CALVING MONITORIZATION BY REMOTE TECHNOLOGY IN DAIRY CATTLE

THIRD DAIRY CARE CONFERENCE, CROACIA.2015

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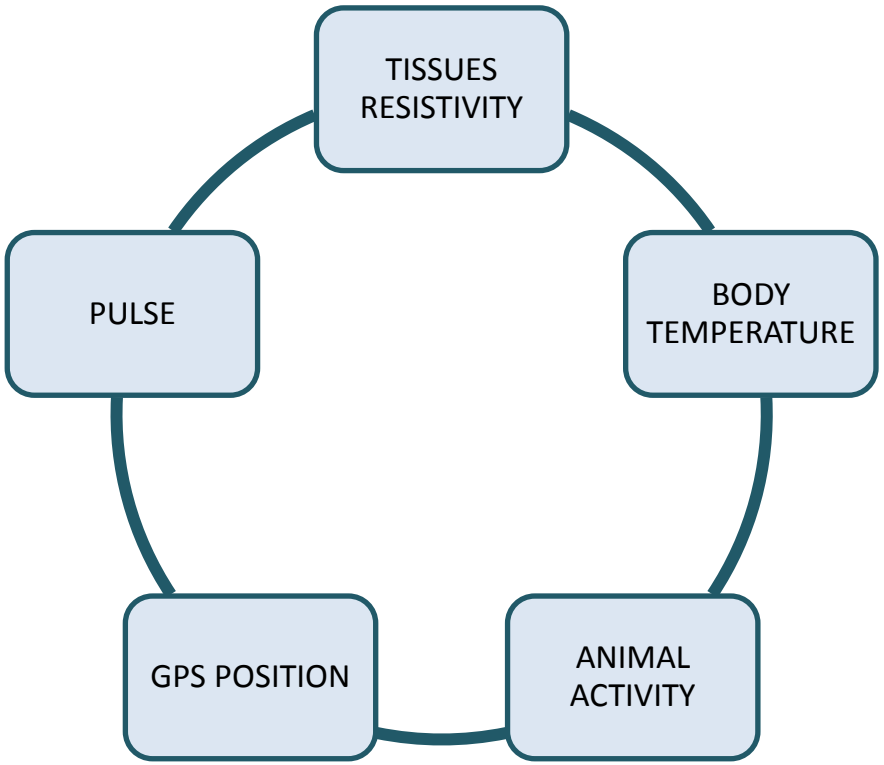
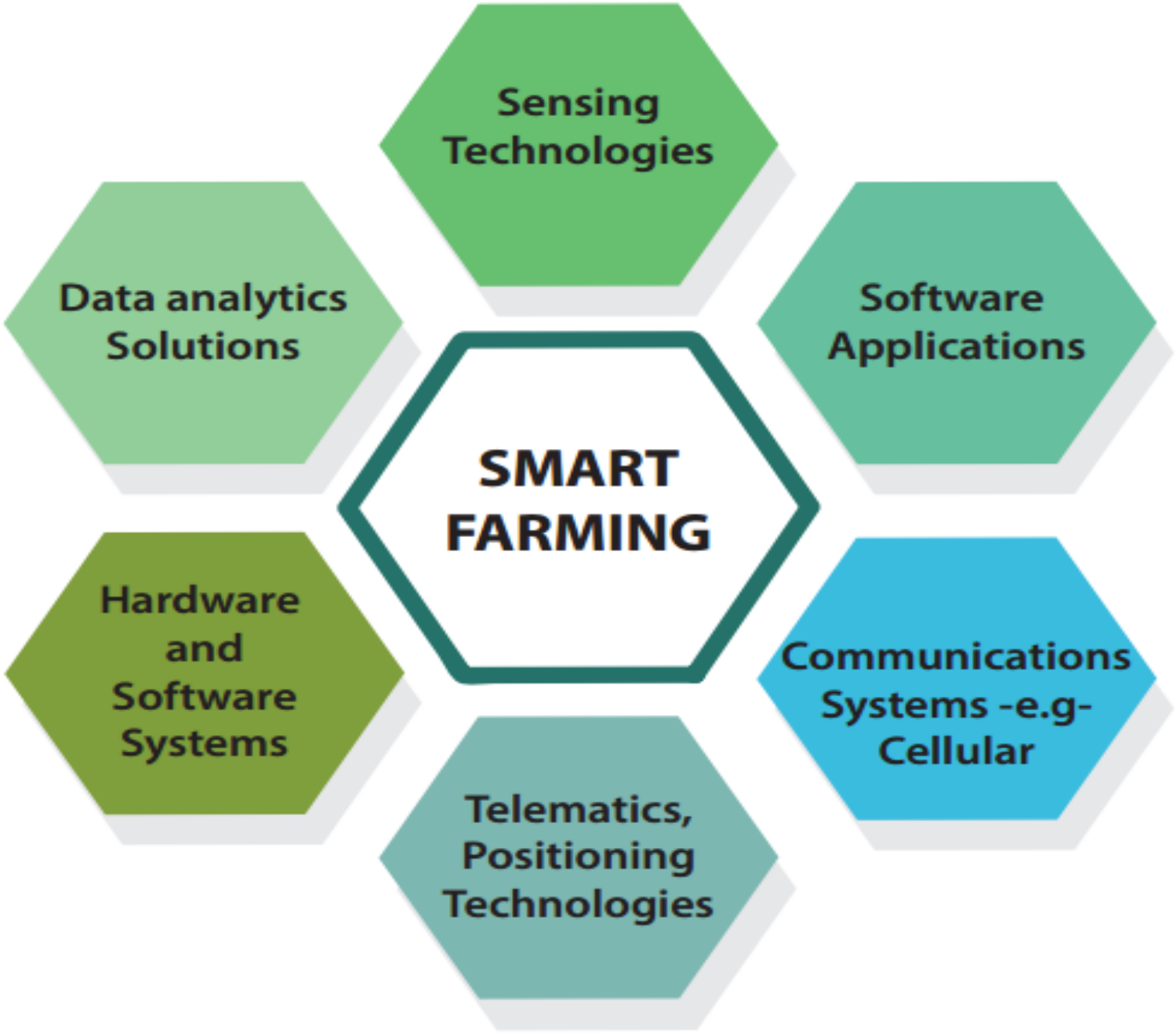
INTRODUCTION

