



Past and Current efforts: study sites

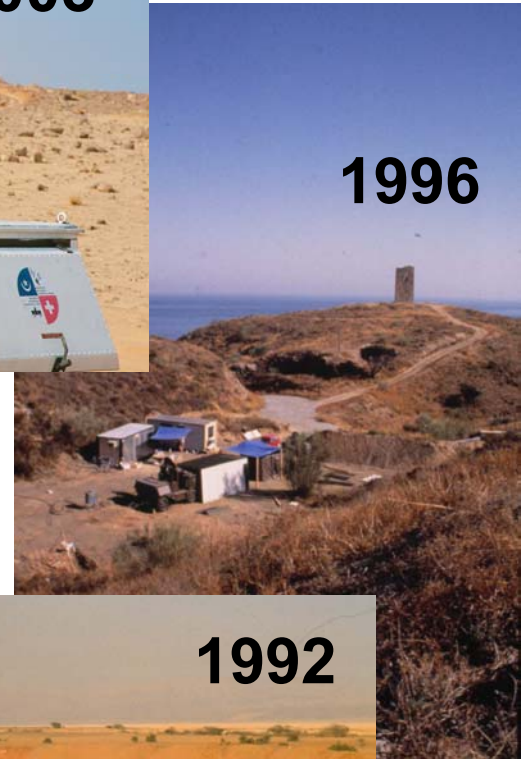
1974



2003



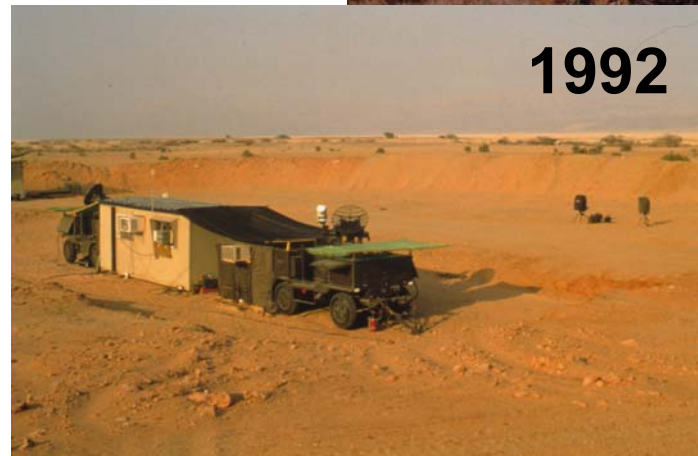
1996



1987



1992





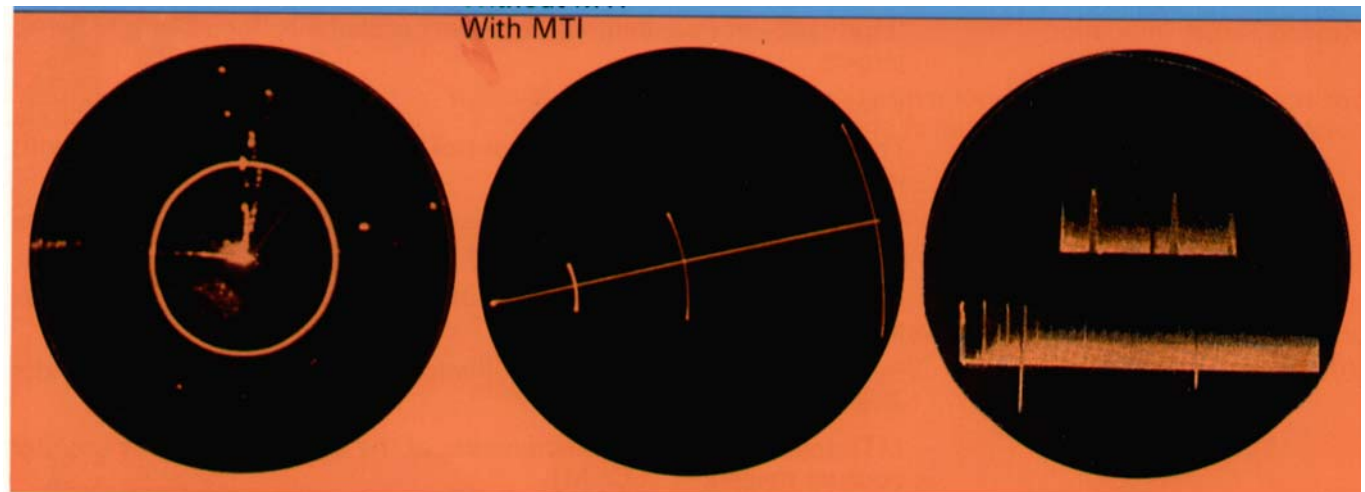
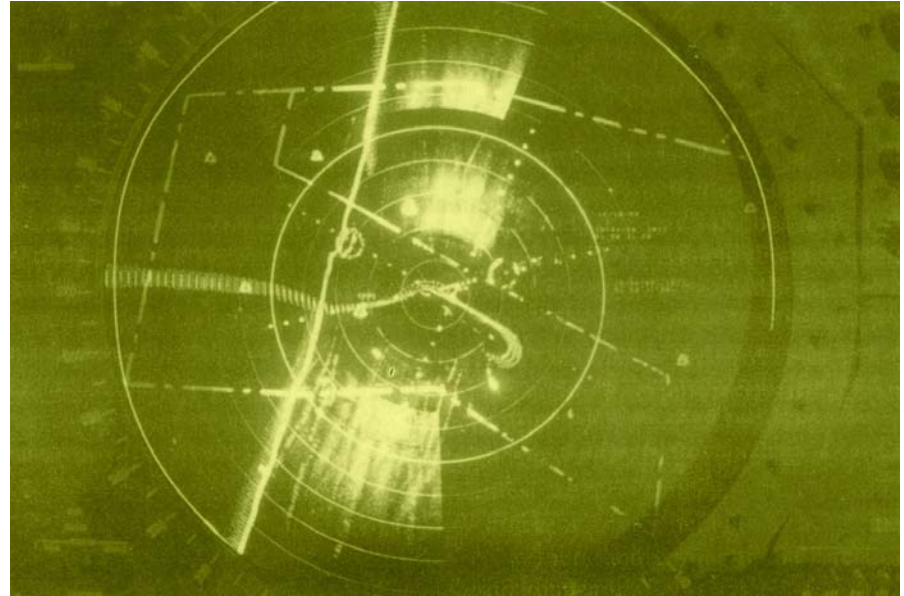
Past and Current efforts: study sites





