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## **MOBILE PROJECT MANAGEMENT**

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### **Abstract:**

Rapid and reliable communications and information systems are required by national and NATO political and military authorities for political consultation, crisis management and for the command and control of assigned forces. Modern technology and the integration of strategic and tactical communications and information systems into an overall NATO Communications and Information System (CIS) has enabled these requirements to be met.

Based on the development of new communication and data transfer technologies, the mobile solutions for the management process have been able to provide new ways to conduct management actions. This environment describes methods and tools available only here, which will bring information, speed and efficiency to any stage and component of the management process.

The paper takes into discussion the impact of the technological development on the management process paradigm. The paper presents the main aspects regarding the command/control and management models used in mobile management. The role of mobile multimedia informatics applications in mobile management is highlighted.

*Key words: NATO, project management, mobile, digital rights management, paradigm, communication, team members, network solutions.*

### **1. Mobile Projects**

Taking into consideration the advantages that the communication technologies bring into the management process, project members will have more information at their disposal. This will conduct to better decisions, better analysis and in the end to high quality results.

Despite the necessary high costs required to implement and to maintain a communication system at this level, in the end, the benefits and the lower levels of costs penalties due to a non efficient information and data transfer will highlight the importance of this resource. It will influence the way in which many of the project tasks are performed.

For example, a simple virtual info board will allow military chiefs staff of units or team members to express ideas, concerns and opinions regarding project activities. These will allow reducing the number of meetings only to the ones that are really important to the project. Nowadays in this sense are used Tele Video Conferences (VTCs) in Romanian Army.

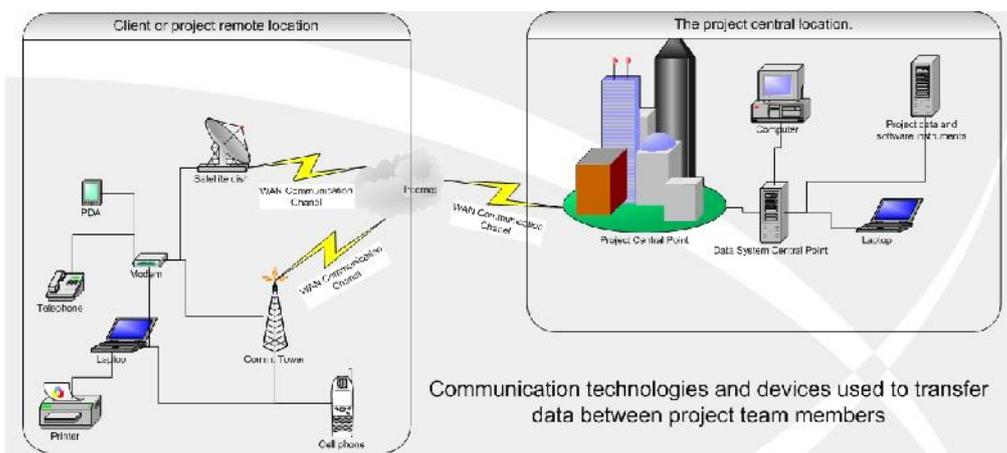
Also, file sharing and file control software systems allow a much better data maintenance and permanent access to information than the printed or paper format. These systems

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incorporate facilities to record information regarding who, what and when has been modified, accessed.

In many projects, mostly in the analysis stage, it is required that a project team will have multiple meetings with the project beneficiary in order to collect information describing project final objectives. In some case, these increase project costs without bringing valuable benefits to the projects[1]. All these can be improved through the use of mobile communication technologies because allows:

- remote access to resources; a report may be accessed using local computer networks or the Internet; in this way, whether you are in your office or at the partner location you will have at your disposal all the resources you need;
- virtual meetings; a partner meeting that takes place at a remote location will have costs due to transportation and accommodation; this can be replaced by an Internet connection that will allow a video meeting;
- permanent contact between project members; the project team has many members, each with a well defined role; every one of them conducts different functions, but they act as one, coordinating and intercommunicating with others in order to achieve their common goal, project implementation; for example, you analyze with the partner different solutions for known and possible problems;
- in order to propose future practical actions you need to take into consideration acquired data and to be based on real and objectives data analysis; for that, in most cases you need to pass the data to a team member;
- the communication system permits permanent communication even when the other member is not at the same location; based on that, the solution to the previously scenario is to electronically transfer the data through the network and to receive in same way the results;
- in this way you can reduce costs and time and also to benefit from the processing power of different network solutions. The data transfer between project team members is depicted in figure 1.