Smart farming - Precision Agriculture: is a way to increase the quality and quantity of agricultural production by sensing technology to make farms more connected and more efficient.

Precision Livestock Farming (PLF): are sensors used for monitoring and early detection of reproduction events and health disorders in animals.



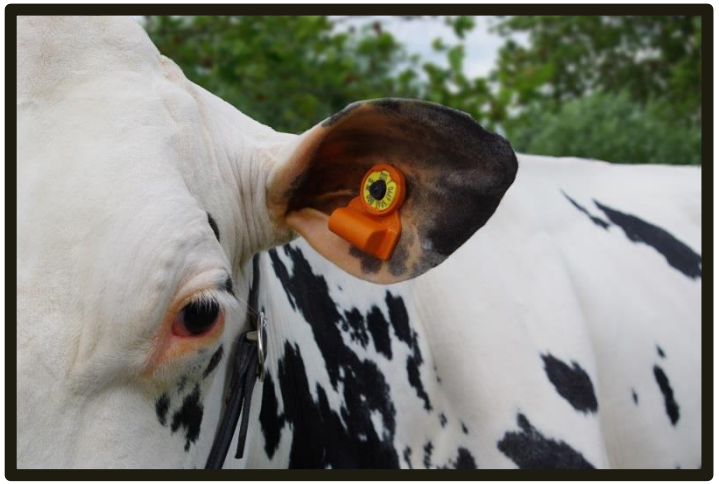

Sensing Technologies
Data analytics Solutions
Software Applications
SMART FARMING
Hardware and Software Systems
Communications Systems -e.g- Cellular
Telematics, Positioning Technologies

OBJECTIVE

The dairy cattle future success will focus on how to use automation and information technology to create a profit generating system covering more factors then merely milking.

