

Strawman for a new
environmental research program
at GKSS

"Monitoring Technology Research"

MOTOR

18 April 1996

MOTOR

General Ideas

- Testing and developing hardware, software and management strategies.
- Deployment of one monitoring platform at a location of interest.
Operation of this platform throughout the year and for 10 and more years.
- Cooperation with commercial, governmental and scientific partners and clients.
- Contributions from two or three GKSS environmental laboratories and in particular from the projects MERMAID and WATIS.

Monitoring

- Monitoring means to routinely measure parameters which are supposed to be in some sense characteristic for the system under consideration.
- The observations are taken over a long time, with a pre-defined sampling strategy and with knowledge about the temporal changes in biases and errors of measurement.
- In many cases, the monitoring data are used later for purposes which have not been envisaged by the initiator of the monitoring operation.

Use of Monitoring Data

- Providing a data base
 - for the description of the system's temporal variability ("geogenic variability")
 - for the analysis of the system's sensitivity against external factors.
 - for the understanding of the system's dynamics
- The detection of unusual developments commonly excited by external forcing. This detection requires information about the "geogenic variability".

Requirements for Monitoring

- Data must be homogeneous: changes in biases and errors must be documented.
- Data must be representative for the considered system: the time resolution must be sufficient for adequate sampling of the processes; temporal extension must be several times the time scale of the considered processes.
- Data must be available for clients.
- Monitoring system must be affordable and available for all times.

For Monitoring Data:

Homogeneity
is more important than
Accuracy

MOTOR

-strawman-

- Routine operation of one platform in the German coastal waters throughout the year for many years.
- Location of secondary importance:
 - Consistency with previous field work and present scientific programs of GKSS and clients.
 - Proximity to other monitoring activities useful (e.g. List radio sonde).
- Performance of affordable, robust measurements of meteorological, hydrographical, chemical, biological and sedimentological data.
- Storage of data in GKSS data bank.

MOTOR

-strawman-

- Study of methodological problems
 - instrumentation and its replacement
 - instrumentation environment
 - operational routine
 - transmission/recording of data
 - storing data; access by clients
 - quality control
- Platform for cooperation with commercial and governmental clients to test new hardware.
- Contribution to scientific programs, pursued by GKSS or clients, in coastal oceanography and regional climatology.

MOTOR

-strawman-

- Statistical and dynamical analysis of monitoring data with respect to the system's spectrum of variation and its sensitivity to external factors on time scales of days, months, and years.

Special Observation Periods

-strawman-

- The monitoring data shall will supplemented with data from "Special Observation Periods" (SOPs).
- During limited times additional instruments at the platform and at other locations are used to record with enhanced temporal and spatial resolution and accuracy the four-dimensional evolution.
- Statistical and dynamical tools are used to determine the representativity of the monitoring data.

Enhanced Monitoring

-strawman-

- Dynamical and statistical models are developed which combine dynamical and empirical knowledge with the MOTOR data and other routinely recorded data.
- These models are tested in routine operation as a diagnostic tool of the considered system. Since the spatial/temporal specification will be greatly enhanced, the data are named "Enhanced Monitoring Data".
- Automatic forecast schemes, based on dynamical understanding as well as on "blind" learning algorithms will be developed.