*Figure 1 Data transfer between project team members*

The key factor in order to develop mobile projects is represented by wireless technology.

## **2. Characteristics of Mobile Management Process**

The dynamic of the social-economic environment has imposed a new dimension to the project management process. There are complex projects that required that parts of it to be considered autonomous sub-projects. There are organizations that manage multiple projects which are independent or linked to each other[2].

All these new and complex situations are required managers to supervise and evaluate situations at remote locations in order to have close contact with the process. The constant need to stay in contact with the overall process and with others management team members requires a communication environment that will eliminate all the disadvantages of being far from the core.

An important component of the mobile management process is the technological one. It provides the physical means to conduct the entire process and it is based on mobile communication devices like mobile phones, faxes and computer networks. Based on these, it is possible to transfer and communicate data and information through the help of a multitude of instruments: virtual meetings, emails, access to remote databases for multiple users[3].

Because of the increased amount data needed by the project management process and because of the projects complexity, it is not enough in the real mobile project management environment to use only these instruments.

It is needed a complex communication and data transfer system that will help project managers:

- to process large amounts of data; the project has many stages and activities that took place in same time and each project type has particularities that generates additional information; data sources are represented by the factors that influence each activity, by the final and intermediate results and by the resources and costs levels; this entire amount of data must be processed in order to evaluate the situation and to take future actions;
- to take decisions in shorter time; because of the project complexity and its factors system, a decision must take into account multiple information sources and it must be based on a large amount of data; without an informatics system that will automate data processing the results will be determined in a longer time period and the risk to get wrong values will increase;
- to communicate information, results and decisions in no time to team members; mobile management is characterized by a continuous movement of team members in order to cover remote sites where different parts of the project take place;
- to simulate complex situations; because the multitude, diversity and complexity of factors that influence in a direct or indirect manner the management process, it is necessary to have the capability and the instruments to simulate future situations knowing the values of all factors or a part of them; this is very important when choosing a particular action from a other possibilities;

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- to estimate partial or final results; it is important to decide the project continuity based on current results and also on future estimated objectives; to be able to do that the project manager must have all the data that describes the process and he must use it to predict future events estimating their impact[4][6][7].

Besides known features of the overall project management process, the mobile management paradigm has a series of particular characteristics. Some have in this special case greater importance or they have been taken into consideration for the first time:

- *security* regards all the methods and techniques used to secure data from disastrous events or from theft; being based entirely on mobile data transfer, mobile project management use data in digital format because this format is very efficient in electronic data transfer; but this communication mode is very vulnerable to electronic attacks when data may be destroyed or lost to a third party that will use it against the project; most of the project information regards financial, schedule and scientific data which have been determined with the cost of great amounts of resources; loosing or damaging it due to a electronic transfer may have great impact on the project future development; also loosing the information or making it public may affect the relation with partners or third parties; as common information was placed in folders and locked in safes or important clients or partners names were replaced by codenames, the electronic transferred data must be encrypted and it must be placed on secure data storage facilities;
- *consistency* describes the degree in which same data located on different devices has similar values; being a mobile communication environment the mobile management use various devices to assure that each team member has the information needed to perform its tasks; these devices store and transmits small amounts of data representing a part of the entire project database; the system used to facilitate and to manage these information transfers must guarantee its consistency, meaning that each device has the actual and correct image of data;
- *usability* represents the effort necessary to read, understand, interpret and use the data; different project team members have various roles in the project management process and because of that same information may have different significance for them; the communication system that represents the base for the mobile project management process must be able to implement various methods of representing data and to highlights its significance in this way; for example a overall time schedule graphic may be important for the high level project management but for the department team leader has grate importance only the time period in which its team must accomplish their objectives; the system must be able to represent data in different formats and to highlights its significance for different types of team members;
- *efficiency*; the communication between team members or different levels of the project management structure must be done fast, in goods conditions and from most physical locations; in order to conduct efficient a project a manager must be in permanent contact with its team and with the events; he must be able to assist and to offer solutions to unexpected problems or up-and-coming high risk situations;
- *mobility* describes the main characteristic of the project members activity; the communication system must allow mobility assuring the means and the instruments

