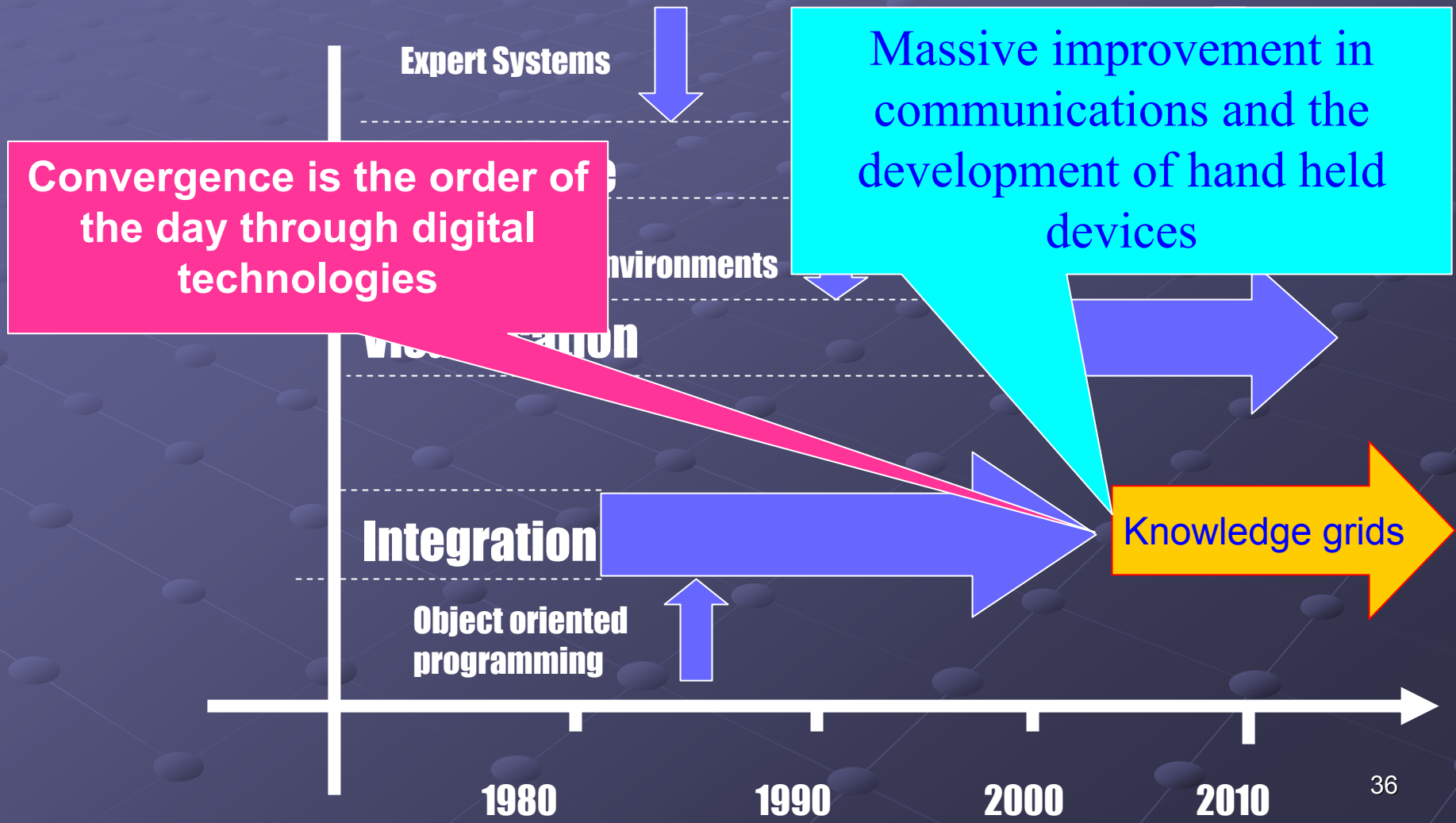
- **Manufacturing (cars)**
- Cars now built in less than 10 hours
- All cars require computer technology to run
- **Massive change in performance**