Past and Current efforts: data recording

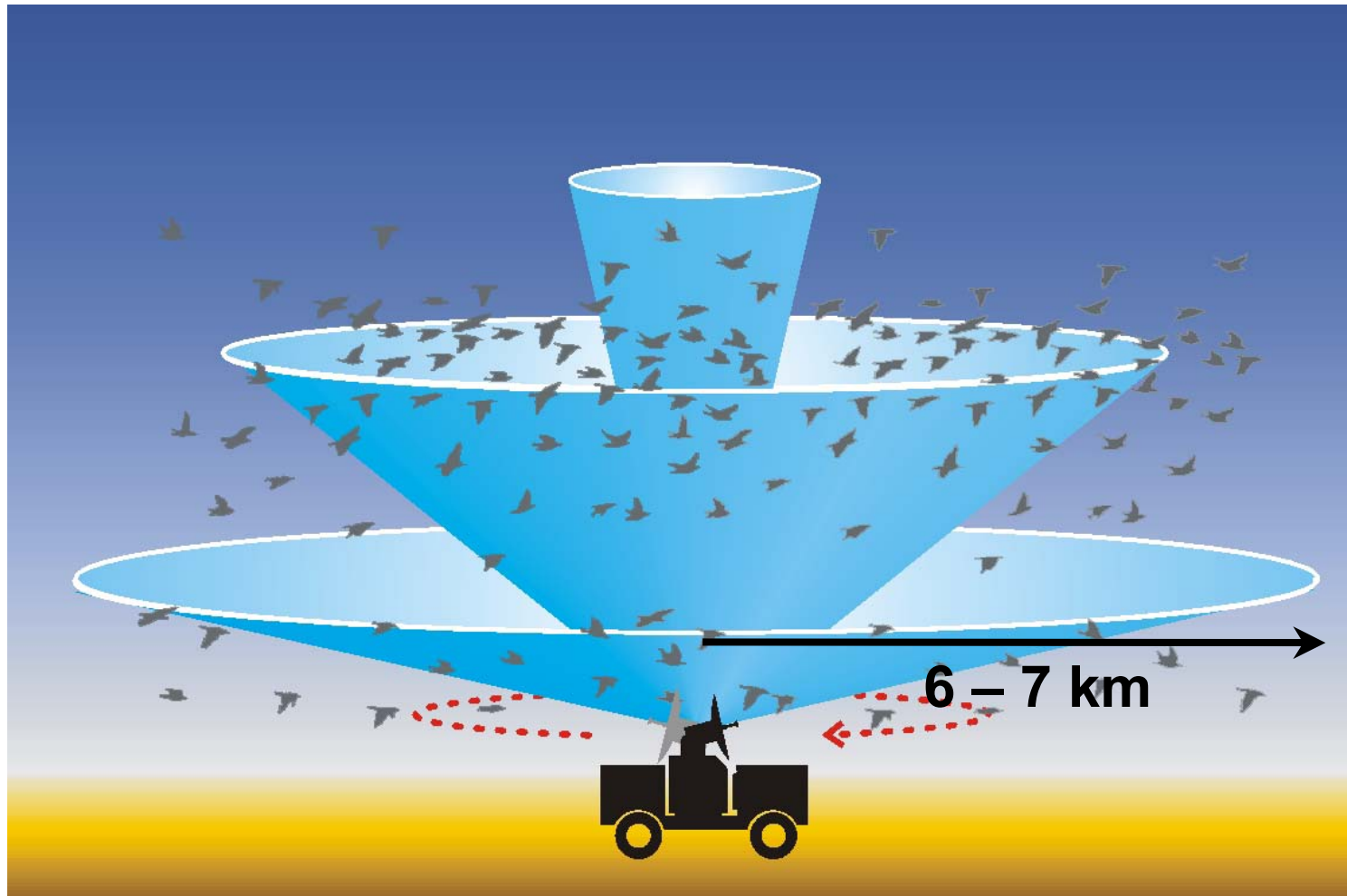
analog photo recording
(time lapse)





Past and Current efforts: data recording

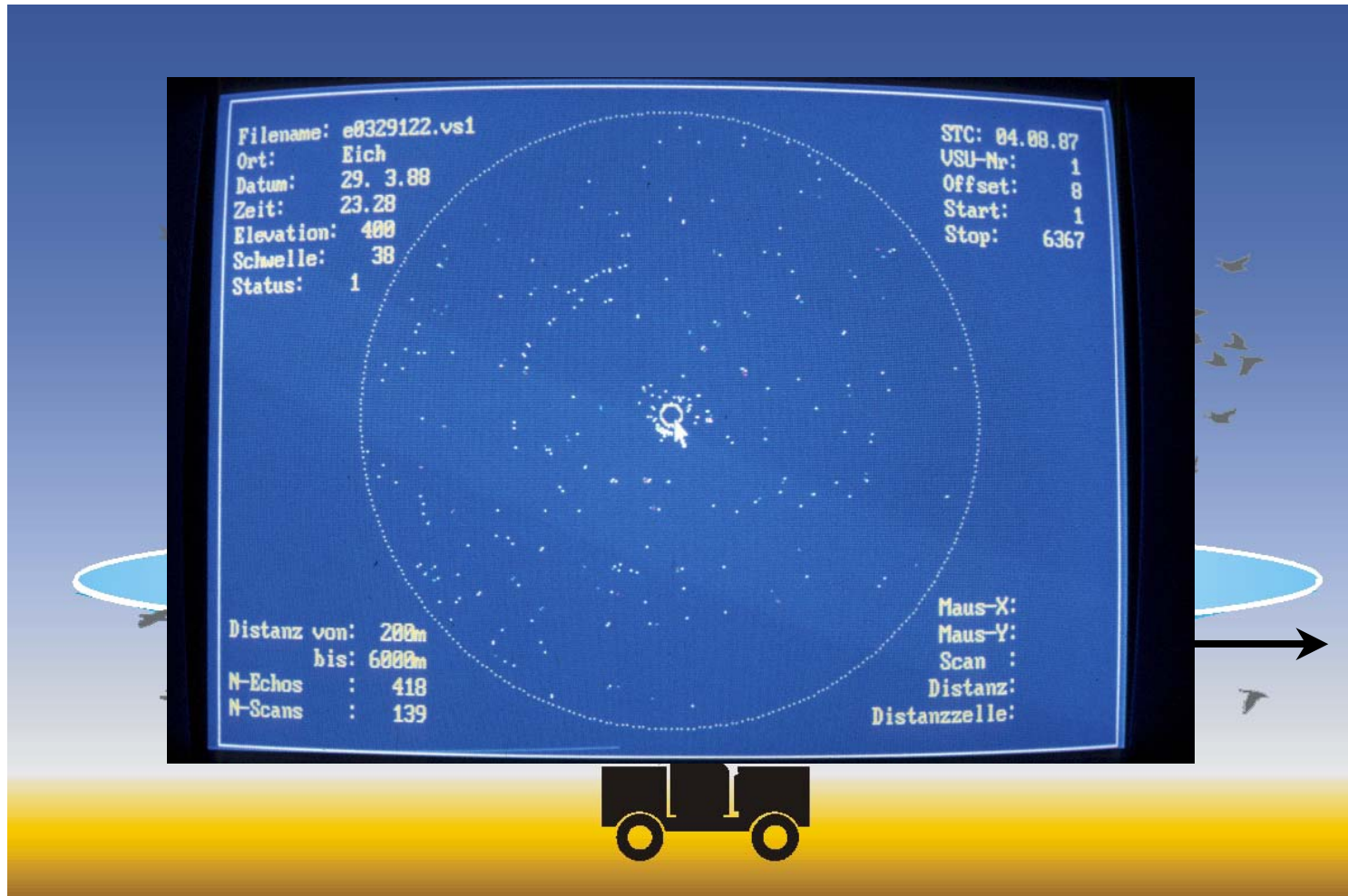
digital video sampling: conical scanning measurement