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to communicate in real time and to transfer any type of information; mobile communications technologies like mobile phones and wireless data transfer represents the physical foundations to mobile project management paradigm; the real problem is to develop a logical system that will incorporate different types of devices, communication environments and communication protocols into an fully functional system;

- *communication* is the key element of the mobile project management paradigm; each project member must have the resources to communicate and to transfer data to other persons or with the system; the format of transferred data it doesn't represent any problem for the system because it is capable to exchange formats in order to make it readable for any device; the channels used to communicate are mostly based on high bandwidth data transfer networks like 3G for mobile phones, respectively, T3 and fiber optics for computer networks; these will allow high data transfer rates needed for video calls, video streaming and large size data;
- *real-time* describes a requirement for the communication and data transfer capabilities of mobile project management process; in a dynamic environment any information loses its importance as the time passes since its born;
- *authentication* is a necessity in modern data communication; information represents a valuable asset because it has required costs in order to be obtained and more important, you can get important results using it; the system must allow access to resources based on a security protocol; because most of the decisions and the data are transmitted in a digital format every message must be authenticated in order to assure the receiver that the sender is who says he is and that the message was not modified; these requirements preserve the high level of confidentiality and trust that is needed in a virtual environment[9][10].

In mobile project management the quality and experience level of each team member and especially of leaders has greater importance because these persons are in different locations and in most cases they must rely mostly on their capacity to decide[8].

A project manager in this scenario is a person that travels from project to project and that is in permanent contact with the project teams through the communication system. The mobile project manager is a person in permanent contact with project parts and teams who has at this disposal a wide variety of communication facilities[5].

### **3. Digital Rights Management**

Within mobile project boundaries, the information moves among project members having different formats. A big role is had by presentation formats of the information been at project members' disposal. In order to provide a high-quality content, secure models and patterns were developed for mobile multimedia content.

The technology development from last decade determined new forms of communication and interaction among project members. Also, the carrying out of a project is traced with mobile devices as mobile phones, PDAs (Personal Digital Assistants), computers with wireless communication technology for a better real time management. Real time decisions suppose a good communication among project team members on the base of the information represented in an adequate format[11].

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The last evolutions in communication technology field permit an information representation in multimedia format. In this context, the securing of multimedia content involves development of secure models and patterns.

Digital Right Management (DRM) is a specification that designate a set of standards for certain particularities and features of command/control and management models. The usage of downloaded media objects is controlled by content providers and operators. The mobile project management involves mobile devices usage. The communication technology is provided by a third organization that must assure a high quality level of the services paid for mobile management by project owner[12].

In accordance with Digital Right Management, the content providers define rules for media objects usage. A single media object has associated different rights with different prices eventually. The content provider grants the rights to preview media objects for free and charge the client only for a full usage rights. So, Digital Rights Management sells rights to use the media object and doesn't sell the media object itself.

There are two ways to deliver the rights to the user, figure 2, (Forum Nokia) [18]:

- delivering to the consuming devices together with media object;
- sending the rights separately from media content.