Market pull and technology push

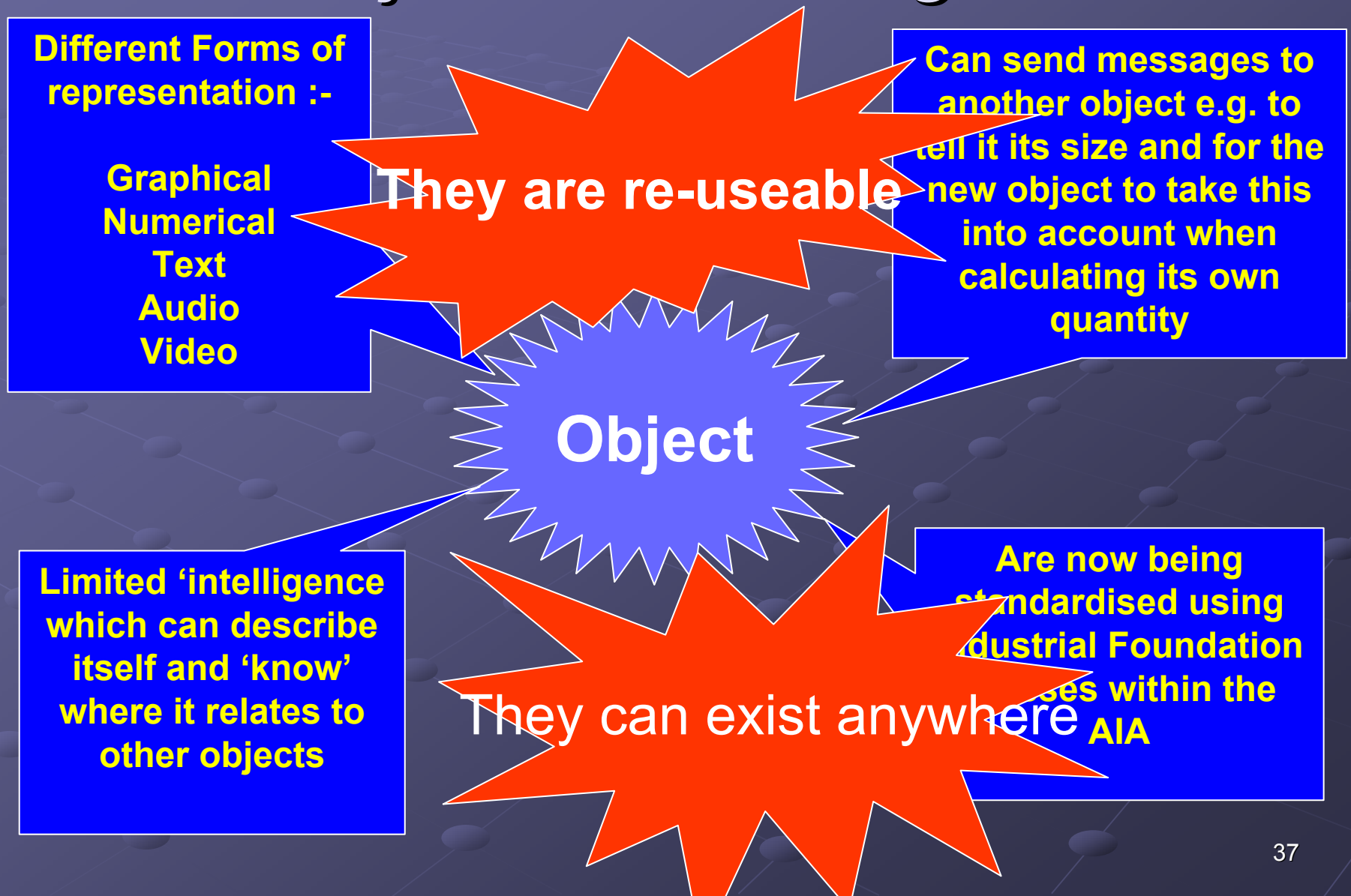
Other industries Construction



Applications: development of IT

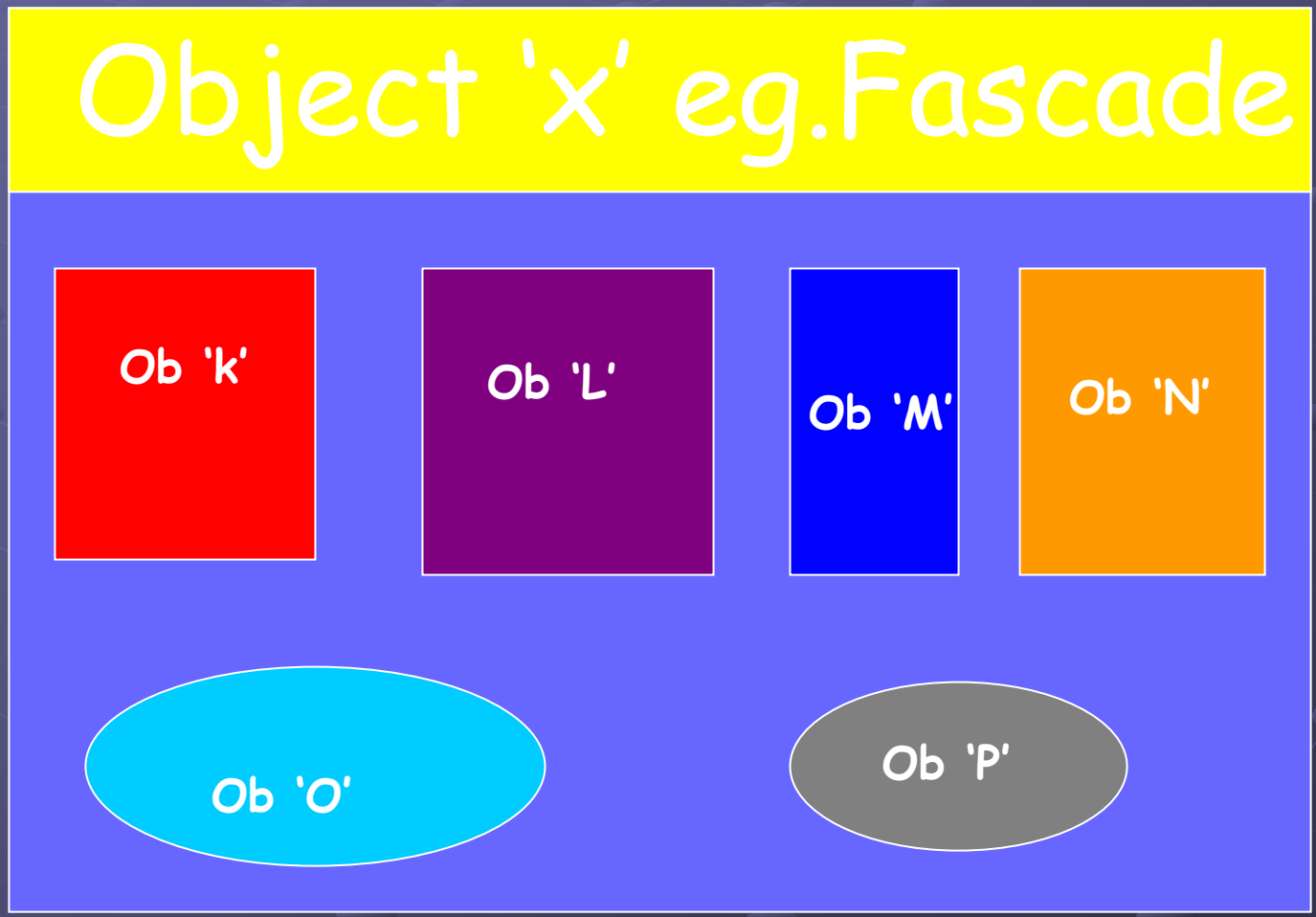


Object Technologies

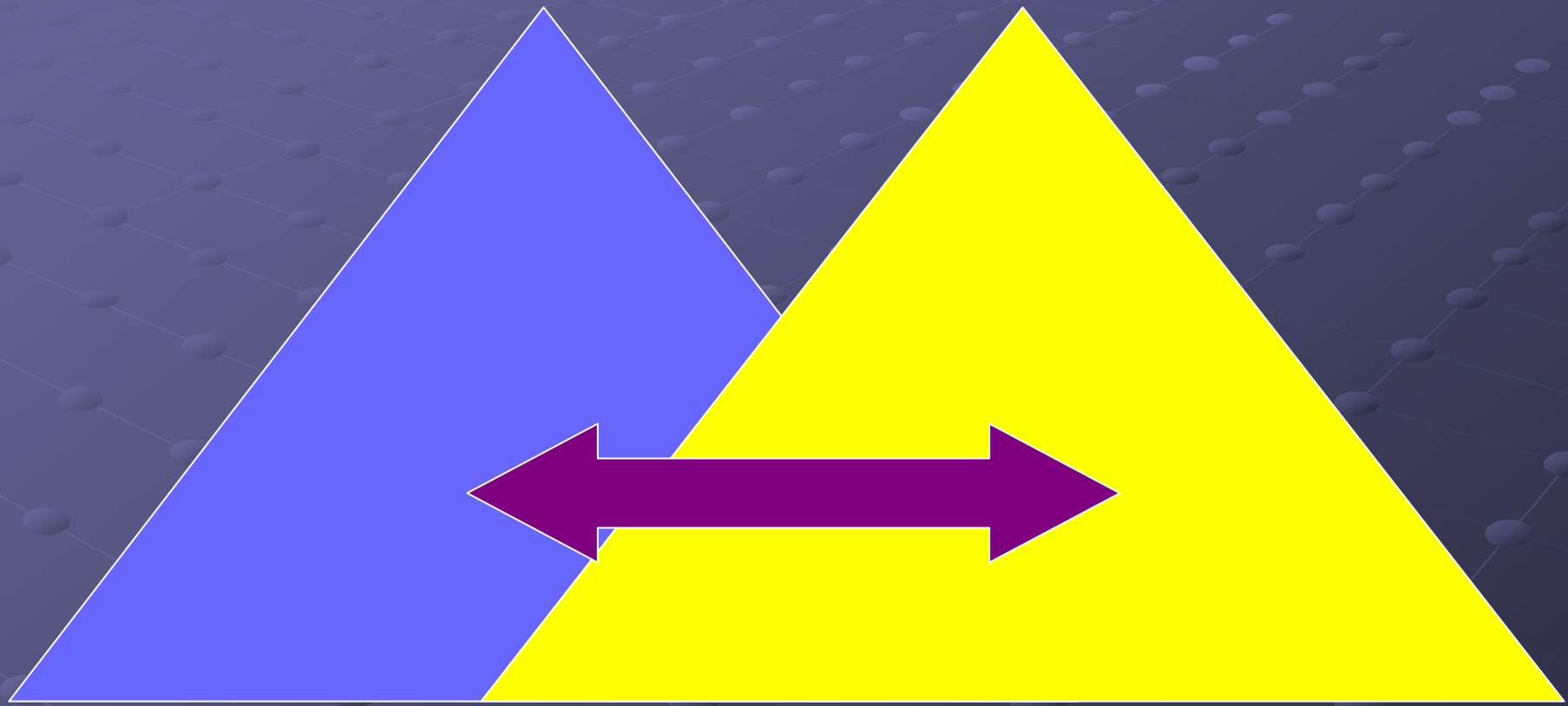



Representation
Object
Messages
Text and graphics
Figures
Scheme dwgs
Dwgs & Spec.
Window
Type xyz, Softwood, size XxX
Glazing area =
Overall area =
Cost =
Designed for cavity wall
Located on fourth floor
Requires cavity detail 'Z'
Reduce cavity wall by 'X'
Provide close cavity detail
Allow for hoisting