Past and Current efforts: data recording

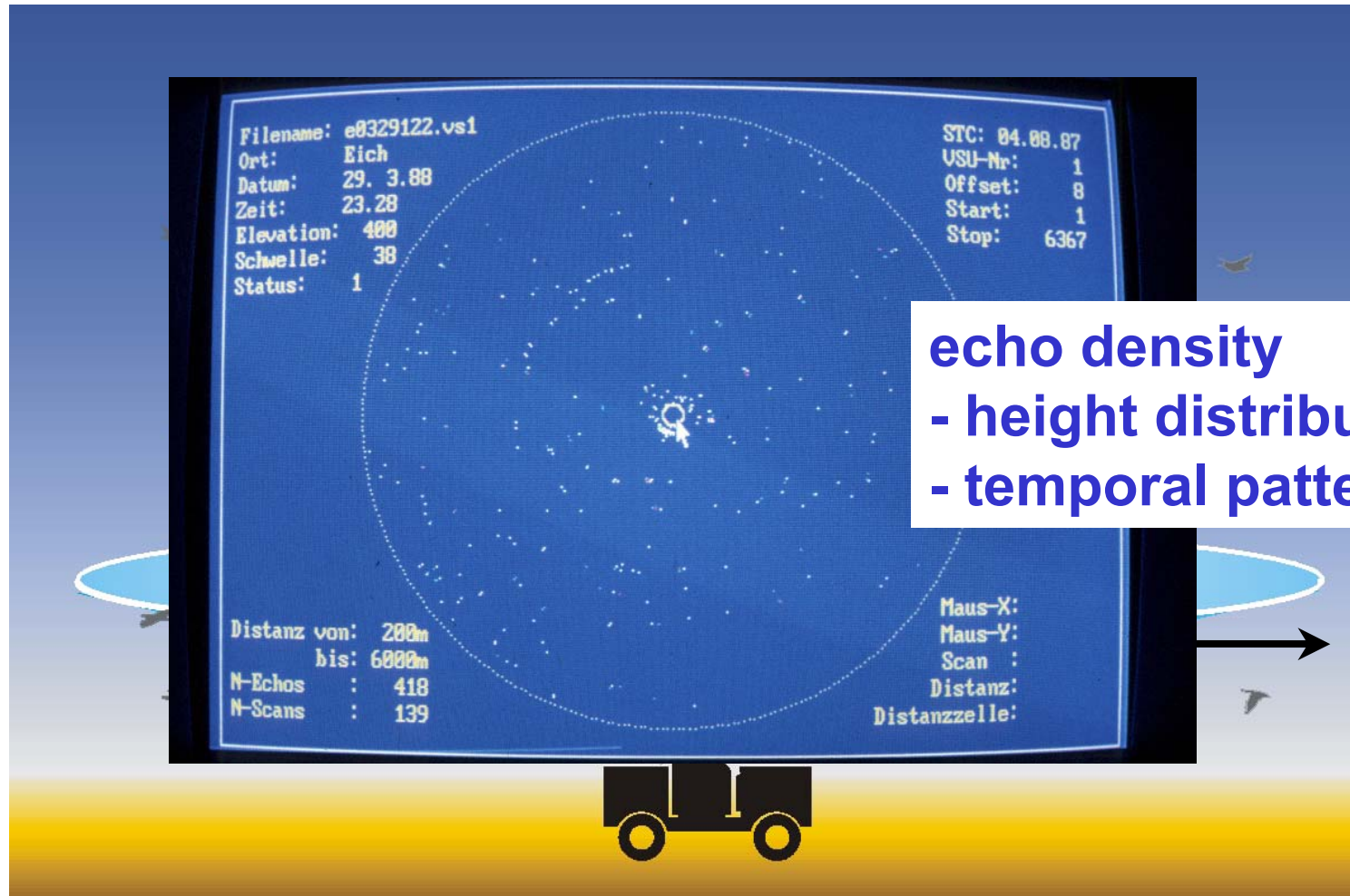
digital video sampling: conical scanning measurement





Past and Current efforts: data recording

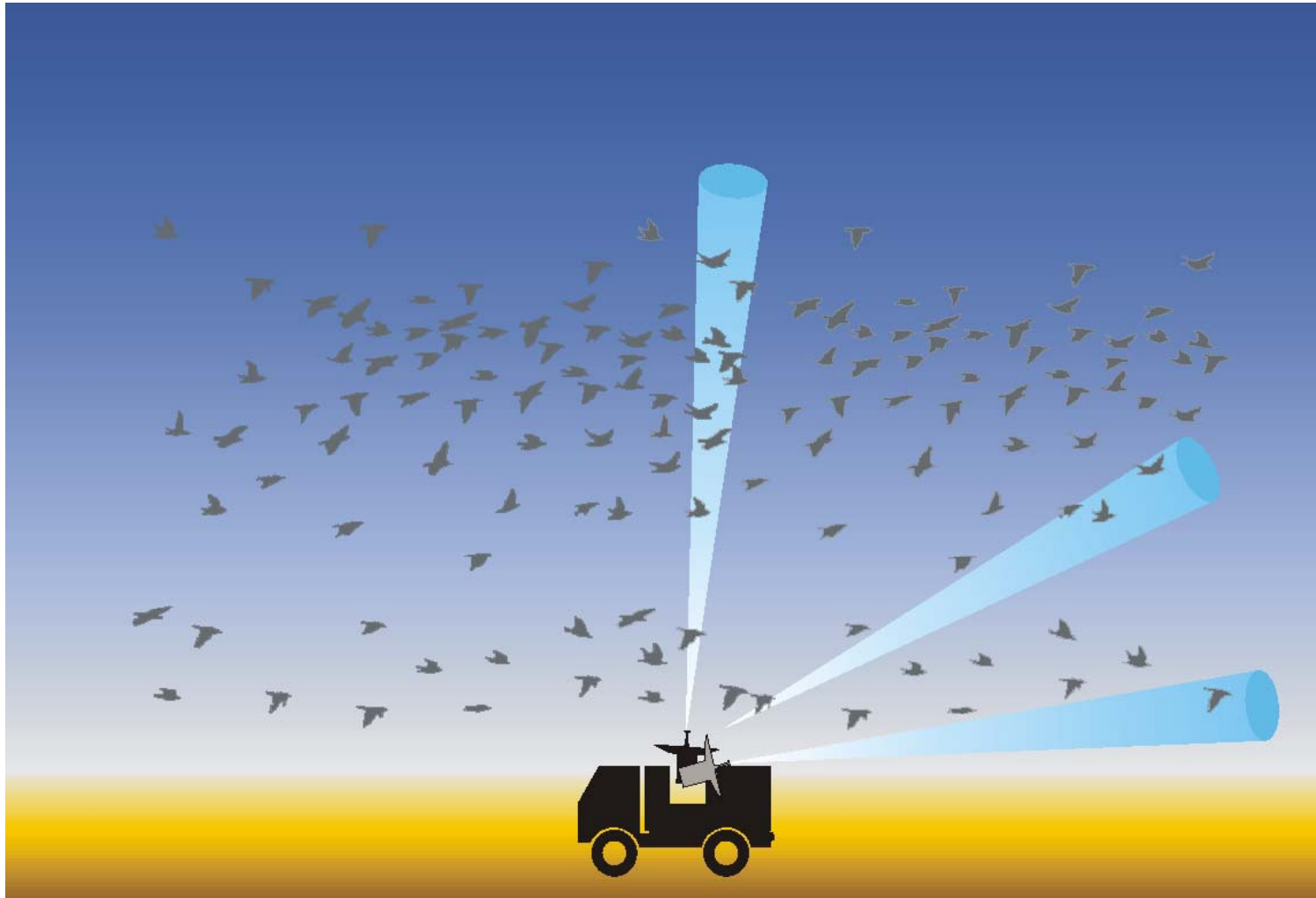
digital video sampling: conical scanning measurement