To monitor the calving process throught the use of sensors (Vel´Phone) and to determine its impact in term of the reduction of postpartum reproductive pathologies (retained fetal membranes) and stillbirths and improvements fertility (*Palombi et al., 2013*)

CowManager
SensOor



Rumiwatch

WSN CATTLE MONITORING

Medria cattle monitoring:

Vel´Phone

HeatPhone

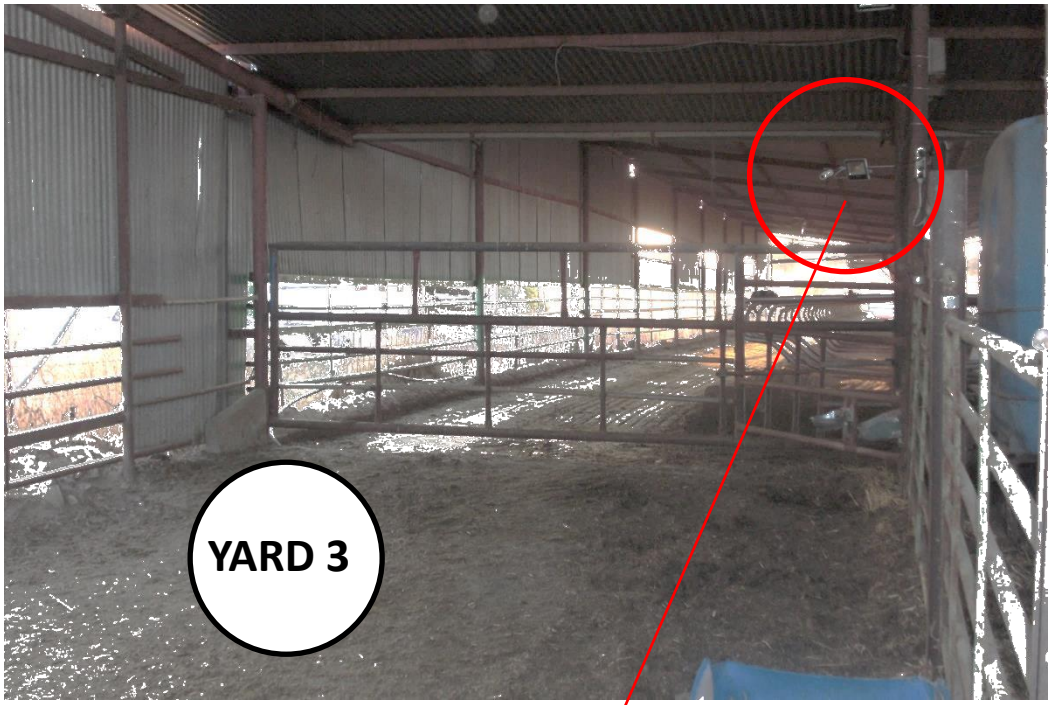
CowScout

MATERIAL-METHODS

DRY COW MANAGEMENT

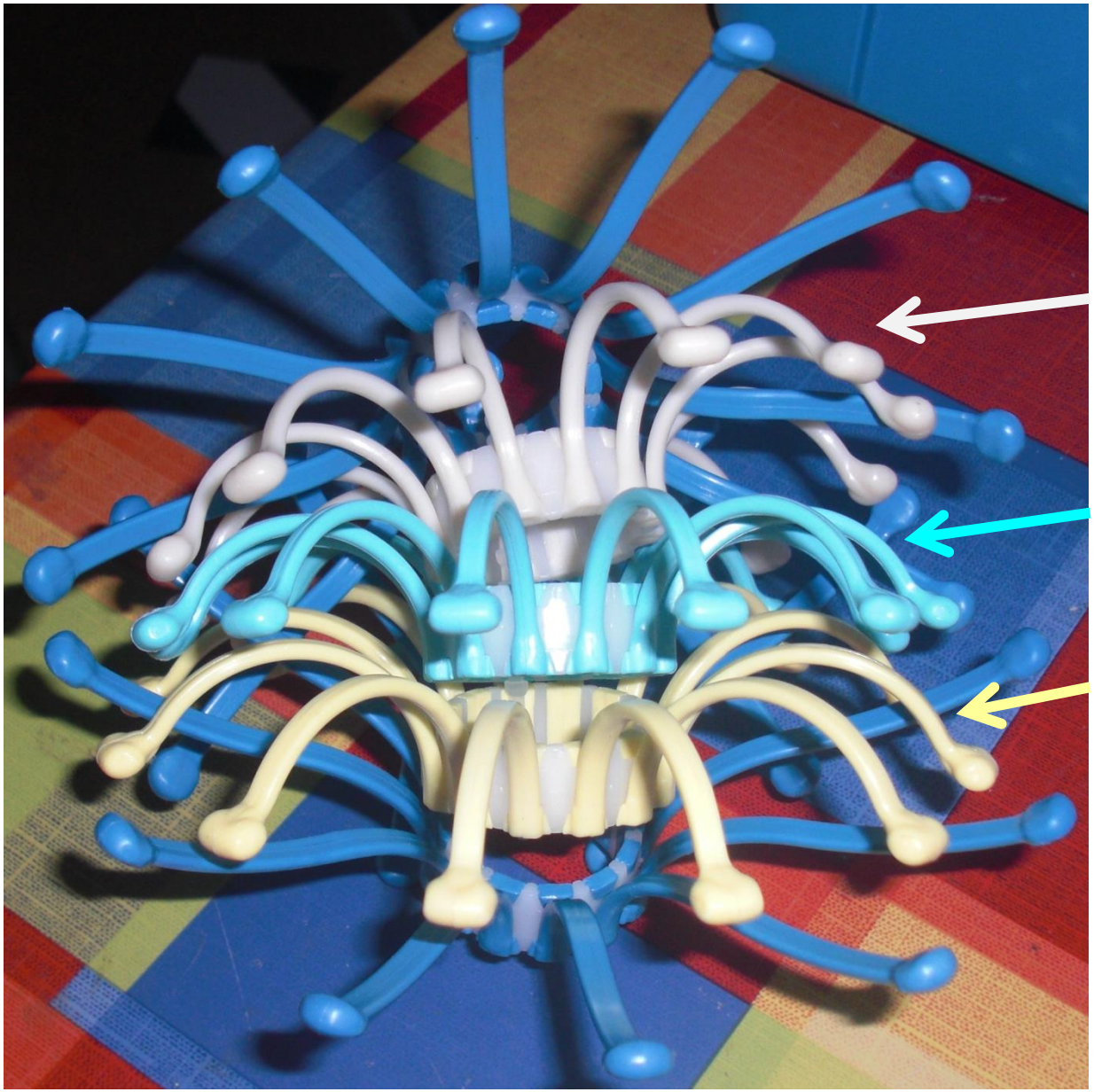
YARD 1: from the time of drying up to 15-20 days before expected calving.	YARD 2: from 15-20 days before delivery to cow is beginning to labour process	YARD 3: the animal calves and it is recorded by video camera.