Nesting of Objects

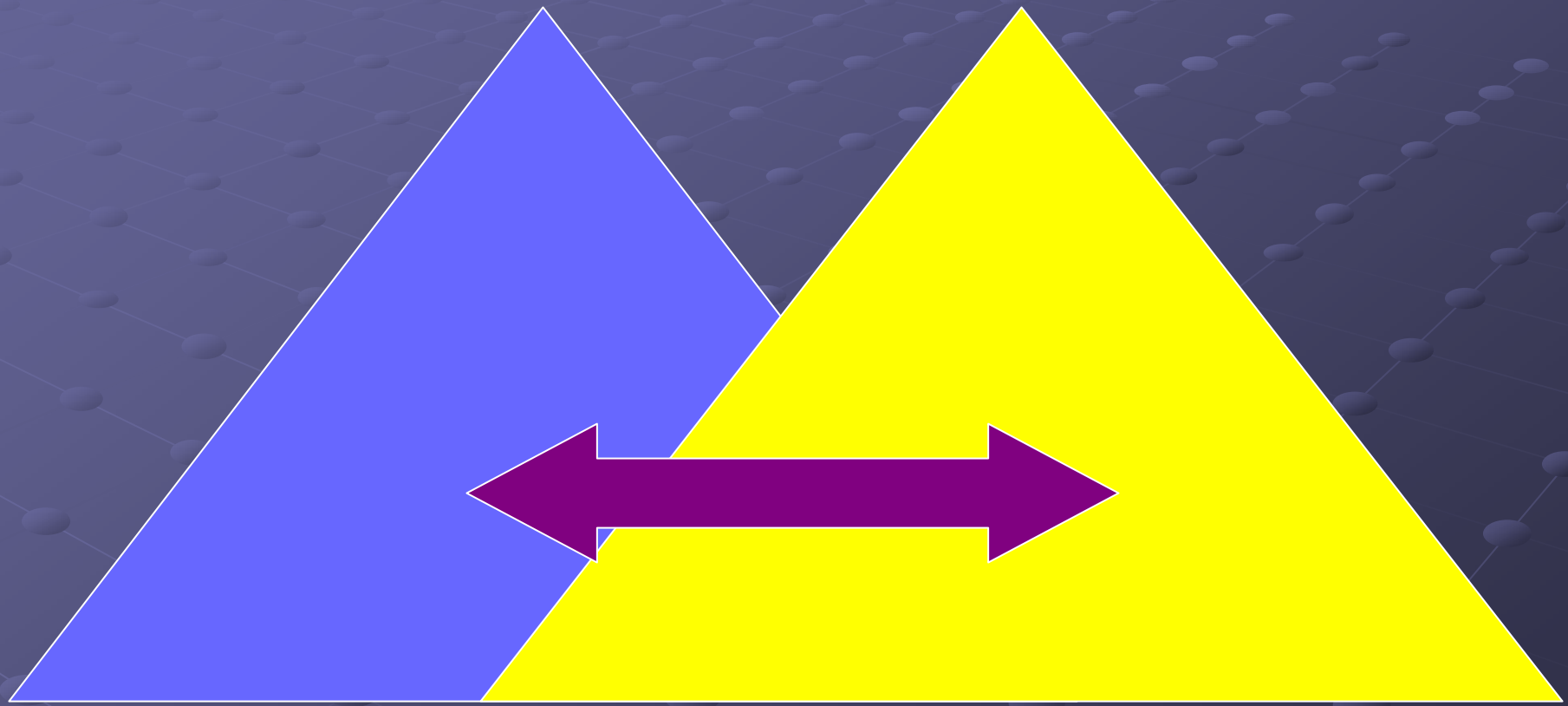


Hierarchies of Objects



Urban Areas ⇨ Buildings

Hierarchies of Objects



Concepts → Applications

Characteristics of objects

- Self referencing
- Re-usable
- Allow some aspects of i elligence
- Variety of methods of re esentation e.g.graphics, text, num s
- Can be manipulated lik ny physical objects to aid understa g and communication

Now being standardised through the IFC's

The Distributed Object Approach

Source: Dr Grahame Cooper

Knowledge Grids

- The objects can exist anywhere in the world
- They can be tapped into by anyone who is allowed to.
- The whole of the grid of computers acts as one
- The analogy is the electricity power grid

