Chapter 6

Dynamical Control of Political Process (DCPP)

6.1- Prologue - All existing Political systems change with time, and when the rates of change are significant, they are referred to as Political dynamic systems. The isolation of a Political system from the environment is purely conceptual. Every Political system interacts with its environment through two groups of variables. The variables in the first group originate outside the system and are not directly dependent on what happens in the Political system. These variables are called input variables or simply inputs. The other group involves variables generated by the system as it interacts with its environment. Those dependent variables in this group that are of primary interest to us are called output variables or simply outputs.

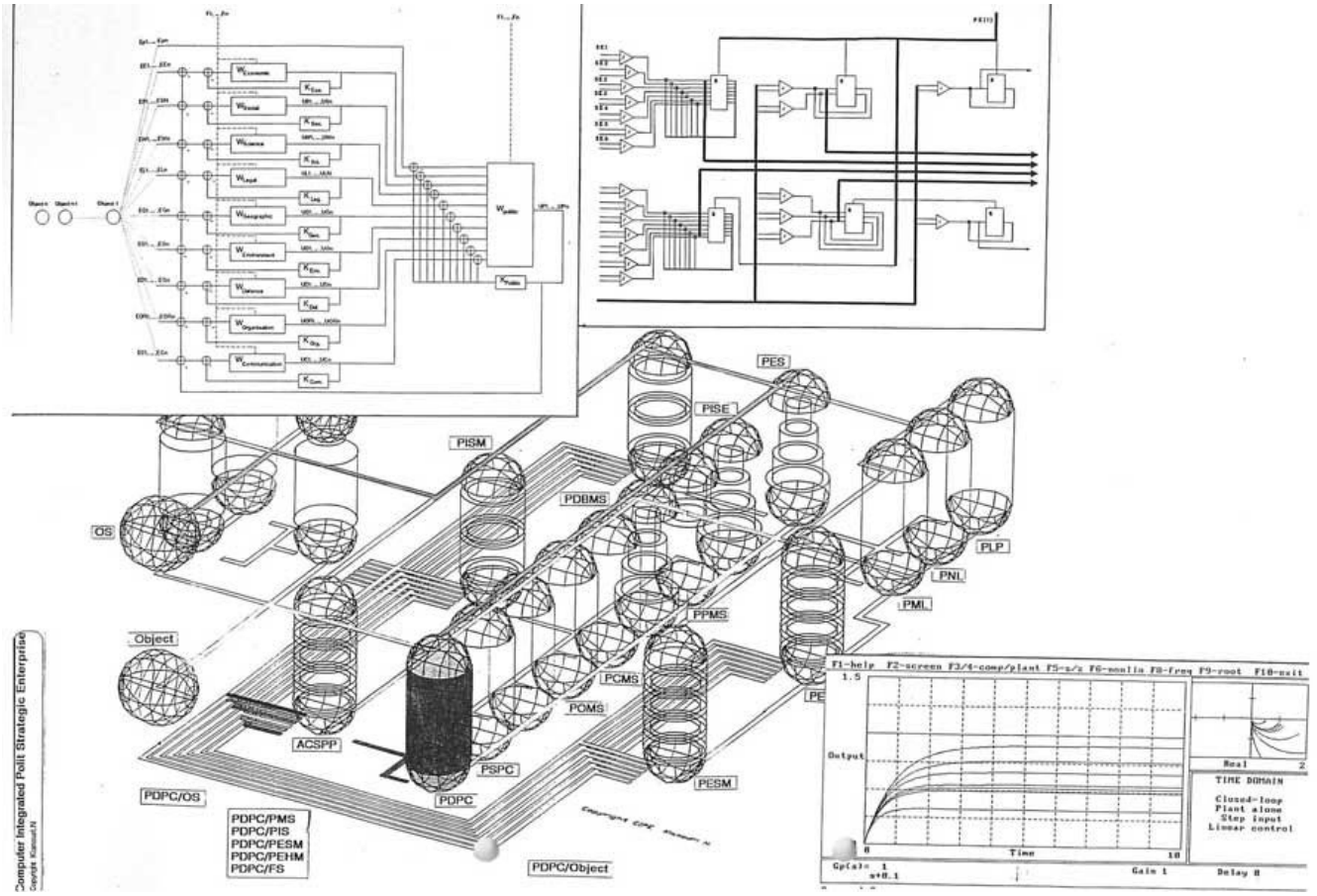

FIG.6.1. IS SHOWS A DCPP STATION AND ITS INTERFACES TO CIPSE STATIONS.