Volver
En vivo
HEIFERS
YARD 1
YARD 2
Suavizar
Borrar
CMS

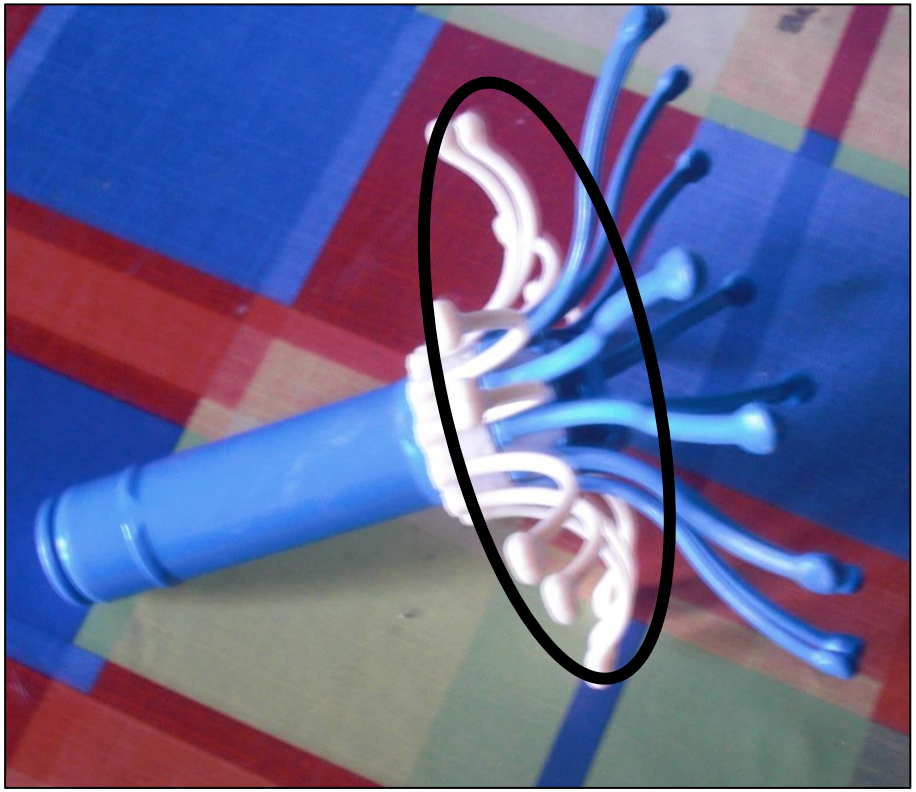

YARD 3

MATERIAL-METHODS

- 51 cows
- Device is placed 7-10 days before predicted labor which is obtained from computer.


PRIMIPAROUS
HEIFERS
MULTIPAROUS

VEL´PHONE FOR PRIMIPAROUS




Medna

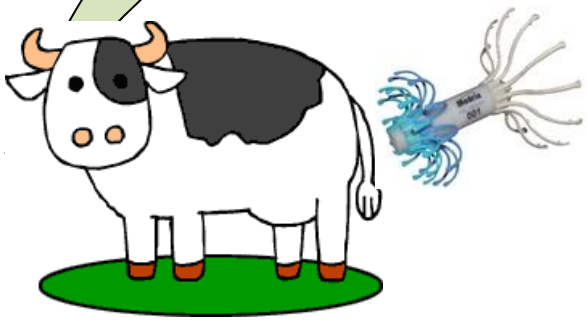
VEL´PHONE

T: sensor has been expelled

E: expulsion of fetus

S: temperature drop

F:activation of the device.