Visualisation

IT Facilities for the Future

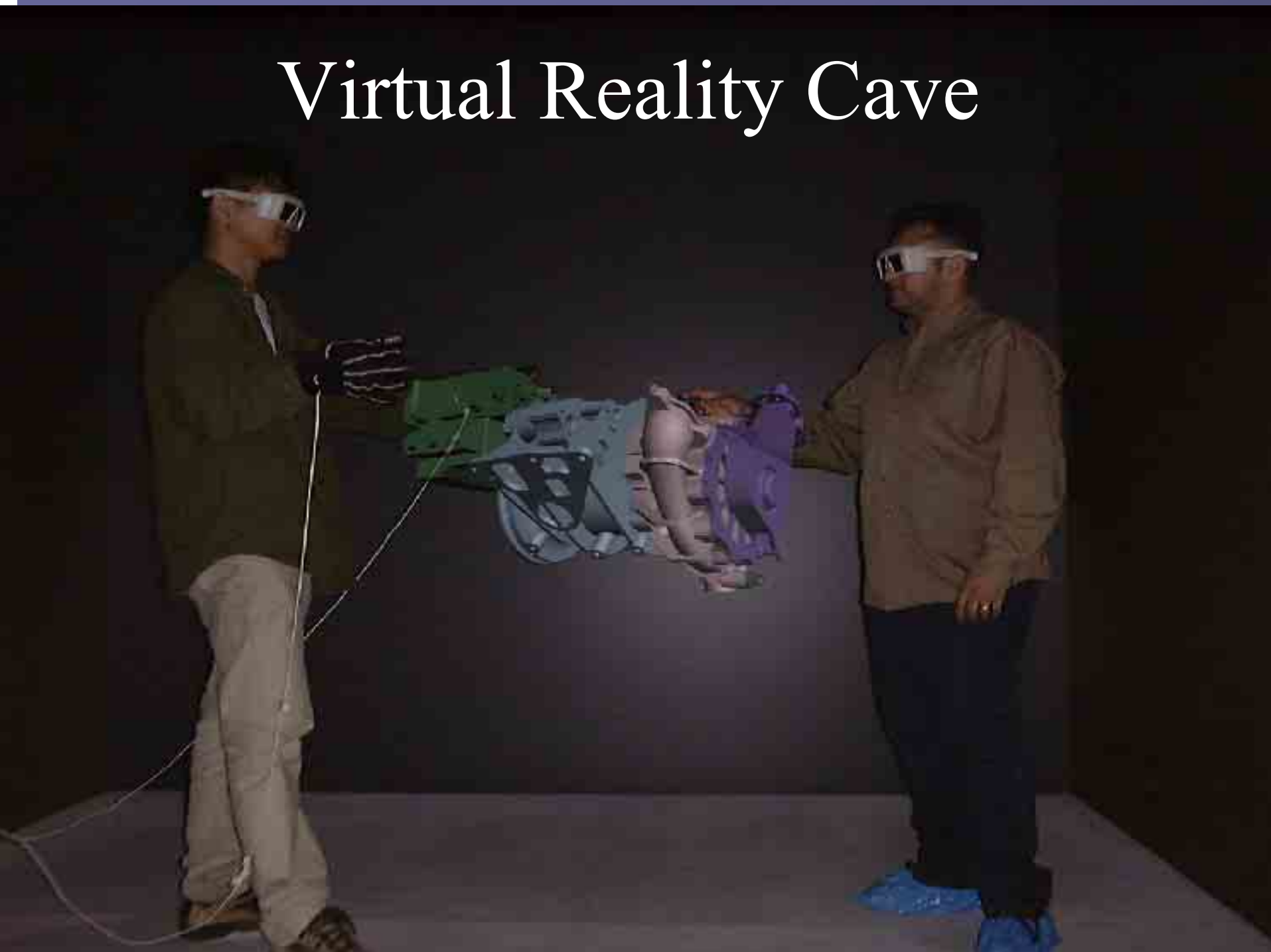
National Industrial Centre for Virtual Environments

Professor Terence Fernando

Reality Centre 70% Vision


The Immersive Workbench

Virtual Reality Cave



Augmented Reality

The wearable VR equipment.

Design Office of the Future?