6.2- List of Functions of Political-Dynamic Process System DCPP:

1- Describe parameters and building Political-dynamic model
2- Regulation Feedback model
3- Dynamic Optimization
4- Simulation full dynamic model
5- Structure and process stabilization of dynamic system
6- Define dynamic shells
7- Define relationship between dynamic system and other dynamic systems.

6.3- Basic Definition in DCPP:

Control - Control is an action undertaken in order obtains a desired behaviour of a system, and it can be applied in an open-loop or a closed-loop configuration. In an open-loop system, a process is controlled in a certain prescribed manner regardless of the actual state of the process.

W1: Coefficient for UN Coallition
W2: Coefficient for Euro/German Coallition
K1, K2, K3: Feedback Value

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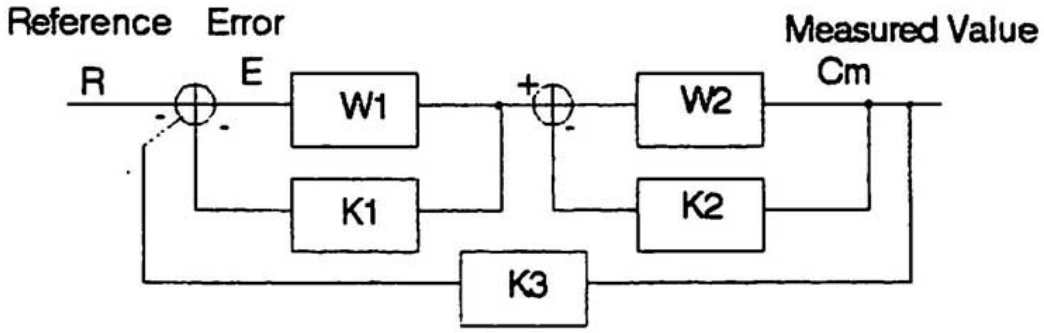
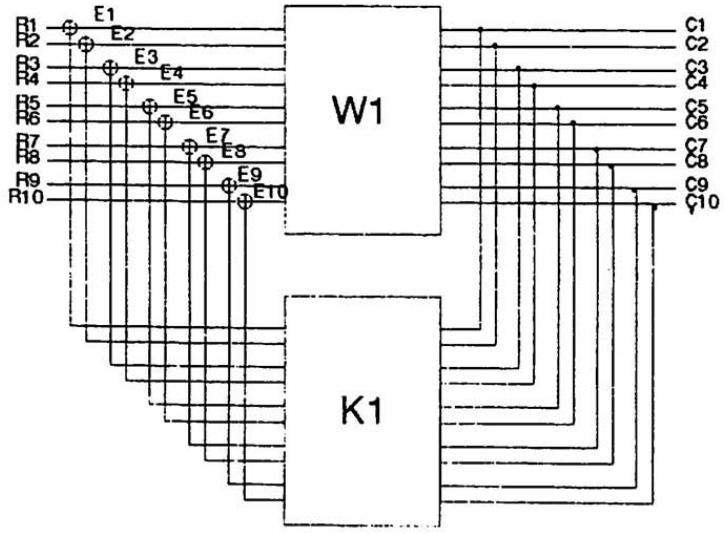


FIG. 6-2

FIG.6.2. IS AN EXAMPLE FOR DYNAMIC FEEDBACK.



W1: Coefficient for UN Coalliti
K1: Feedback Value
R1, R2, ..., R10 : Political References

FIG. 6-3

FIG.6.3. (A) AND (B) IS A DYNAMIC REPRESENTATION OF POLITICALICAL SYSTEM AND THE INPUT AND OUTPUT

ARE DEFINED AS POLITICAL, POLITICAL-ECONOMIC AND OTHER POLITICALSUBSYSTEHS VALUE. THE FEEDBACK MECHANISM IS RELATED WITH THE OUTPUT AS POLITICAL SYSTEM.