FIRST W

016TB activacion a 11h16.
12:19

01AYT activacion a 11h21.
12:24

01AYU activacion a 11h26.
12:32

016TA activacion a 11h26.
12:33

Informe 1/1 20h00
016TA 38.3
016TB 39.3
01AYT 38.4
01AYU 39.1
21:04

jue., 10/09/2015

SECOND W

01AYT : 0h, parto probable 48 horas
8:02

Informe 1/1 08h00
01AYT 38.5
9:01

Informe 1/1 20h00
01AYT 38.5
21:01

lun., 06/07/2015

Informe 1/1 08h00
01AYT 37.9
9:01

01AYT : 8h, parto esperado 48 horas
9:34

THIRD W

01AYU expulsion a 06h36.
7:40

Informe 1/1 08h00
016TA 38.3
016TB 38.1
01AYT 38.1
9:03

016TB expulsion a 16h25.
17:29

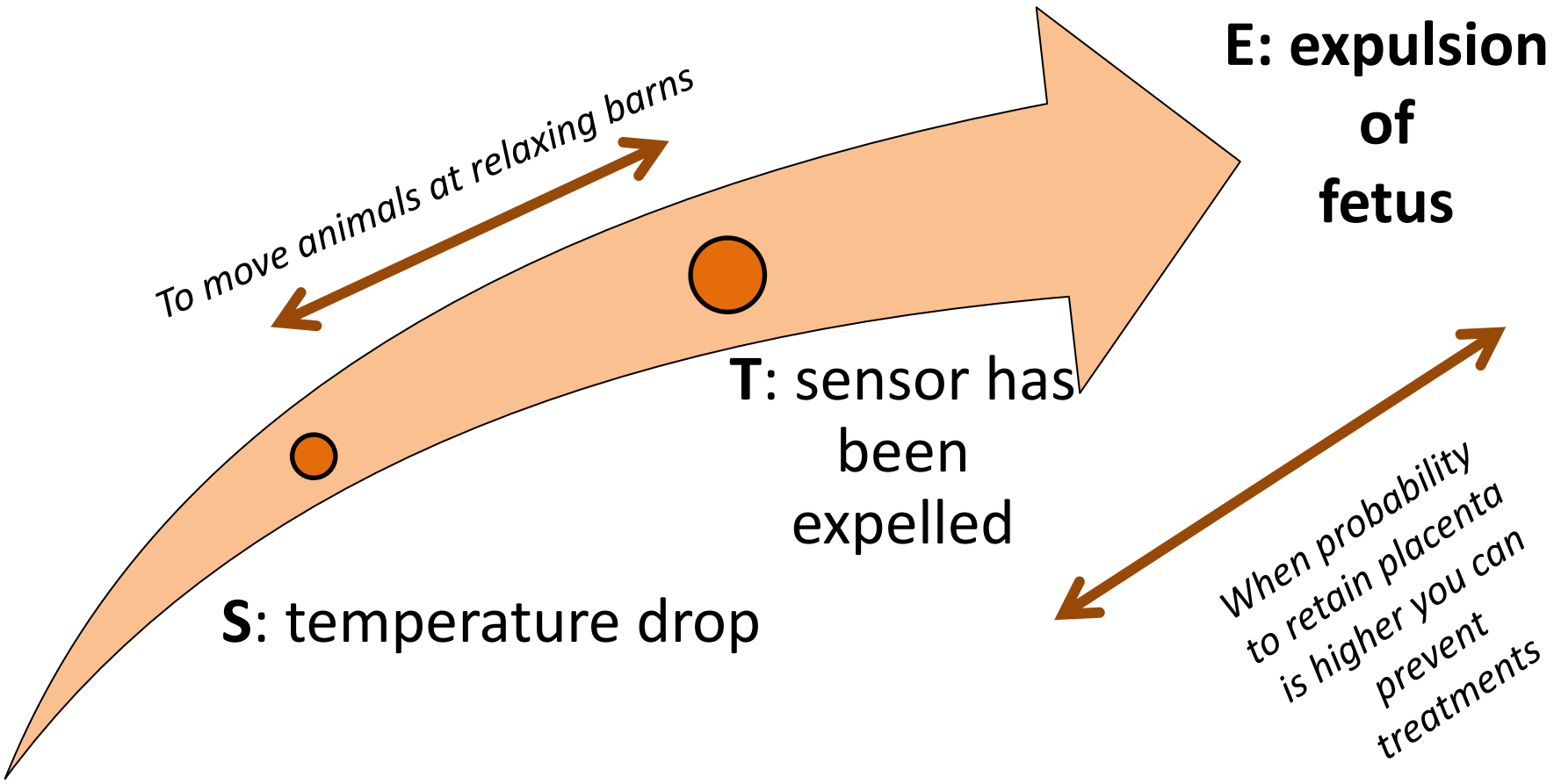
Informe 1/1 20h00
016TA 38.6
01AYT 38.6
21:03

sáb., 26/09/2015

016TA expulsion a 05h17.

EXPULSION OF FETUS

VEL´PHONE


To move animals at relaxing barns
E: expulsion of fetus
T: sensor has been expelled
S: temperature drop
When probability to retain placenta is higher you can prevent treatments

33% of calvings are difficult

(Barrier et al., 2013)

SHEET DATA COLLECTION

CALVING DATE	IDENT. NUMBER	SECOND WARNING (YES/NO)	HOURS	THIRD WARNING (YES/NO)	MINUTES	REMOVAL PLACENTA (YES/NO)
03/07/2014	992	YES	24	YES	55	YES
18/07/2014	731	YES	12	YES	15	NO
20/07/2014	1172	YES	10	YES	30	YES
04/08/2014	1122	YES	6	YES	45	YES
07/08/2014	991	NO	-	YES	90	YES
07/08/2014	1965	NO	-	YES	90	YES

RESULTS-CONCLUSIONS

- 14.9 % of devices did not send second warning.
  - 5% failed in third warning.