Past and Current efforts: data recording

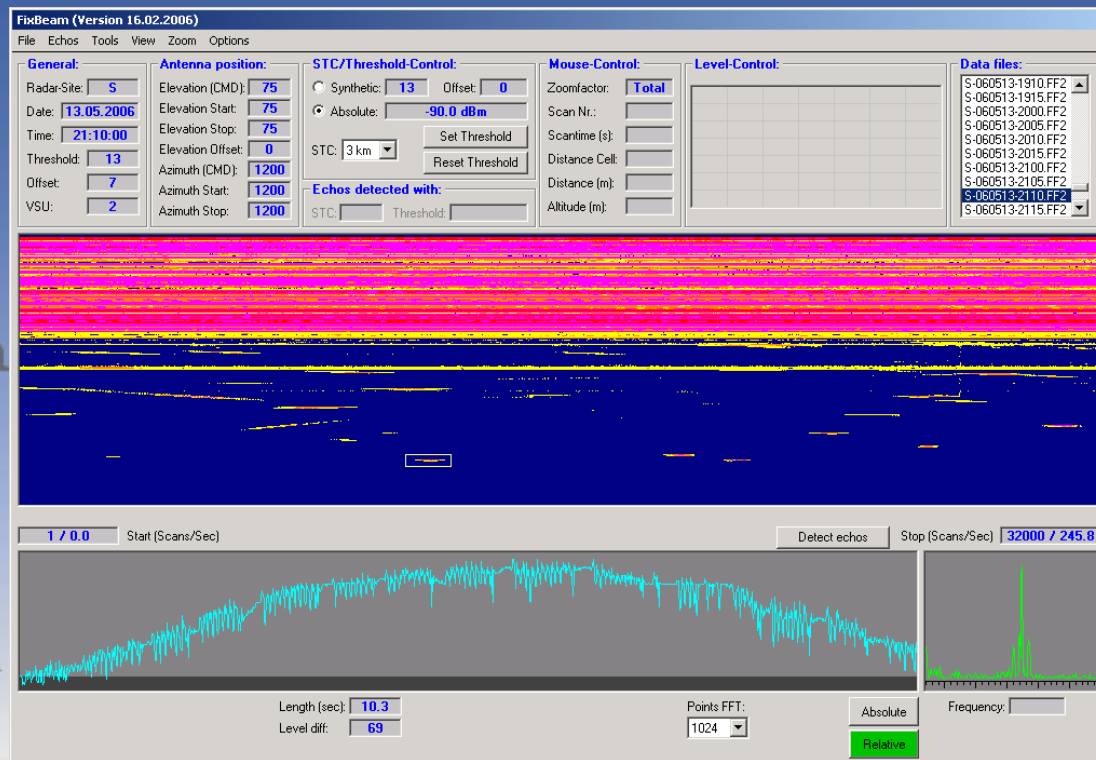
digital video sampling: fast fixed beam measurement





Past and Current efforts: data recording

digital video sampling: fast fixed beam measurement

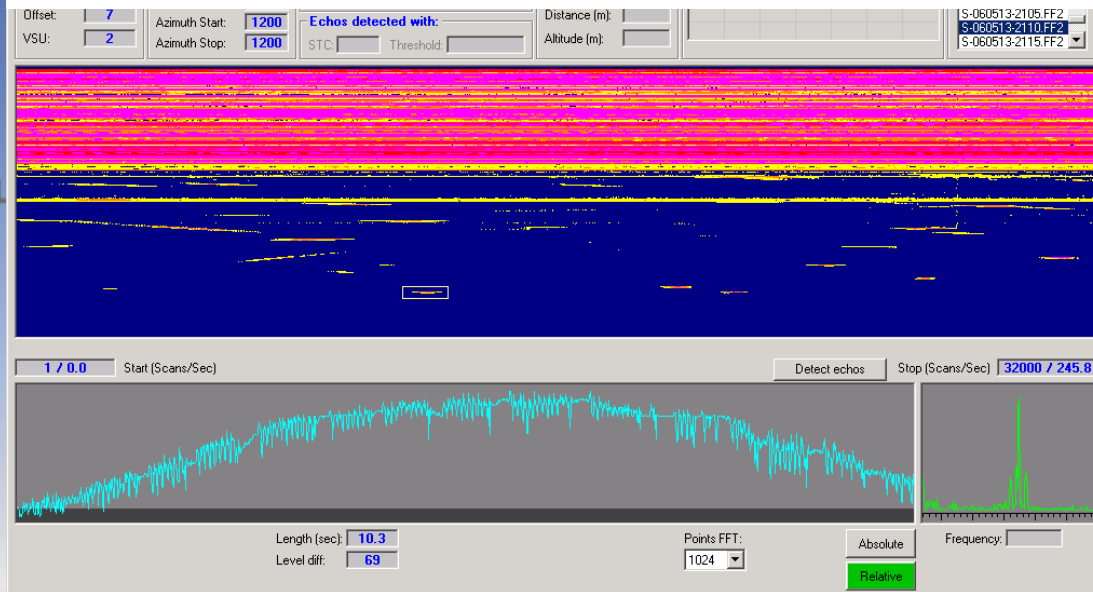




Past and Current efforts: data recording

digital video sampling: fast fixed beam measurement

intensity of songbird migration
- height distribution
- temporal pattern





Past and current efforts: different operating modes

Tracking single targets



- individual flight paths
- wingbeat patterns

Conical scanning

- spatial and temporal pattern



Fix beam sampling

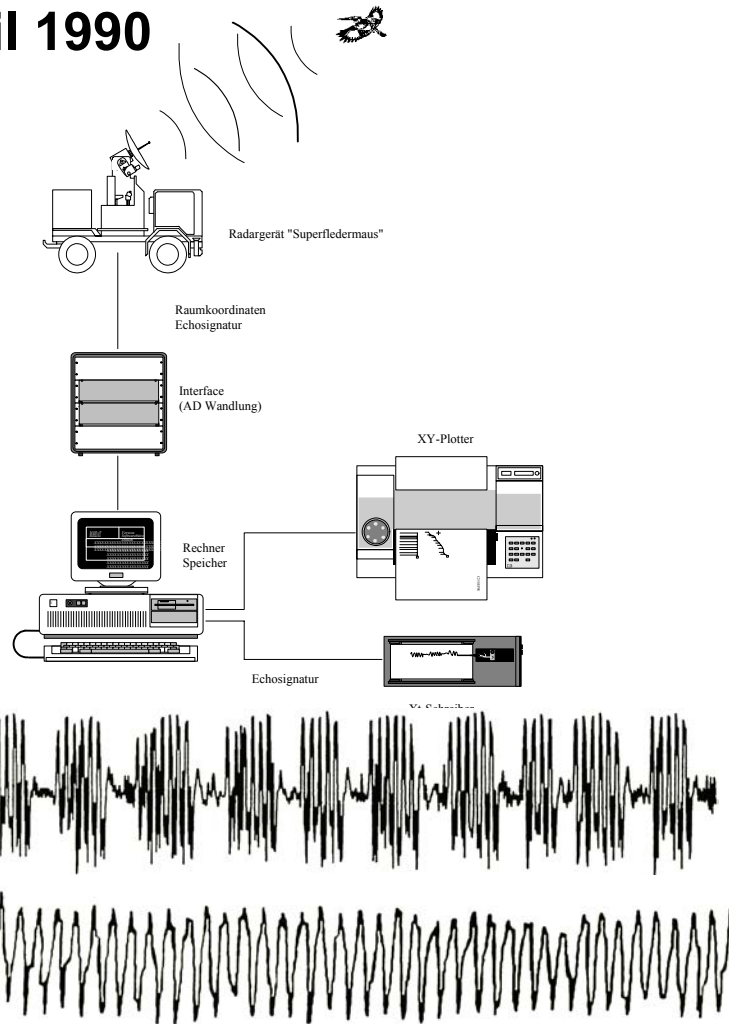
- echo identification by wingbeat patterns
- spatial and temporal pattern





Past and current efforts: radar equipment

until 1990



today





Past and current efforts: radar results

General information:

intensity / density in time and space

identification by wing beat pattern

Individual flight paths of single birds and flocks

direction, speed, height

identification by wing beat pattern



Past and current efforts: radar results

General information:

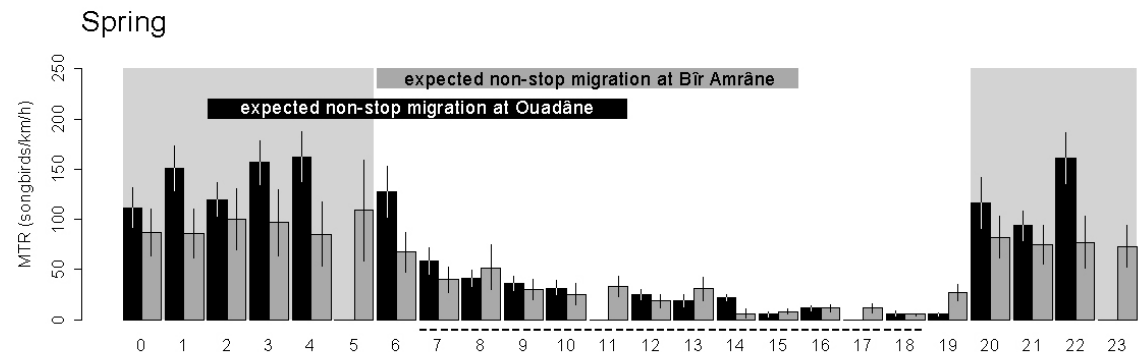
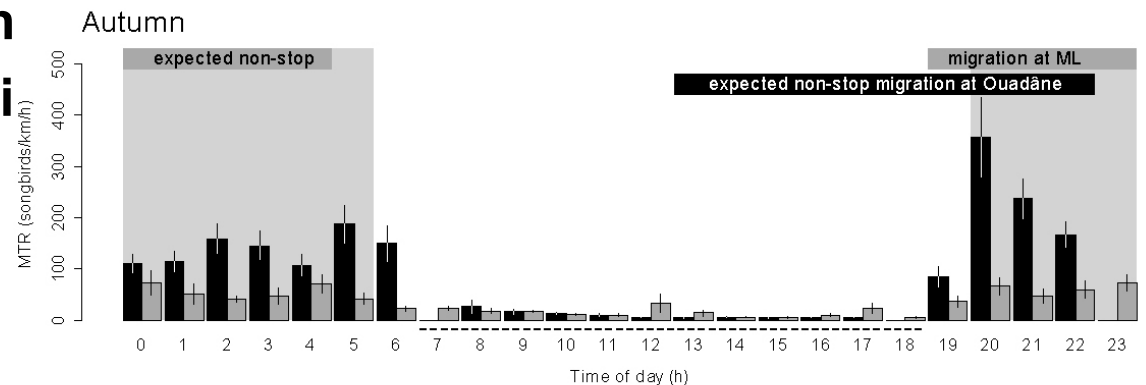
intensity / density in time and space

identification by wing beat pattern

Individual flight paths of single birds and flocks

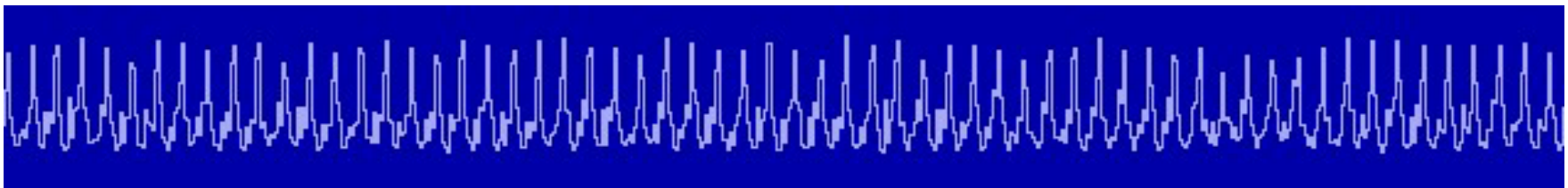
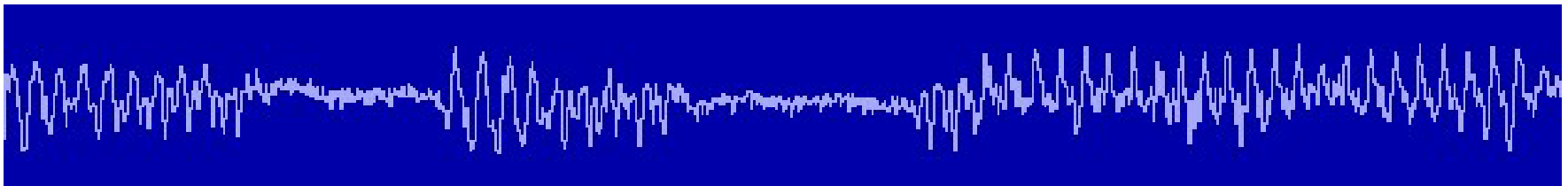
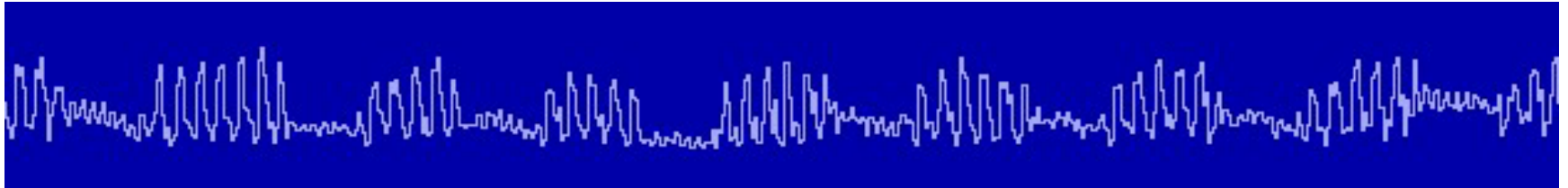
direction, speed, h

identification by wi



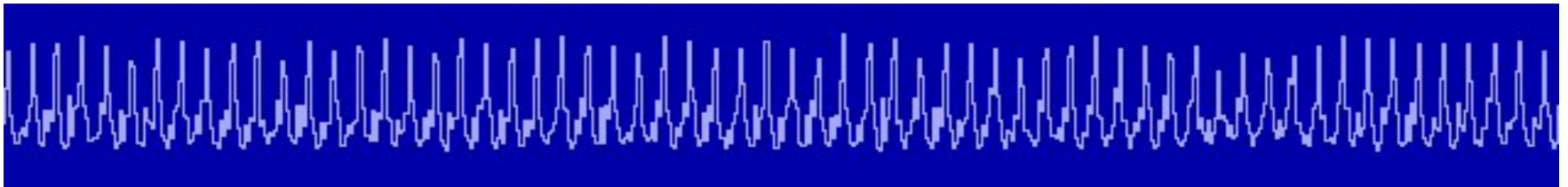
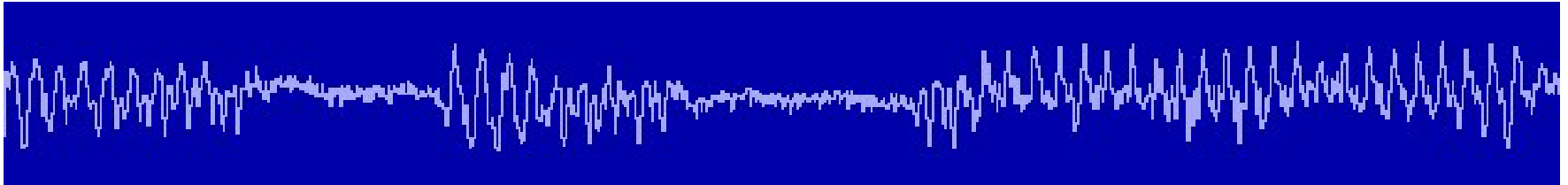
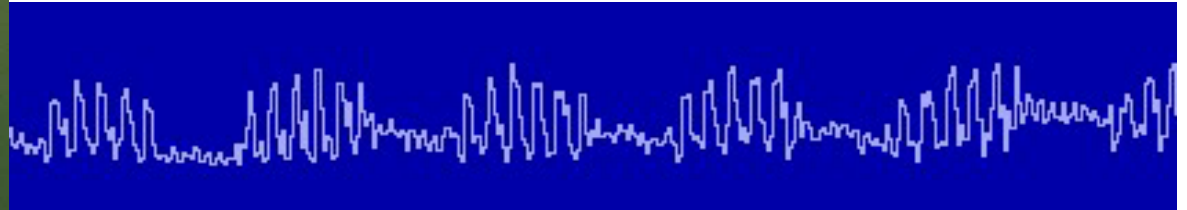


