

ICAO CAR/SAM

Seminario sobre Sistemas de Gerencia de Pavimentos

Airport Pavement Management Systems in Developing Countries Implementation Issues

by

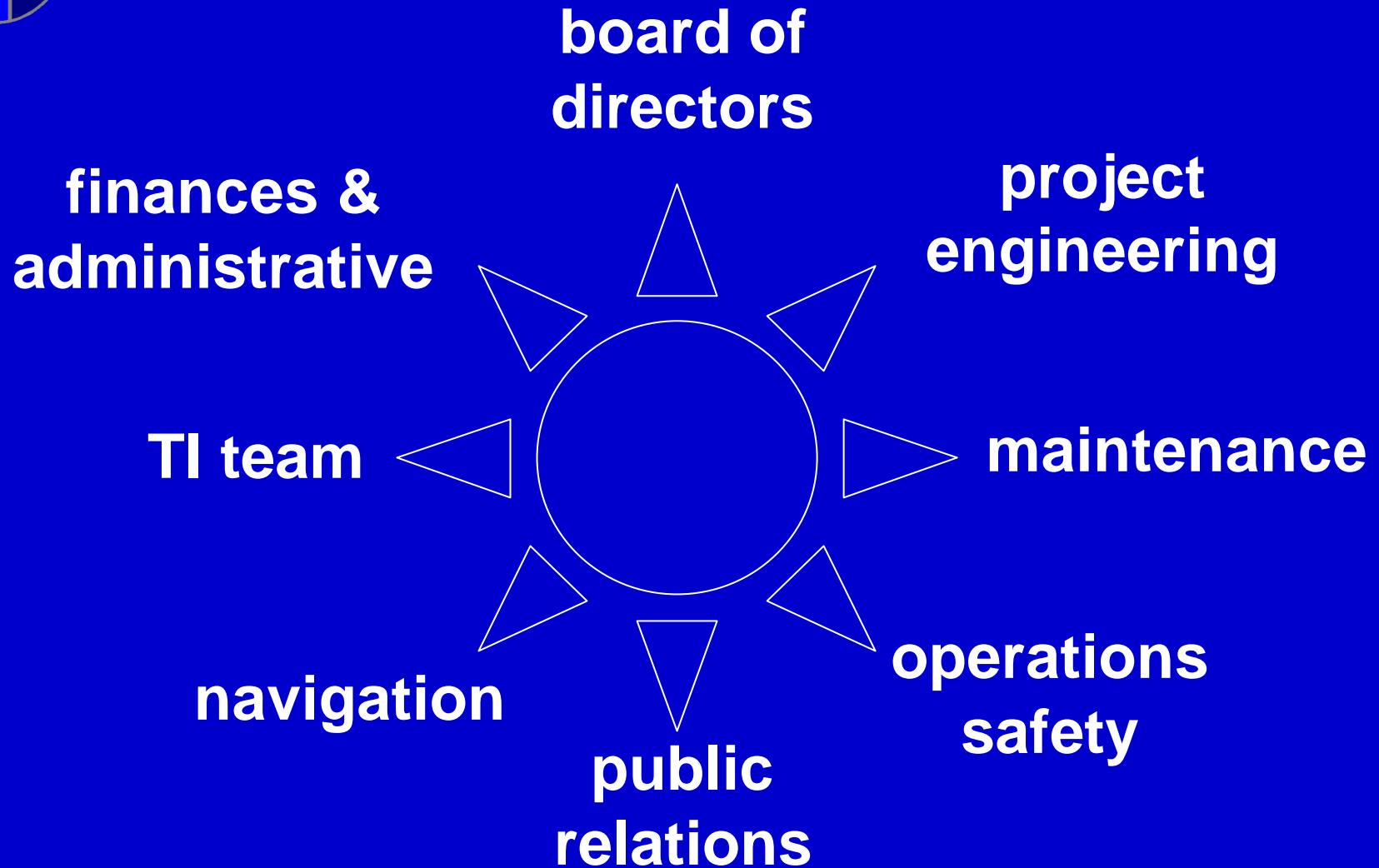


**Oswaldo A. Fonseca - Ph. D.
Lieut.-Cel. @ Brazilian Air Force**

Lima - Peru, Nov./2003



Airport management personnel...