1. Animals calved before the expected data.
2. Vel´Phone was placed too late.

RESULTS-CONCLUSIONS

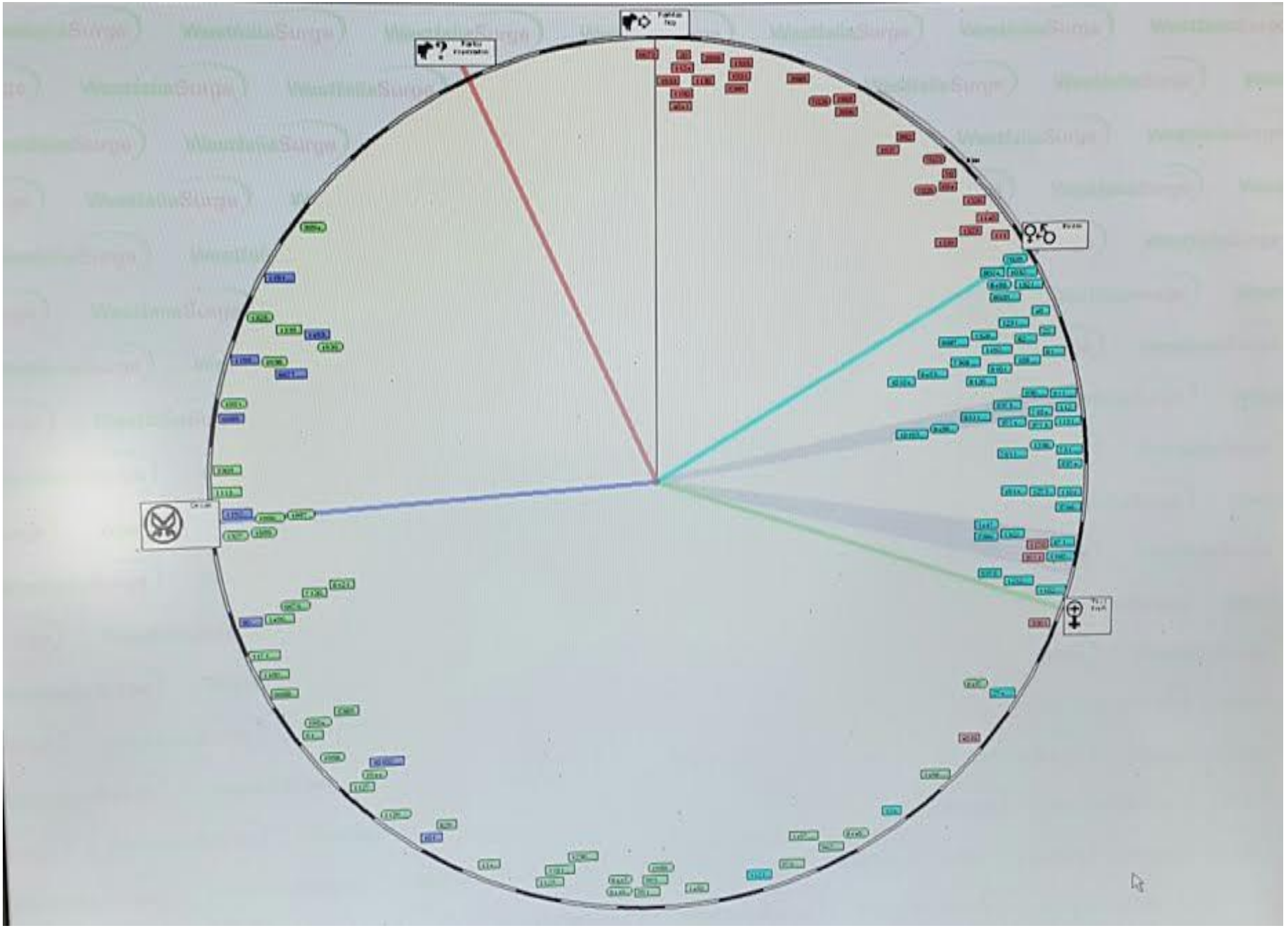
	SECOND-THIRD WARNING (S-T)	THIRD WARNING-EXPULSION OF FETUS (T-E)
RETAINED PLACENTA	17.0±1.7h	176.7±63.3 min
NO RETAINED PLACENTA	26±4h	94.1±12.8 min

NO SIGNICANT DIFFERENCES

$p < 0,05$

RESULTS-CONCLUSIONS

- The next step was to combine above information with another data from pedometer or behaviour and can predict future events.