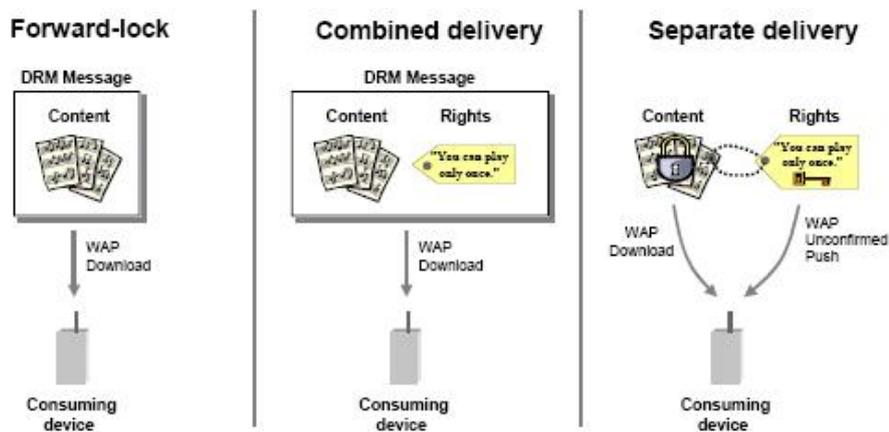


Figure 2 Digital Right Management content delivery types

The last case provides a better security level by making it more difficult to steal the content.

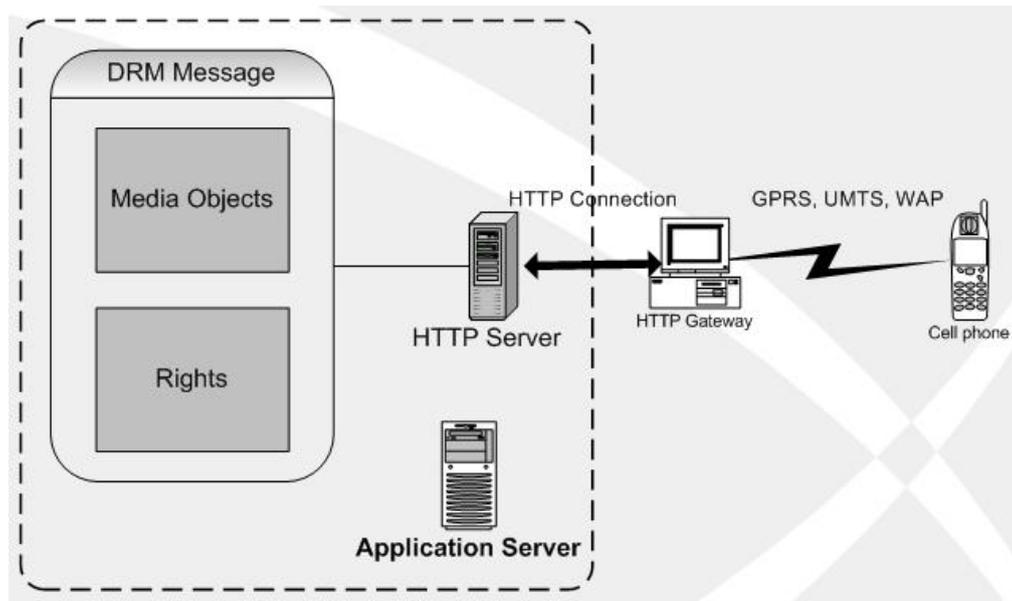
The common Digital Right Management practices take into account the special aspects of the mobile field in order to support basic functionality with some security level. The specification defines a “forward-lock” special case of combined delivery. In this case, the Digital Right Management message doesn't contain a rights object. Delivery of Digital Right Management content supposes two problems:

- currently, it is no way to prevent the transfer of the media objects from a user's device to another one;
- it is no easy and convenient way to preview a media object before it is purchased.

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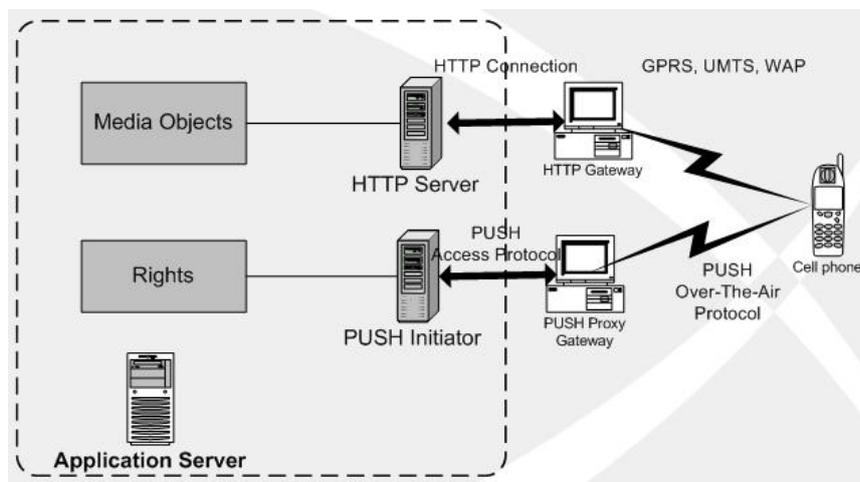
A solution is to pay for media object before user previews the media object. Other solution is to preview a low-quality level of media object in order to be previewed. For forward-look and combined delivery, the Digital Right Management message packages the content, optionally with a right object. In order to send the message to the device, it is used the Open Mobile Alliance mechanism[13]. The consuming device renders the content from Digital Right Management message and the eventual right object.