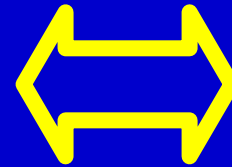




Airport PMS in Developing Countries Implementation Issues

perfect ideas

Plato



Aristotle

**everything has
its purpose**

Lord Kelvin

Caetano Veloso



PMS Implementation Review

Back, in late 70's, there was a dream:

I'd like to have all pertinent data available to me by the time a pvt. section in any given airport needed M&R intervention...



PMS Implementation Review

Efforts in the 80's

- Several “pvt. mgmt. activities” were then carried out generating written reports.
- Such activities consisted mainly of pvt. condition analysis and pvt. structural evaluation.
- Demand for more comprehensive data led to roughness, friction and deflection measurements.
- Need of funds for M&R led to acquisition of ready-made PMS softwares in both airport and highway agencies.



Effects in the 90's

- Data became food for thought for technical personnel.
- Adopted technology very often required a level of operational proficiency not practicable in local markets, particularly in developing countries.
- However, quality of data was questionable.



✦ **State Highway Departments in Brazil (HDM)**

- **Lack data reliability**
- **Difficulties in monitorizing and updating data**
- **Racionality problems in results**



PMS Implementation Review

✦ **Delaware DOT experience, Abbott, E., 1998**

- **Great number of data, unuseful in the short run, and with high collecting costs.**
- **Difficulties in monitorizing and updating data**
- **Pavement Mgmt - “Business Process”**



PMS Implementation Review

**Data, data and data...
Where is my data?!**

- **Computerized solutions**



easy data manipulation



PMS Implementation Review

- **Computerized data manipulation faster than human gathering, inputting and processing data (inventory, monitoring, updating)**



drop in quality of data

**What is best to come up with a decision,
more data or less data?**



PMS Implementation Review

- **Automatic data acquisition systems
(technology)**



raise in cost (\$) ↗

Is it affordable for the agency?



✘ **Virginia State Airports** (Brotten & McNeely, 1993)

- **61 airports - objective: project level mgmt**
- **MicroPAVER System**
- **Data: construction history
condition evaluation
NDT in selected runways**
- **Additional supplement included for optimization and prioritization**
- **Use of PAVER was temporary, being substituted lately**

