

Georeferenced Data Collection and Yield Measurement on a Self Propelled Six Row Sugar Beet Harvester

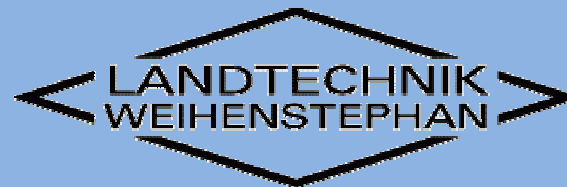
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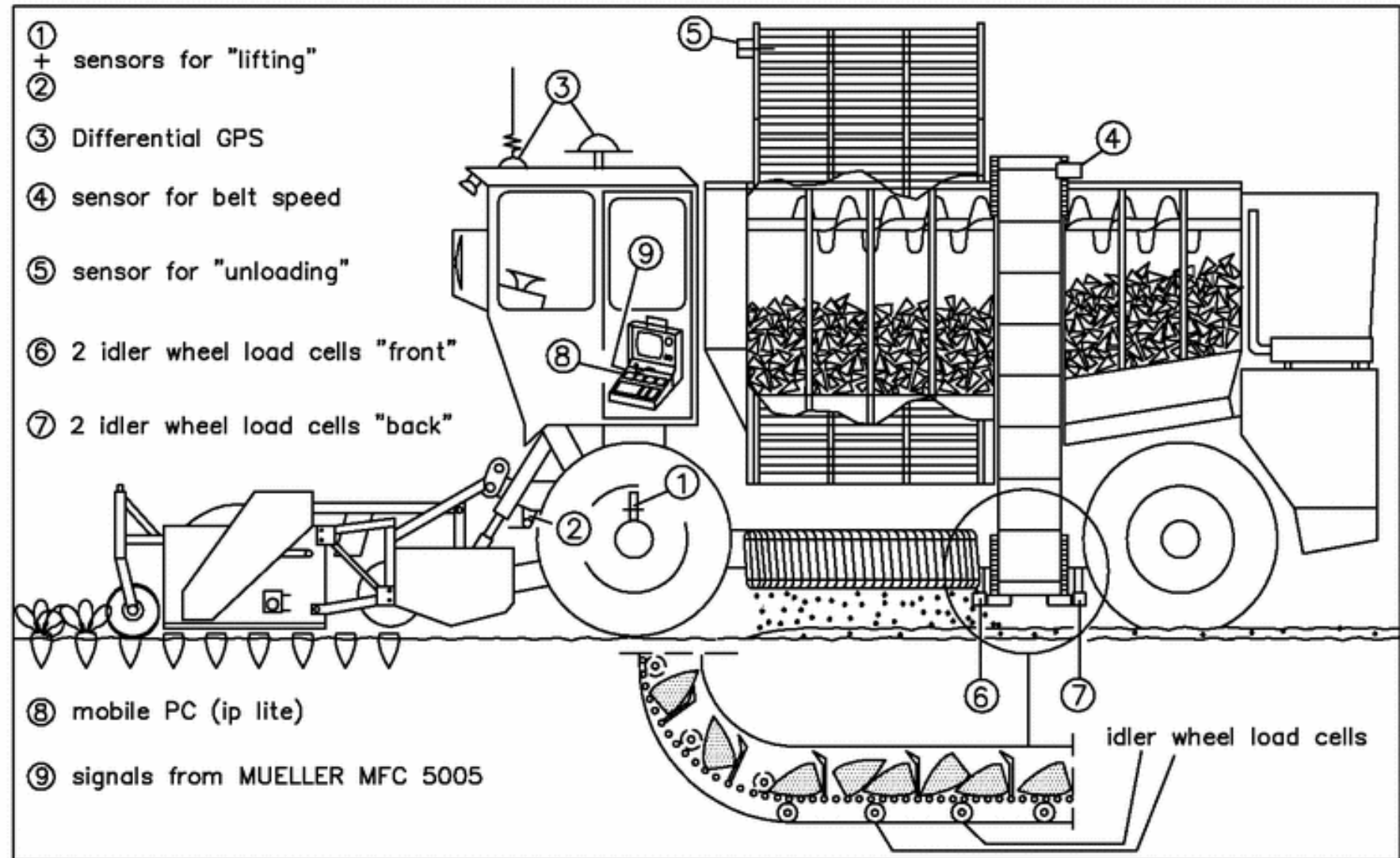
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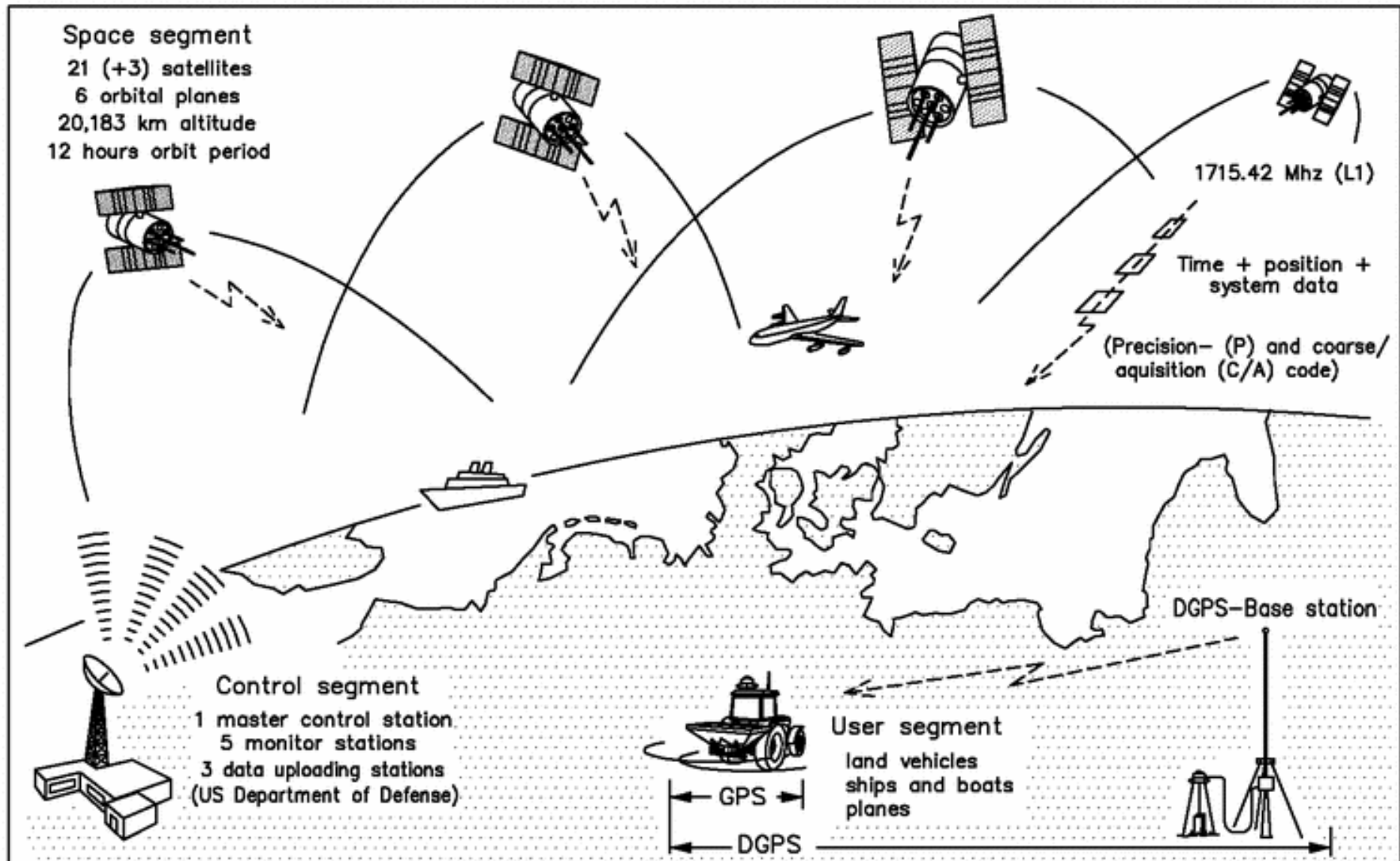