Feedback Control - Feedback has advantages when applied to automatic control. Feedback occurs in automatic control systems when the control action depends upon the measured state of the machine or process being controlled. Feedback gives an automatic control system the ability to deal with unexpected disturbances and changes in the object behaviour.

Political-Regulation - A control system for maintaining the Political-object output constant at the desired value in the presence of external disturbances is called a regulator. Disturbances will cause the object output to device and the regulator must apply control action or control effort to attempt to maintain the object output at the reference value with the minimum of error. Feedback is fundamental to regulation because only feedback can provide information about the actual output. A good regulator will minimize the effects of disturbances on the object output.

Political-Closed System - The model is assumed to be isolated from the external environment and normally has a well-defined input set which maps explicitly onto the output. This classification represents an approach to systems which is traditionally favoured by scientists from the reductionism approach.

Political-Open System -This polit-systems model allows for dynamic interaction with the external environment. They are characterised by their non-predictable deterministic output. The inherent interaction with the external environment makes it impractical to predict the outcome of a given set of input conditions, even when some of the basic elements are well-defined.

Intrinsic Feedback - The internal feedback of a system output that is modified and recycled within the system to alter inputs delivered to the system.

Extrinsic Feedback - The external feedback of a system output that is modified and recycled wi thin the external environment of the system to alter the inputs to the system before they are delivered to the system.

Political-Adaptive System - If a Political system has the ability to change itself or its environment in order to survive', it is known as a Political adaptive system.

6.4- Simulation of Political Dynamic Systems (Dynamic Model) - A model is a tool used in developing designs or control algorithms, and the major task in which it is to be used has basic implications on the choice of a particular from of a system model.

A dynamic-model is a tool used in developing designs or control Political-algorithms. Political-dynamic-mathematic models can be grouped according to several different criteria. For Example:

- Linear, nonlinear,
- Distributed, lumped,
- Time-varying, stationary,
- Continuous, Discrete.

At the dynamic level a new entity is required with respect to which the functioning and the changes can be analysed. This entity is time, which is either given explicitly. Thus, every static of the system can actually be seen as a snapshot in time, i.e. it may be labelled with the corresponding moment of time.

The Political-dynamic behaviour of Political-systems can be modelled by differential equations. Mathematical models can be grouped according to several different criteria. Classification of system models can be in four most type of models: Nonlinear and linear, Distributed and lumped, time-varying and stationery, continuous and discrete. Many computer techniques and packages exist for solving differential equations and simulating the behaviour of dynamic systems.