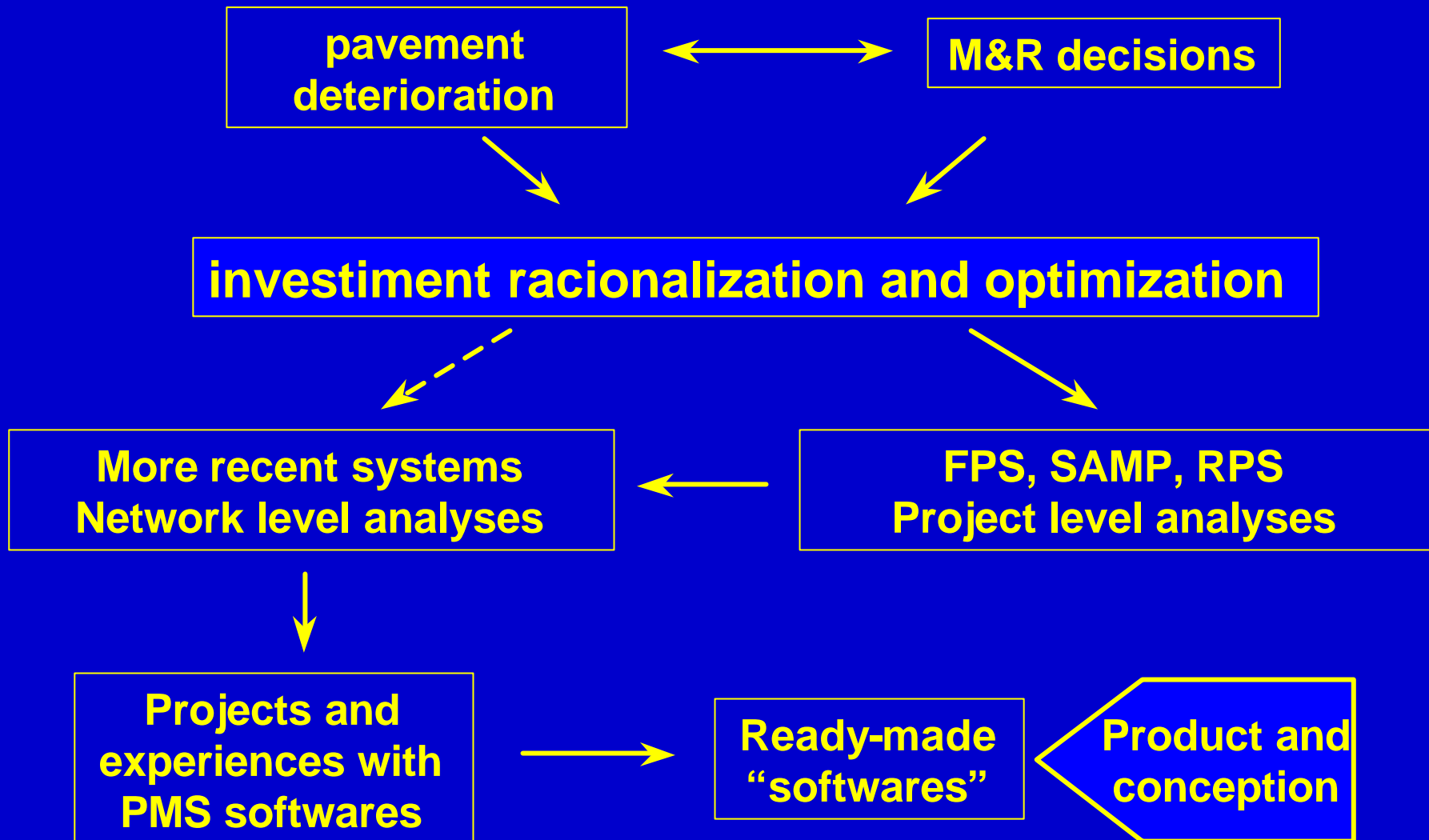


✘ Georgia State Airports (Comer, Carol, 1998)

- 94 airports - objective: network level mgmt
 - MicroPAVER System v. 4.1
 - Data: construction history
condition evaluation
structure type
 - Still no GIS
- results: recommendation of services along the analysis period



PMS auxiliary software - a historical view





Typical agency context

- **Runs several airports jointly, all important either for economic or political reasons.**
- **Airports spread out over a significant area (metropolitan area, region, state or country).**
- **Distances among airports may be so large that environmental effects may lead to M&R services with differentiated costs in each region.**



Typical agency context

- **Shortness of resources makes it difficult for the agency to monitorize pvt. performance and even update huge databases.**
- **Generalized detailing data on traffic and pvt. structural properties may require an amount of effort incompatible with agency resources.**
- **Need for M&R resource allocation to airports with largely different traffic levels.**



Conception issues

- **A PMS is not a computer program.**
- **Several activities of a PMS can be carried out with and without the help of a computer program.**
- **Computerized subsystems can be integrated within a PMS analysis and incorporated in subsequent versions of a PMS system.**
- **Incorporation of subsystems in a unique PMS software does not guarantee satisfaction at all levels.**



Conception issues

“Size works against excellence.”

Bill Gates



Conception issues

- A PMS should be implemented in progressive stages.