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Data acquisition and yield measurement
in a self propelled sugar beet harvester HOLMER 1995/1996
(Machinery Ring Dachau)

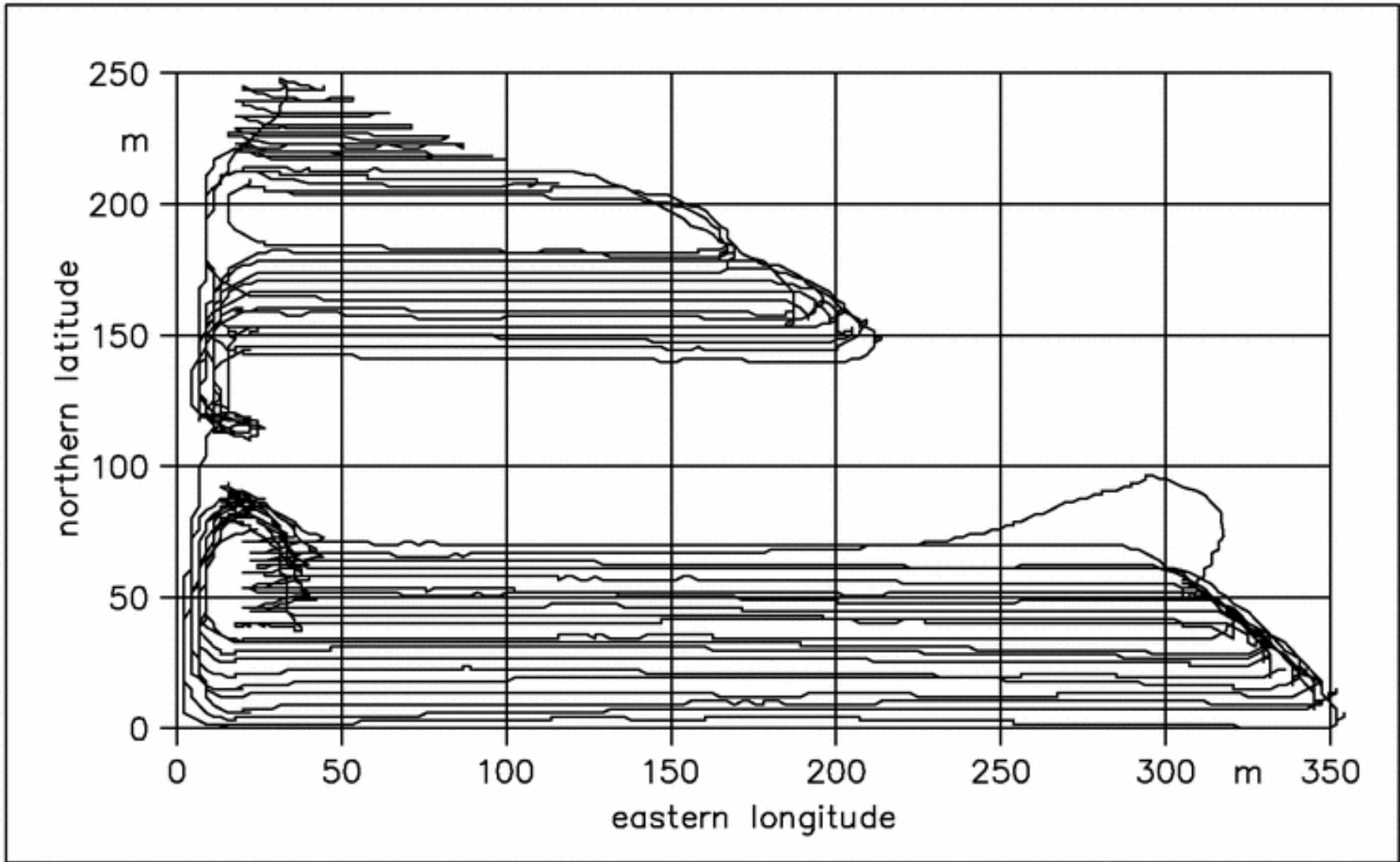
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WEIHENSTEPHAN
Be 982 186



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System design of NAVSTAR
 Global Positioning System (GPS)