The combined delivery architecture is depicted in figure 3.



*Figure 3 Combined Delivery architecture*

For a separate delivery, the provider has to convert the plaintext media object into Digital Rights Management content format defined in Digital Right Management Content Format specification. The conversion supposes a symmetric encryption of the content. Thus, the Digital Right Management content object is protected to users who have not the Content Encryption Key. The separate delivery architecture is depicted in figure 4.



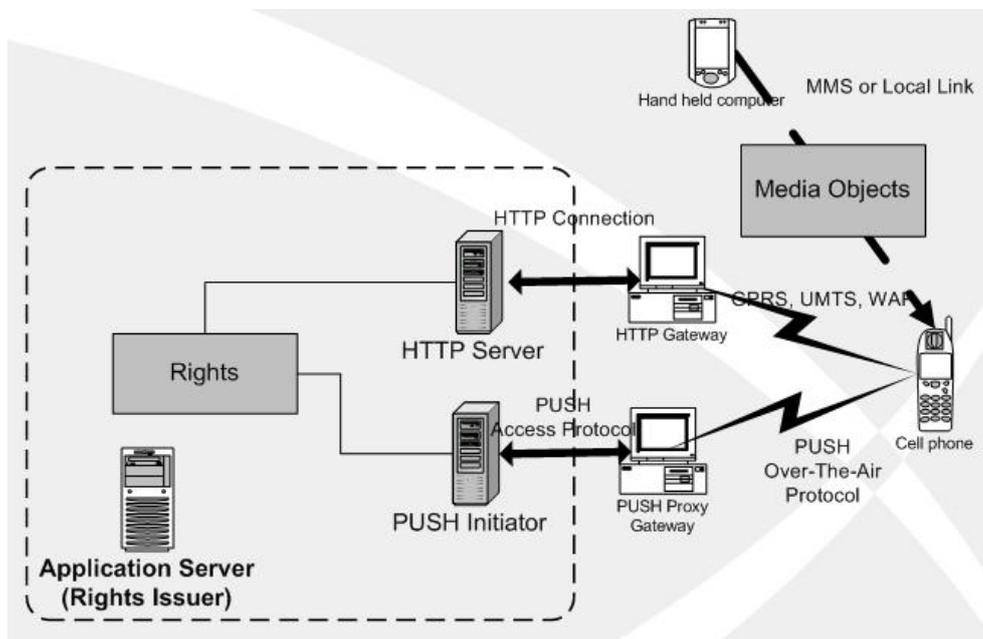
*Figure 4 Separate delivery architecture*

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The right object pushing is done using WAP (Wireless Application Protocol). This way of delivery introduces some latency between receiving the content and the reorder. The specification contains a mechanism used by the service to indicate to the device that a right object will be pushed.

The flexibility is the characteristic of super-distribution case for a separate delivery. Sharing of media objects without compromising any command/control model behind the rights is encouraged. As in the previous case, the WAP pushing is used. The media object is passed from mobile device to mobile device with the right object that is obtained from Rights Issuer. The mobile device is allowed to choose rights from Rights Issuer by opening a browsing session.

The super-distribution architecture is depicted in figure 5.



*Figure 5 Super-distribution architecture*

Regarding the Digital Rights Management Message Format, in table 1 there are depicted MIME (Multipurpose Internet Mail Extensions) media types for objects, conforming to the format.