Control Room in a nuclear power station

Clash detection

Designers

Contractors

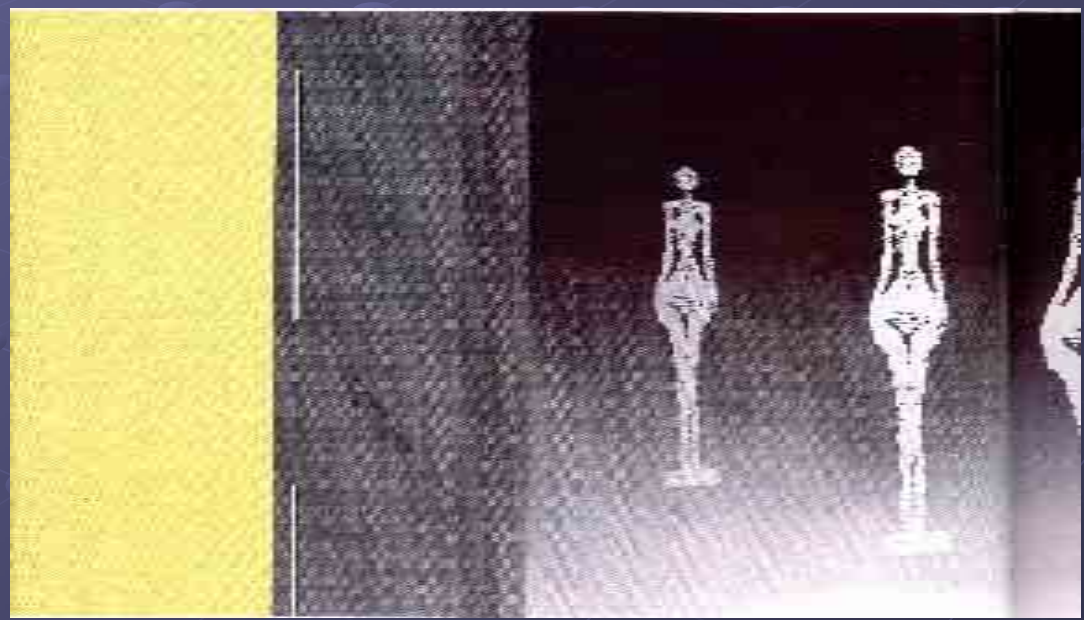
Clients

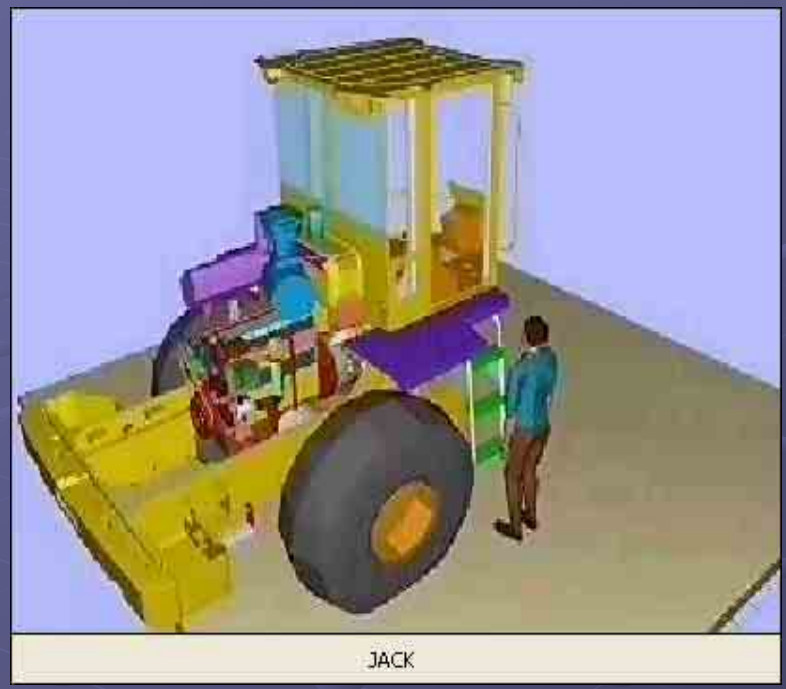
Users

Try before you buy!!