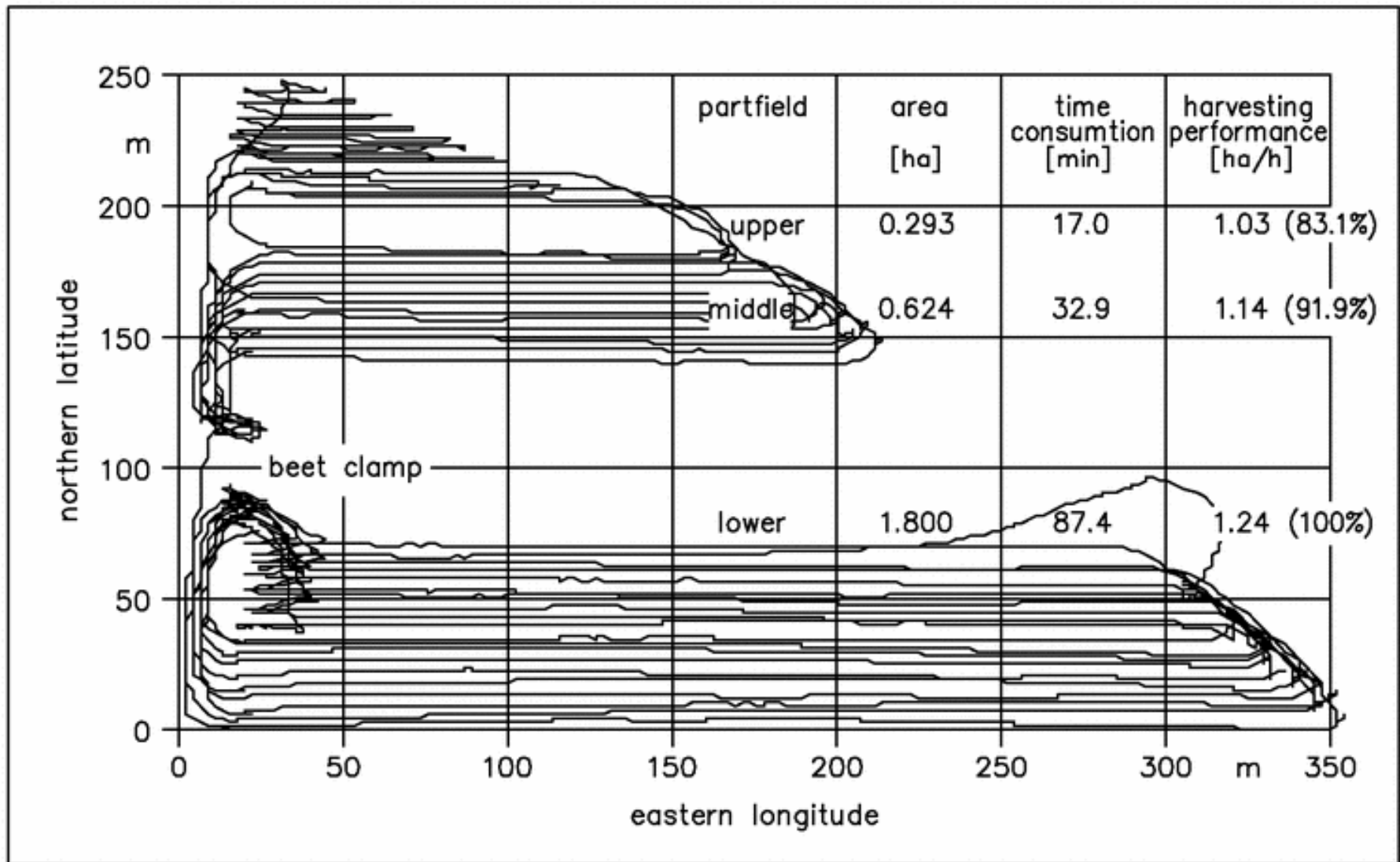
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Traces
(6 row sugar beet harvester)