Past and current efforts: identification



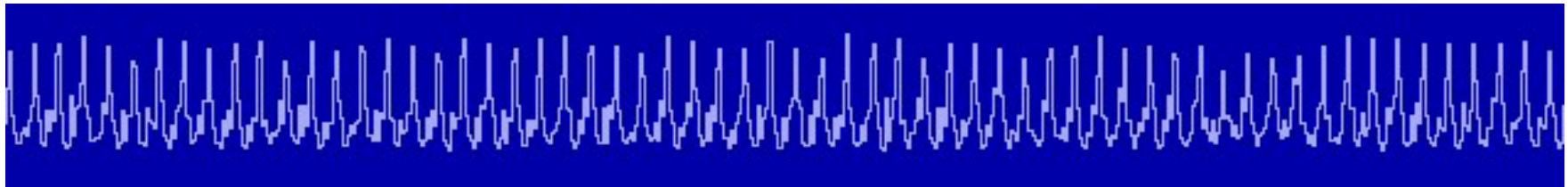
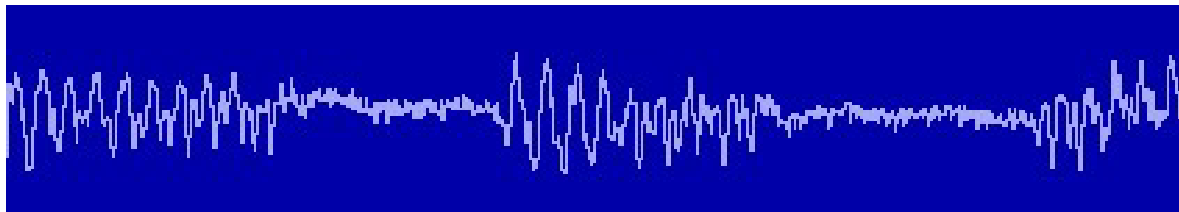
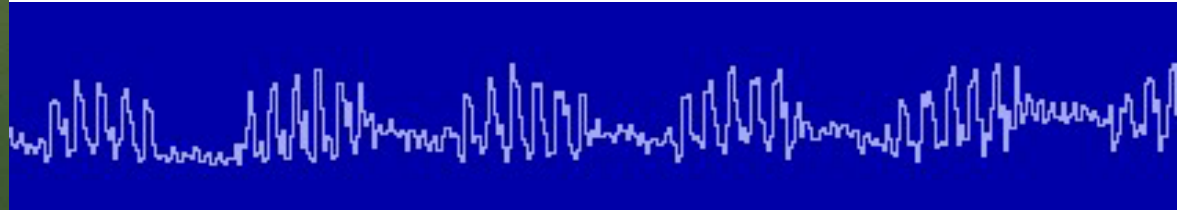


Past and current efforts: identification



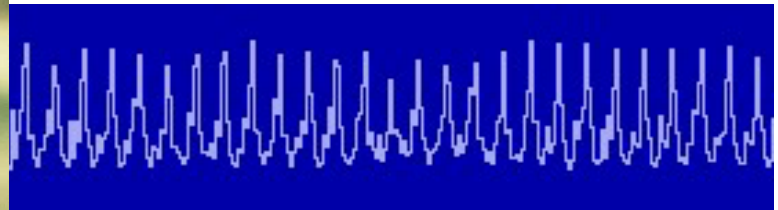
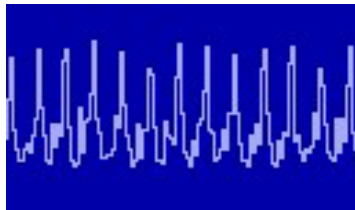
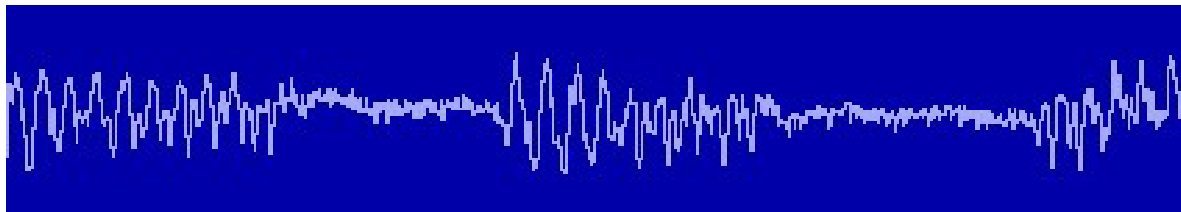
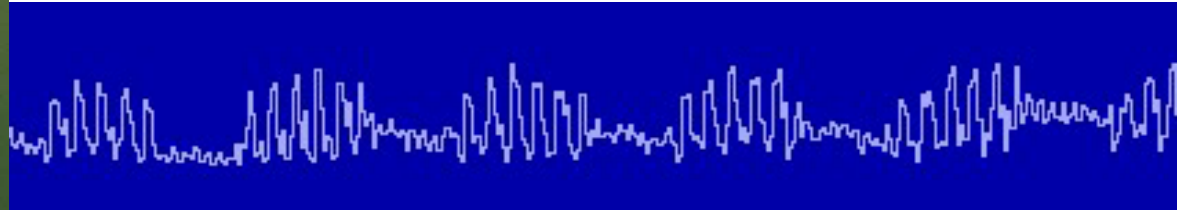


Past and current efforts: identification



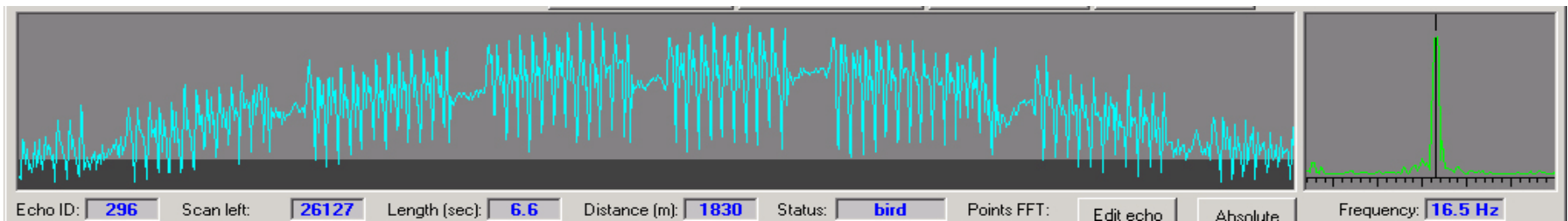
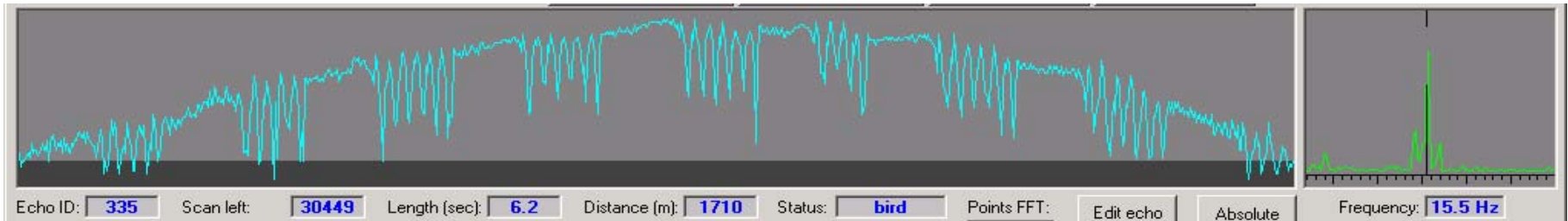
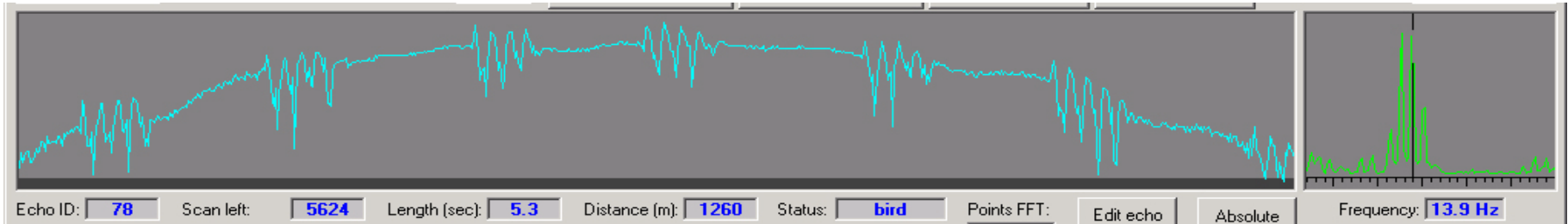