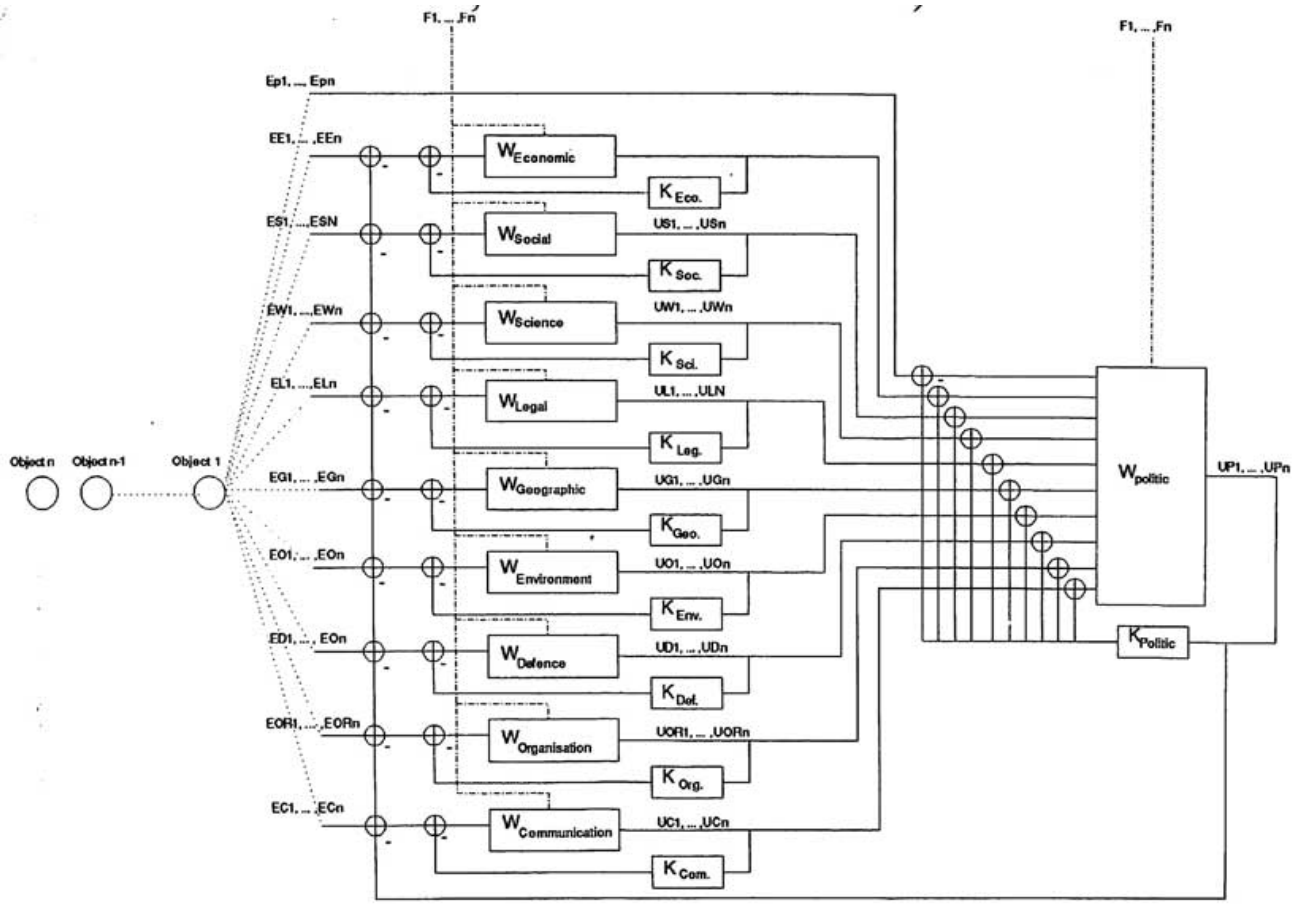


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FIG. 6-4

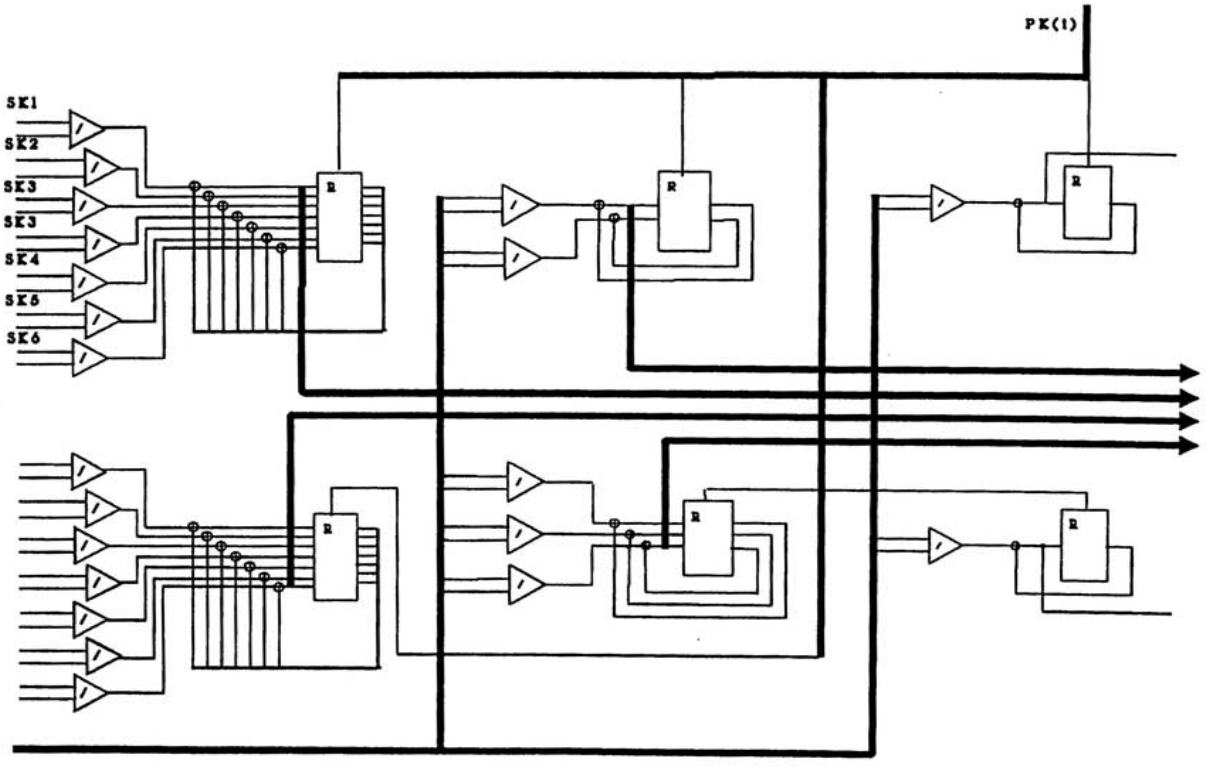

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FIG. 6-5

FIG.6.4. AND **6.5.** ARE THE MORE COMPLEX REPRESENTATION OF A POLITICAL DYNAMIC SYSTEM.

Political-Dynamic Control Function - Modern Political-automatic control is based upon a unified of knowledge called feedback control theory, which can used to analyze and control the performance of complex Political processes. The development of the digital computers has provided a powerful new tool to use in applying the results of control theory to real-word applications.

As the term control implies, in every polit-control problem there is a Political system (which may be device or a process) with associated output or controlled variables that are to be forced to satisfy certain constraints. Typically, output Political variables cannot be adjusted freely; instead, they depend in an indirect way on another set of variables that can be adjusted. The Political variables in this second set are called input or manipulated variables.

Proportional Control Feedback - Is one of the simplest feedback schemes where the control effort is simply proportional to the error. Proportional control has been discussed at some length in the previous chapters and so the treatment here is brief.

Dynamic System with Nonlinearities - When there is nonlinearity present in a dynamic system, it is often possible to divorce the nonlinear block and dynamic effects. All the nonlinear effects can be lumped into one nonlinear block with no dynamics, i.e. the input and output relationship of the block is just the static characteristic of the nonlinearity. Equally, the dynamics of the system can be lumped into another block which represents the linear differential equations governing the dynamic behaviour of the system.

Stability of Nonlinear System - When a linear system is on the point of instability (marginal stability), theory states that is will oscillate sinusoid ally at the phase-crossover frequently.