Virtual Humans

- **Perception**
- **Cognition**
- **Body motion**
- **Intelligence**





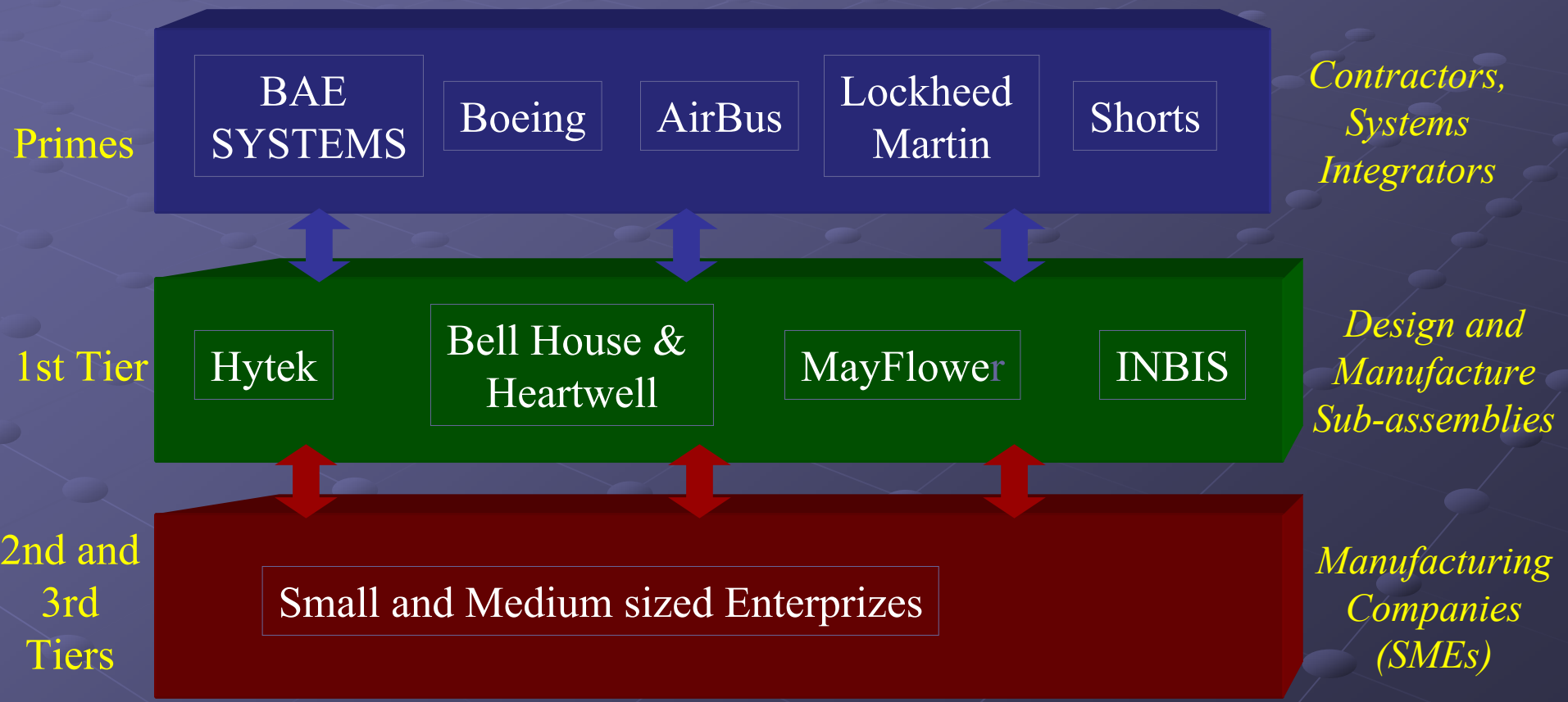
Human simulation – leading to Autonomous agents

So what are other industries doing?