*Table no. 1 MIME media types*

<b>DRM method</b>	<b>MIME media types</b>
<i>Forward-lock</i>	application/vnd.oma.drm.message
<i>Combined delivery</i>	application/vnd.oma.drm.message application/vnd.oma.drm.rights+xml
<i>Separate delivery</i>	application/vnd.oma.drm.rights+xml application/vnd.oma.drm.rights+wbxml application/vnd.oma.drm.content

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The Digital Right Management message is based on a MIME multipart composite type in which one or more objects are combined in a single body. The Digital Right Management message body must be according to the body of the multipart media type defined in RFC 2046, chapter 5. The Digital Right Management message must contain one or two body parts, one body part for each object[16][17].

If HTTP (Hyper Text Transfer Protocol) or a MIME compliant protocol is used to transport the Digital Right Management message, the boundary delimiter must be included as a parameter in the media type definition.

RFC 2045 defines a Content-Transfer-Encoding. This specifies how a body is encoded for transfer by some transfer protocol. A Content-Transfer-Encoding header must be included in the body part of the Digital Right Management message.

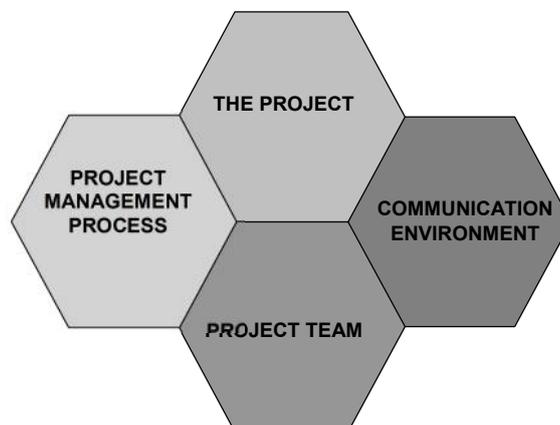
A Content-ID header is used to associate a media object to a right object.

#### **4. Mobile Management Process Paradigm**

The architecture of the mobile management process is based on four important components, which are strongly interdependent:

- the project management process, defines the methodology used to analyze, define, implement and evaluate the project; it describes how to manage resources, costs and the project stages.
- the project management team, represents the process human factor; it is entirely responsible for achieving project final objectives through decisions that affect every stage of the project;
- the project, is defined mainly by its objectives; it represents the motive for which the entire management process takes place;
- the communication environment provides the means and the rules to achieve permanent data transfer and communication between each member of the project team.

Figure 6 describes the main components of the mobile management architecture:



*Figure 6 Components of the mobile project management architecture.*

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As paradigm, it establishes the boundaries of the mobile management process and the elements necessary in order to assure a good real time communication among the project team members[14].

The mobile management process paradigm presents the basic rules applied when a mobile project management is carried out. Also, it represents a future “view” for a communication environment within a project. This kind of communication environment supposes the usage of mobile communication devices in order to base the real time decisions.

The mobile project management supposes a fully understanding of mobile management process paradigm, taking into account the components, their characteristics and features and the relations among the components.

The most important advantage gained after the implementation of mobile management process paradigm consists of enhancing the project capability with benefits regarding the productivity and profit of the client organization.

As component of mobile management process paradigm, mobile technology extends the reach and capabilities for existing information infrastructure of the project in which it is implemented. The paradigm will change the way in which the project team member work and communicate. It opens new dimensions of project management capability and productivity.

The processes are built around the limitations of different technologies. New technology implementation supposes eventually the development of new processes. The new processes may lead to an appearance of the inefficiency within project management because the mobile technology has strengths and weaknesses[15].

The success of the paradigm implementation consists of technical aspects of the mobile technology development and the new technology and mobile services costs.

### **5. Conclusion**

The possibility of coupling the mobile technology with project management creates a new paradigm to improve effectiveness and efficiency in project managing.

The paper described the mobile project characteristics and features and provided the components for mobile project management.

The mobile project management is implemented trough mobile technologies having in view their limits and benefits, standards and protocols used in order to assure a communication among team member in a wireless and placeless environment.

The success of the implementation for this paradigm depends of benefits gained as functionality of relationship between Groups of Forces and time.

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