FIG.6.7. IS AN EXAMPLE FOR DEFINATION OF A POLITICAL SITUATION AND PROPORTIONAL REGULATION VALUE FOR MAKING A STABIL FUNCTION.

6.5- Political Dynamic-Block Diagram Representation - The basic block diagram element, called a block, is a box with one input and one output. The box contains the gain, or more generally the transfer function, G(s), expressing the relationship between an input and an output. The block represents a multiplication between an input and an output. The block represents a multiplication i.e. the input is multiplied by the factor in the block to produce the output. the direction of signal flow from input to output is most important since signal flow in the opposite direction would suggest that the input is obtained by multiplying the transfer function by the output. The arrows in a block diagram are therefore most essential.

Block diagrams have the great advantage that they show the cause and effect relationship of system components. They also show how the elements in a system are interconnected so that the interactions that take place in more involved systems can be plainly seen. Furthermore, by manipulation of the diagram, complex overall systems can be simplified to obtain transfer functions relating overall system inputs and outputs.

In order to simplify block diagrams it is often necessary to move takeoff points or summing junctions past block. It is easy to memorize these rules if you realize that the output signal must be unchanged by the move.

The prime objective in feedback control systems is to minimize the difference between the output and the reference since this represents an error. The control system should quickly reduce this error to zero (or some acceptably small value) when there is either a disturbance or reference value change. The process dynamics cannot normally be modified but we relatively free to alter the controller to give an acceptable overall performance within the constraints of the available control effort.