**Yes, we do back up...,
to mistakes, there is no commitment!**

Juscelino Kubitschek

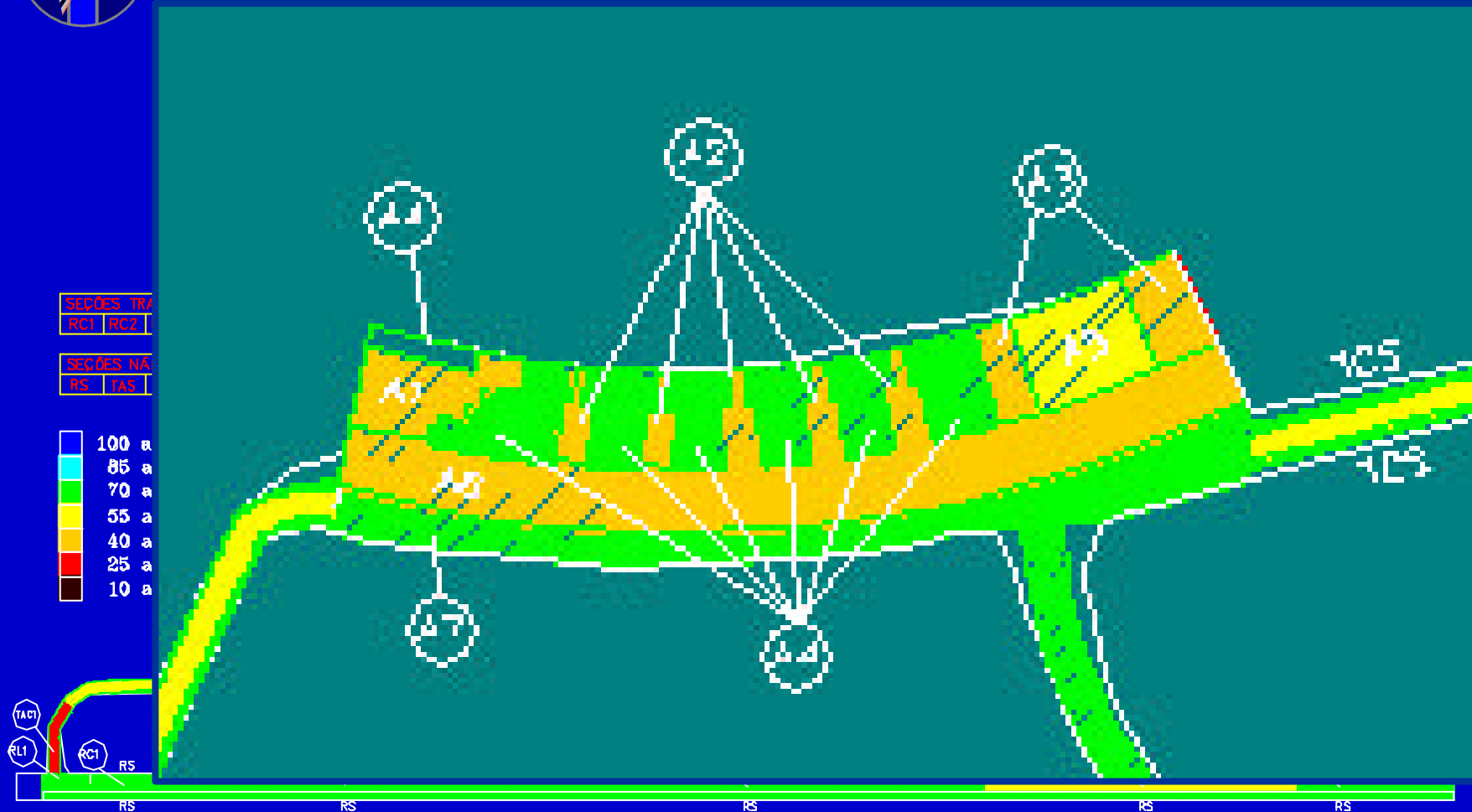


Data Requirements

- Type and quality of data as well as procedures for obtaining them should consider the size and distances among airports;
- Type and quality of data as well as procedures for obtaining them should also meet the strategy to be used by the agency as a function of the resources available.
- Amount of data should be consistent with system operationalization period and stage.
- Meaningfulness and rational info is a must, rather than precision.



Seek rationality when dividing pavement in homogeneous sections





Data Requirements

- **Environmental region where airport is located**
- **Structural data (type, PCN, mat'l layers, etc.)**
- **Traffic data**
- **Functional data (friction, roughness, etc.)**
- **Pvt. Condition (PCI) and inspection date (family models)**
- **Section age, area and surface type**
- **M&R categories and typical services**
- **M&R services costs for each airport**



Airport PMS in Developing Countries Implementation Issues

Conclusions

- **Size of paved network** x **Data detailing** x **Available resources**
- **Reliability degree of data**
- **Adopted technology** x **Operational proficiência**
- **Simplification of the decision making process, as expected by top managers**



Airport PMS in Developing Countries Implementation Issues

Outline

- **PMS Implementation Review**
- **PMS auxiliary software - a historical view**
- **Typical agency context**
- **Conception issues**
- **Data requirements**



Airport PMS in Developing Countries Implementation Issues

Objective

Identify specific characteristics of developing countries related to pavement management systems in order to allow for the establishment of appropriate Airport PMS implementation strategies.



“No matter how good the process has been, it can always be improved.”

Deming