Past and current efforts: identification





Past and current efforts: identification





Past and current efforts: identification

The image displays a central photograph of a small bird, likely a species of warbler or similar, held in a person's hand. The bird has a reddish-brown breast, a greyish-blue head and back, and a yellowish-green patch on its wing. The background is black. Surrounding the central image are six small panels, each showing a waveform and a frequency spectrum. The panels are arranged in two columns of three. The left column shows waveforms with labels: Echo ID: 78, Echo ID: 335, and Echo ID: 296. The right column shows frequency spectra with labels: Frequency: 13.9 Hz, Frequency: 15.5 Hz, and Frequency: 16.5 Hz.

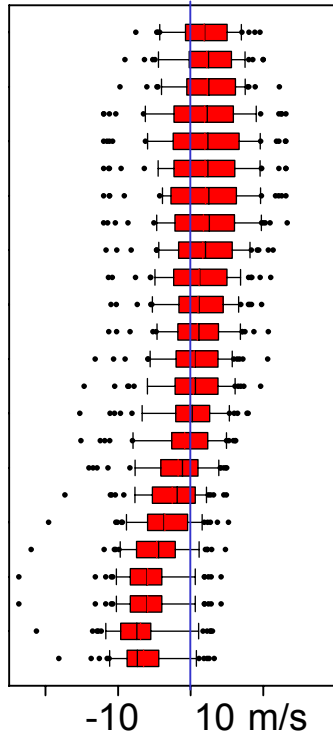
Panel	Label	Value
Top Left	Echo ID:	78
Middle Left	Echo ID:	335
Bottom Left	Echo ID:	296
Top Right	Frequency:	13.9 Hz
Middle Right	Frequency:	15.5 Hz
Bottom Right	Frequency:	16.5 Hz



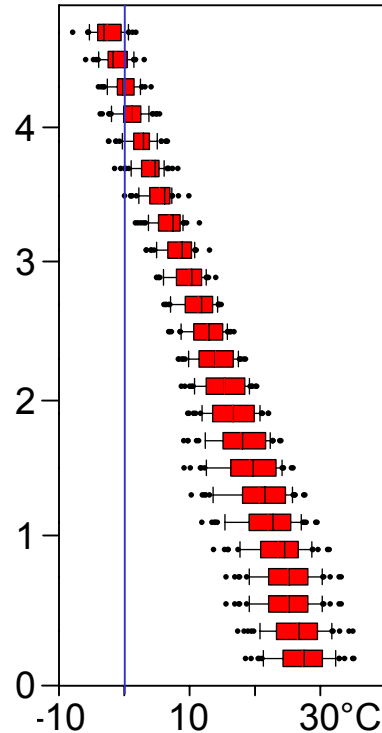
Past and current efforts: physiological models

Atmospheric conditions (Sahara spring 03)

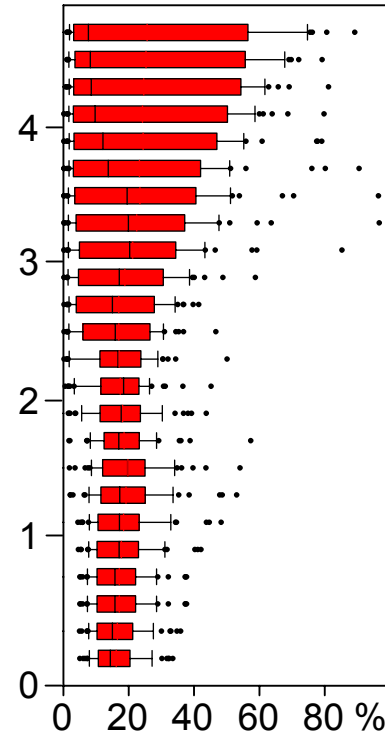
tailwind-com.