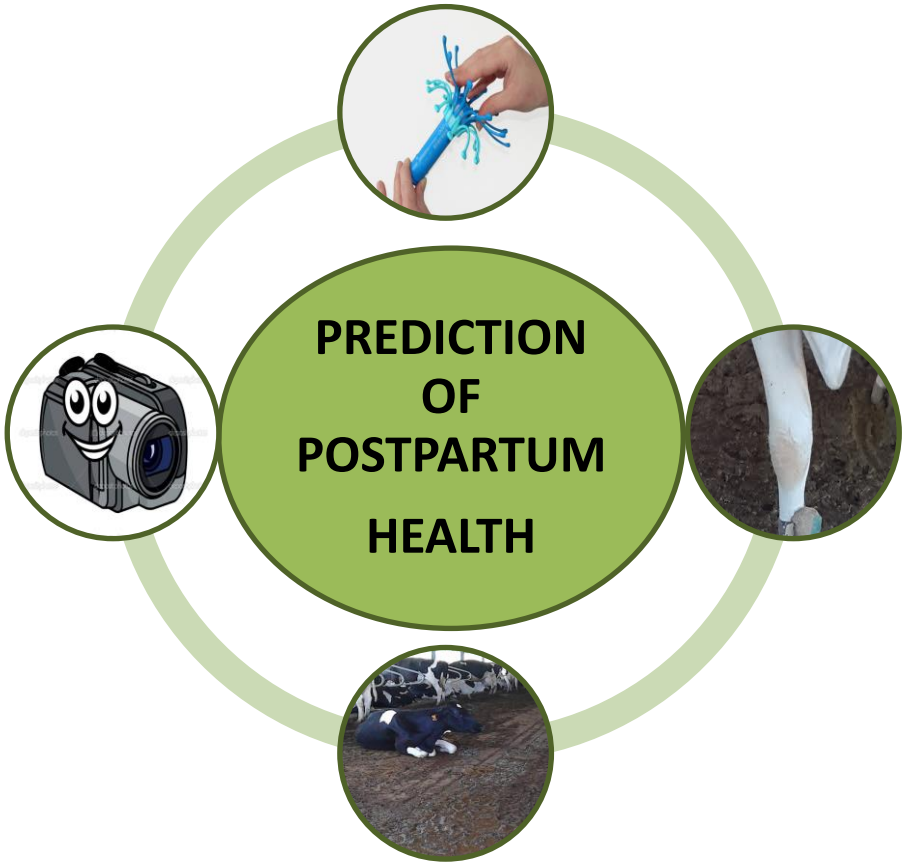


NUMBER COW	CALVING DATA	INCIDENTS	FIRST INSEM	NUMBER INSEM	PREG (YES/NO)	PREG DATA
930	31/08/14	FMR	1/11/14	8	**NO**	-
1100	25/09/14	FMR	14/01/14	3	YES	23/05/15
1170	16/12/13	FMR	31/01/15	8	YES	21/09/14
1124	18/09/14	-	02/12/14	2	YES	23/12/14
101	22/09/14	-	29/12/14	2	**YES**	28/04/15
1127	05/10/14	-	16/04/15	1	YES	16/04/15
70	22/08/14	-	04/10/14	2	YES	20/11/14

CONCLUSIONS

1. *These are preliminary results but it is the first step to begin predicting future situations.*
2. *We have started to link some results of cows with FMR and interval calving-fertilizing insemination.*
3. *The most important is the combination of different sensors and indicators to predict health of cow.*

CONCLUSIONS



To enhance a better prediction of FMR, beside Vel´Phone, we have started to use a pedometer 20d before delivery which gives us information of cows which would suffer some pathologies in postpartum and in this way we will attend to this group of animals and not all. This is very important to economic level.


THANKS FOR YOUR ATTENTION