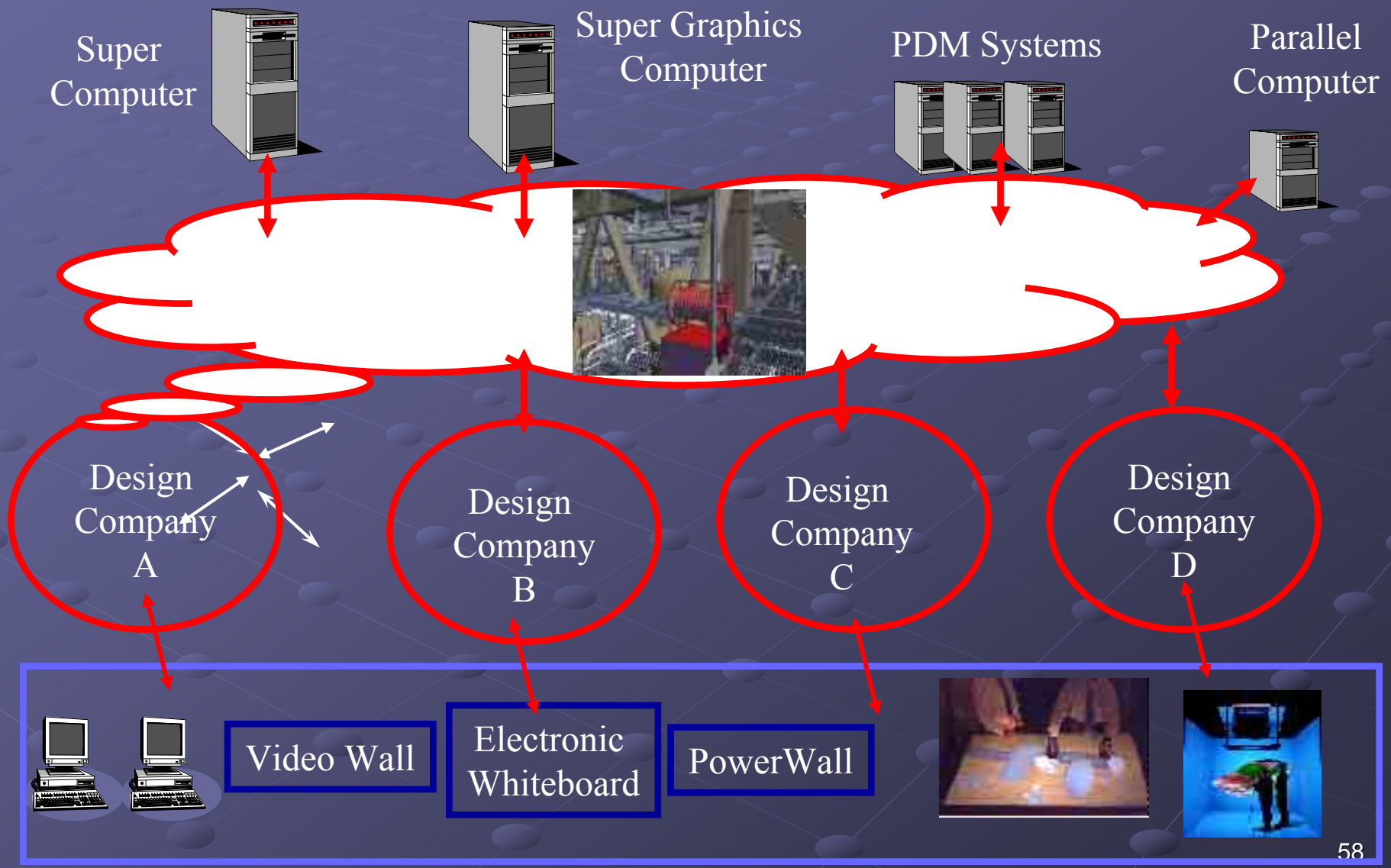
The Aircraft Industry

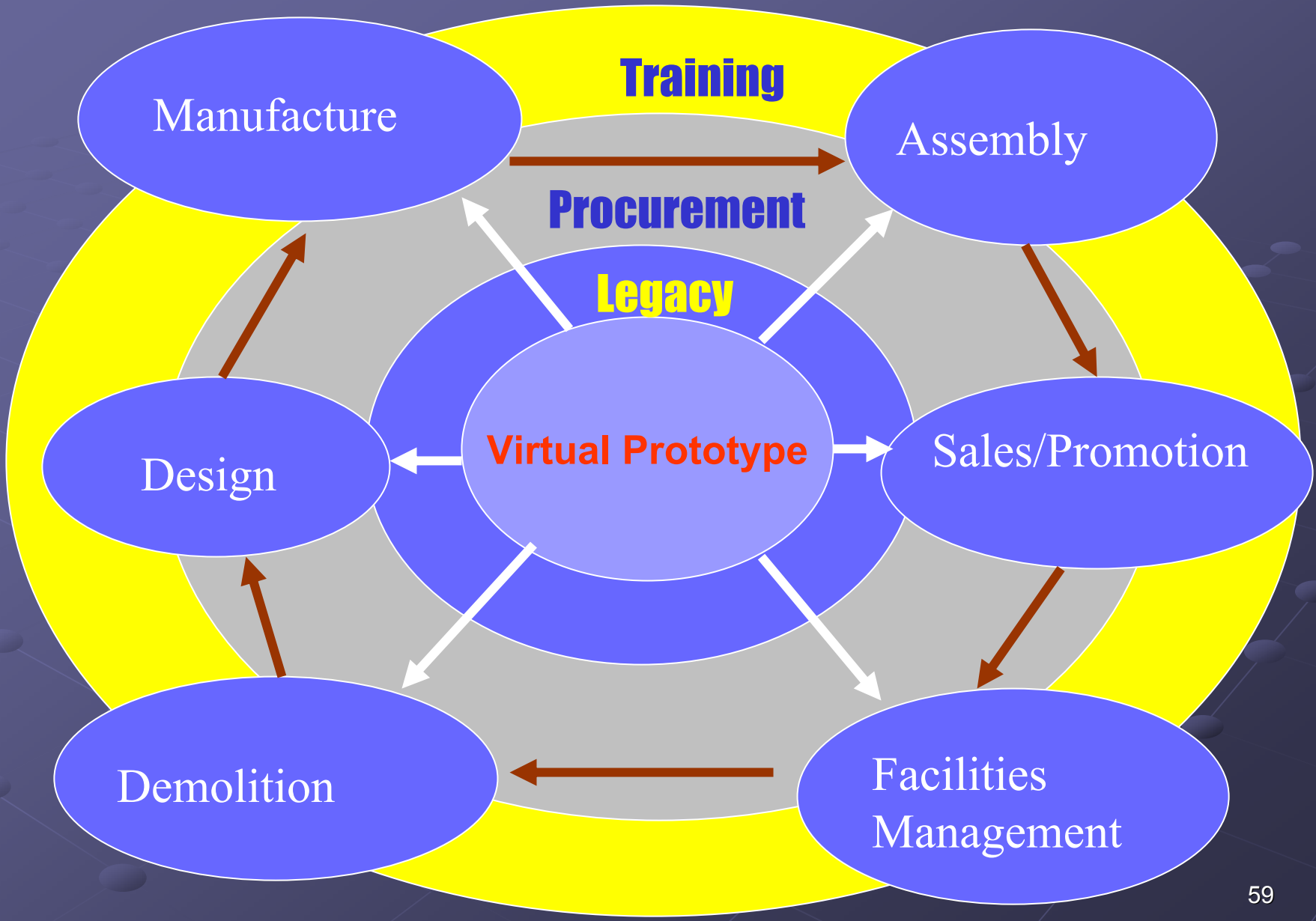
Distributed Working is Essential

Example



Possible Model for GRID Computing




Training
Manufacture
Assembly
Procurement
Legacy
Virtual Prototype
Design
Sales/Promotion
Demolition
Facilities
Management

Future Workspaces

C2020 Vision.

Thanks for listening

CRC Construction Innovation
BUILDING OUR FUTURE