Be  982 210



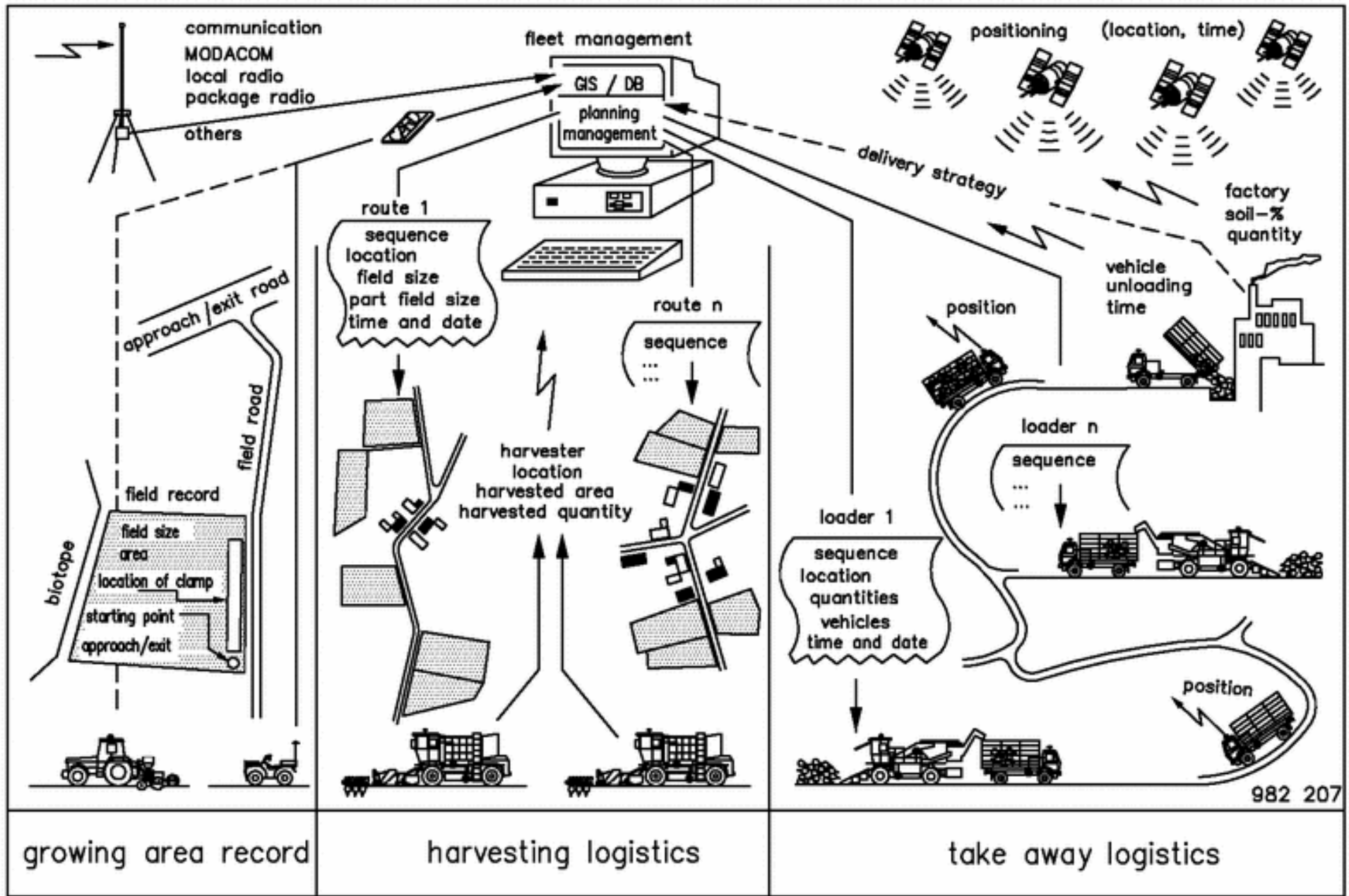
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Traces and processing data
(6 row sugar beet harvester)

982 371

 Be 982 187

partfield	lower			middle			upper			total	
area	1.8 ha			0.624 ha			0.293 ha			2.717 ha	
driving / standing	[min]	[min]	[%]	[min]	[min]	[%]	[min]	[min]	[%]	[min]	[%]
<i>driving</i>	7.8			4.0			3.5				
<i>standing</i>	10.7			4.4			4.0				
		18.5	21.2		8.4	25.5		7.5	44.1	24.4	25.1
lifting		56.9	65.1		19.9	60.5		8.0	47.1	84.8	61.8
unloading											
<i>standing</i>	8.1			3.1			0.3				
<i>driving</i>	0.8			0.7			0.3				
		8.9	10.2		3.8	11.6		0.6	3.5	13.3	9.7
others		3.1	3.5		0.8	2.4		0.9	5.3	4.8	3.5
total		87.4	100		32.9	100		17.0	100	137	100
harvesting performance (rel.)	1.24 ha/h (100 %)			1.14 ha/h (91.9 %)			1.03 ha/h (83.1 %)			1.19 ha/h	
harvesting speed	5.53 km/h			5.25 km/h			7.31 km/h			5.66 km/h	



Conclusions

- Global Positioning Systems combined with some additional sensors and a data acquisition makes automated geo-referenced data collection in a sugar beet harvester possible.
- During the first season in 1995 the systems run without continuous support by scientific or technical staff of the institute only started and stopped by the 65 years old driver.
- The technology for continuously working mass flow and yield detection in the sugar beet harvester needs further development and modification.
- The analysis of the data has shown that the position and time information of satellite positioning Systems together with some additional sensor data delivers work time studies without the usual gaps. The visualization of the traces of the harvester allows to analyse the harvesting process for future optimization.
- Automated data acquisition on the sugar beet harvester as well as on the sugar beet planter and sugar beet loader will become a key technology for future organization conception for the harvesting and fleet management in sugar (beet) production.
- For this final target the shown approach has to be developed. Beside the improvement of the yield detection system, heaper universal data recording systems are needed. They have to be based on the DIN 9684 standardized agricultural bus system LBS which will in future be followed by ISO 11783.