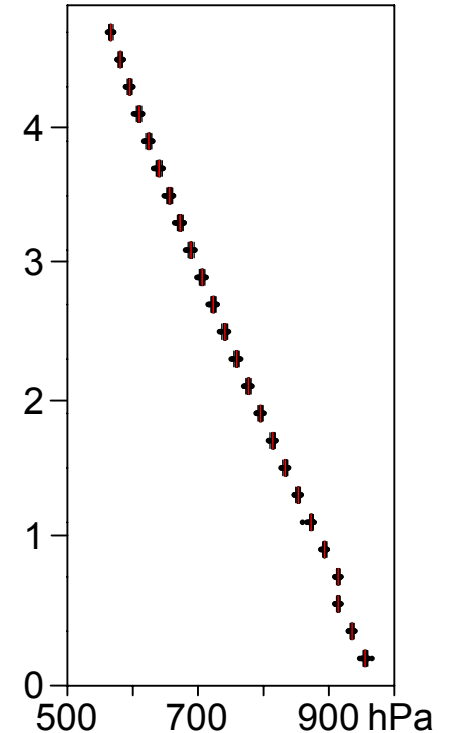
temperature



rel. humidity

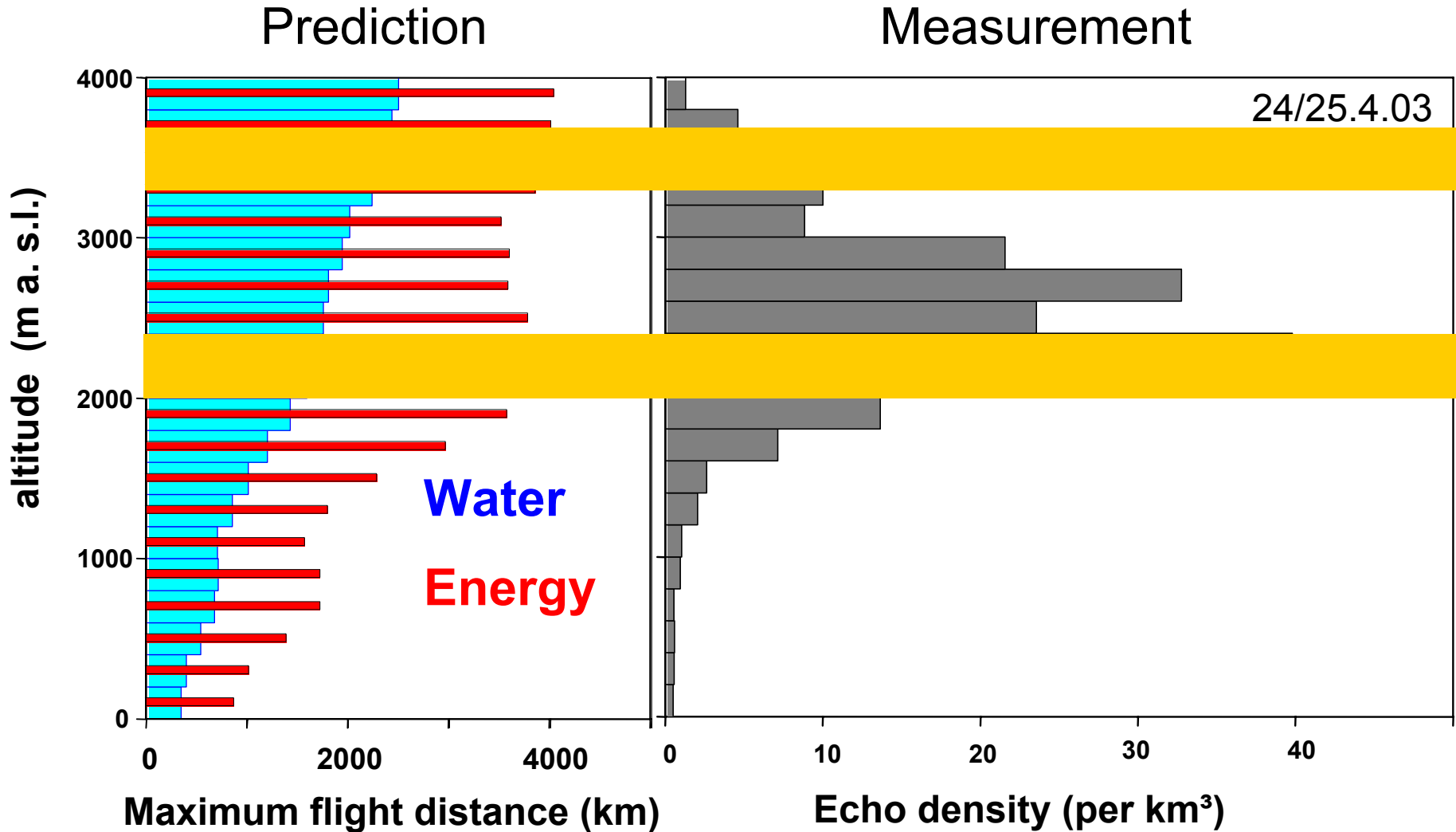


air pressure





Past and current efforts: physiological models

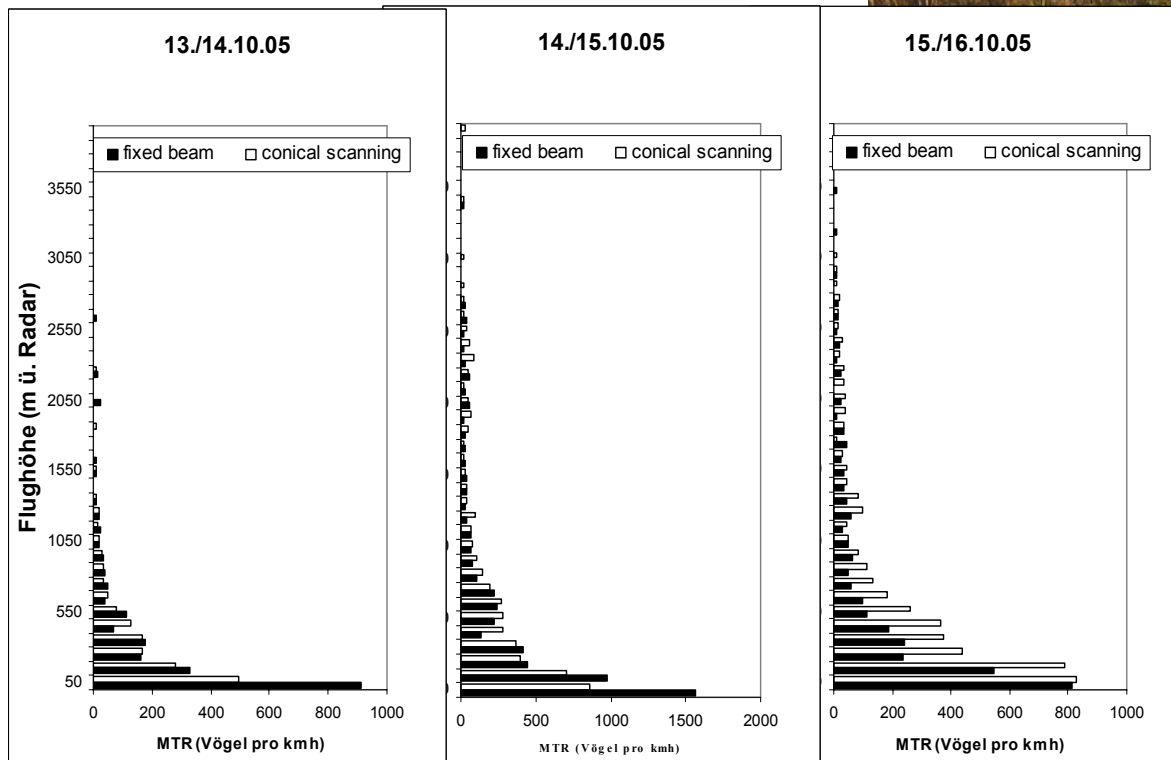




Current efforts: calibrating different radar systems

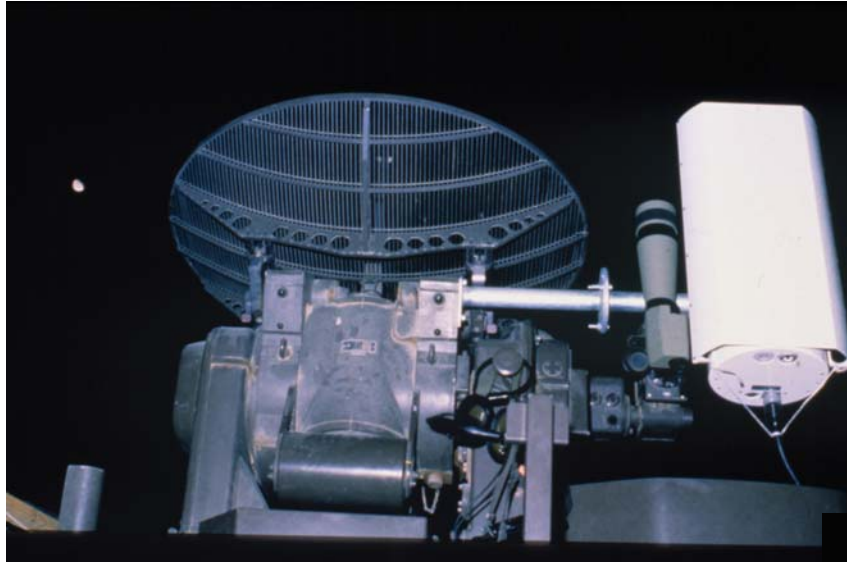
radar systems compared:

- tracking radar „superfledermaus“
(fixed beam and conical scanning)
- ship radar (four different one)





Past and Current efforts: infrared observatoins



- Passive infrared**
- distance calibration**
- density cross calibration**

- easy to handle**
- bird insect differentiation**
- strong influence of background heat**





Past efforts: the Sahara project