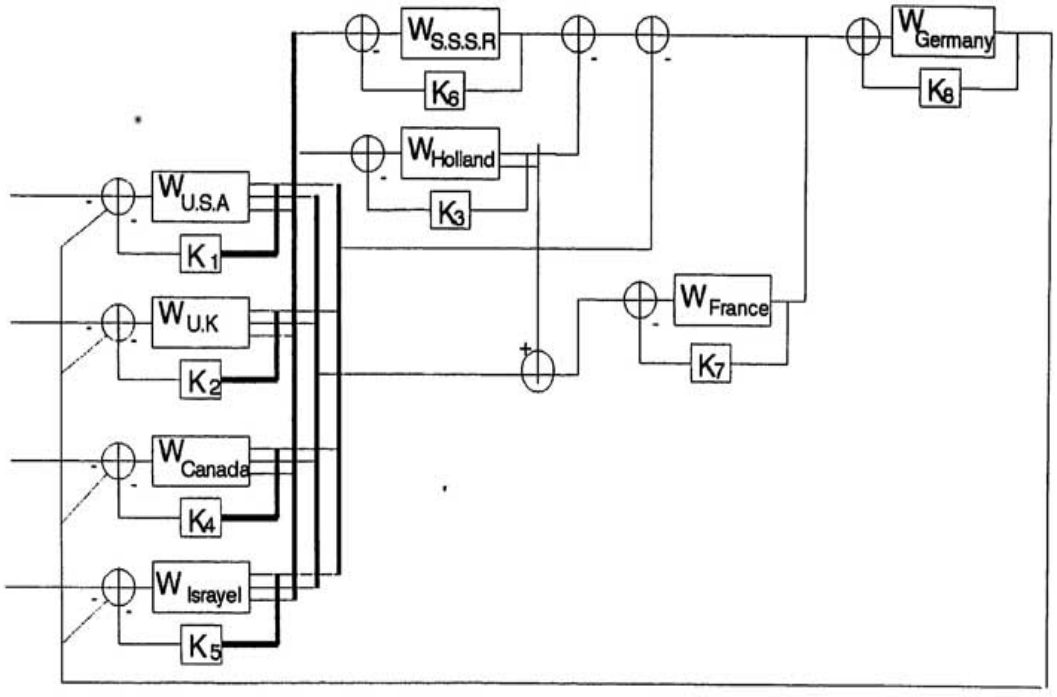

FIG. 6-6

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THE **FIG.6.6.** SHOWS A POLITICAL DYNAMIC SYSTEM WITH COMPONENTS OF THE POLITICAL-OBJECT, - SUBOBJECTS, DYNAMIC RELATIONSHIP BETWEEN POLITICAL-SUBSYSTEHS AND REGULATION MECHANISM (OR FEEDBACK) •

6.6-DCPP Interfaces with other CIPSE Stations:

6.6.2- DCPP / PISE (Engineering User Interface for DCPP) - The four key stages involved in the implementation of dynamic control are:

- Understanding of dynamic behaviour of the Political object; This includes an assessment of the nonlinearities and the determination of time constants.
- Specification of the Political problem; It is necessary to consider dynamic control and supervisory control in conjunction with the need for additional tasks.
- Selection of the programming or integrated package; This is governed by the choice of sampling are major concerns.
- Choice of control strategy and tuning to achieve the desired performance.

The DCPP package must provide the user interface with the opportunity to customise the appearance of the GUI in such factors as colours and fonts, and also control functions such as keyboard focus policy and mouse button functions. The user is allowed to select the best mechanism for operating a function according to:

- Level of experience; A totally new user may wish to interact through menus; an expert may prefer command 'short-cuts'

- Personal preference; A left-handed user prefers a different assignment of mouse button functions
- Special requirements; With a non-standard keyboard one has to modify default function keys for copy, undo, help and so on
- Familiarity; One may have strong background of previous experience with another GUI, and would like the new working environment to be familiar as possible.

6.6.3- DCPP / PDBHS (Managing Database of DCPP) - The process of collecting and storing data for dynamic process control from a Political system.
6.6.4- DCPP / PCMS (Managing Communication of DCPP) - That is need to provide sophisticated graphical interfaces for the modelling of dynamic systems together with links to foreign numerical simulation, analysis and controller implementation tools.

6.6.5- DCPP / PPHS (Managing Project of DCPP) - Dynamic interfaces between life-cycle (or activity) subsystems are importance in project management, first because of the continuous importance of the clock in all projects, and second because early subsystems (like design) have managerially dominant role on subsequent ones (like enterprising). Dynamic interrelations require careful handling if minor mistakes in early systems are not to pass unnoticed and snowball into mistakes in early in the project.

Control is the act of reducing the difference between Political-plan and reality. It is also the last element in the implementation cycle of planning-monitoring-controlling. Information is collected about system performance, compared with the desired (or planned) level, and action taken if actual and desired performance differ sufficiently that the controller (manager) wishes to decrease the difference. Note that reporting performance, comparing the differences exist are all parts of the control process. In essence, control is the act of reducing the difference between plan and reality.

As has been emphasized throughout this book, control is focused on three elements of a project-performance, cost, and time. The polit-management is constantly delivering concerned with these three aspects of the project. The two fundamental objectives of control are:
- The regulation of results through the alteration of activities.
- The stewardship of organizational assets.

Most discussions of the control function are firmly focused on regulation. The Political-management needs to be equally attentive to both regulation and conservation.

6.6.9- DCPP/PSE (Managing Software of DCPP) Simulating Nonlinearities in CODAS-II – "CODAS" is a highly integrated and interactive suite of programs for designing and simulating single input/single output control systems. CODAS comprises a time domain, a frequency domain and a root-locus design environment, whereas CODAS-II additionally features a non-linear domain, and extends the design and simulation facilities to discrete-time/sampled-data systems and non-unity feedback systems.

Systems are described by an overall gain constant, and two linear transfer functions. One transfer function describes the "plant" dynamics and the other describes an optional compensator (controller). Transfer functions can be defined in polynomial or "pole/zero" form or a mixture of both. In addition to a rational transfer function, the plant model may include a transport delay. Transfer functions are entered by typing them into the package in "free format" as they would appear on the written page. Editing of transfer functions is facilitated by a built-in editor. The data describing the system and associated parameter settings can be stored and recalled from disk as named files.

In the time domain environment, the transient response of either the open-loop or the closed-loop system may be obtained. In the root-locus environment, the locus is automatically drawn using a branch following method. The frequency domain environment allows the frequency response of either the open-loop or the closed-loop system to be drawn as a Nyquist diagram (direct or inverse), a Nichols plot or a Bode gain and phase plot. In all cases a hard copy of the screen can be obtained, and the results filled if desired.

FIG.6.8. IS A TYPICAL STEP RESPONSE, THAT HAS A DYNAMIC SOFTWARE MONITORED. THE TASK IN A CODAS PACKAGE HAS DONE.

6.6.11- CIPSE-DCPP Project - DCPP is a highly integrated and interactive suite of programs for designing and simulating single input/single output control systems. CIPSE program has been developing a software system DCPP, (Political Dynamic Process Control), to provide sophisticated graphical interfaces for the modelling of dynamic systems together with links to foreign numerical simulation, analysis and controller implementation tools. DCPP contains several graphical editors and an operation editor for defining mathematical tools. CIPSE contains several graphical editors and an operation editor for defining mathematical relationships represented by the blocks in a block diagram. In addition, tools for the automatic transformation and layout of diagrams, the symbolic manipulation of signal flow graphs and the translation of discrete event systems have been added to the system. At the moment, DCPP has links to several simulation languages and to the computer algebra system CIPSE.

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The emergence of powerful graphical workstations has brought about the possibility of implementing sophisticated graphics based user interfaces (GUI's). We discuss aspects of the design and specification of a generic graphical user interface for control systems design and the emerging standards for user interface implementation that underlie it, with special reference to the DCPP standards. The use of these interface standards in future design environments should enable the rapid development of novel design methods and at the same time enforce a consistent 'look and feel' across applications. We discuss the problems faced by the implementer in developing applications for different interface standards and also comment on the effects these different GUI standards have on the user's view.

6.6.12- Dynamic Decision Making - The tasks of process control in dynamic control consist of following characteristics:

- A series of decision are required
- These decisions are interdependent
- The decision problem changes, both autonomously and as a consequence of the decision maker's actions; and
- The decision are made in real time

Dynamic decision tasks differ from static tasks in that a series of interdependent decisions are required to reach the goal, and form sequential decision tasks in that the time aspects important.

The characteristics of Political-dynamic decision tasks are complexity, feedback quality, feedback delay, possibilities for decentralization, rate of change.