

# Differences between S/X and VLBI2010 operation

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# IVS Observation Calender

## classic S/X vs. VLBI2010

S/X IVS-Operation 2010, Jan-Apr						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

present  
individual 24h sessions

VLBI2010 IVS-Operation 2010, Jan-Apr						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

future  
24h/7 days observation

## Turnos Enero 2010

		07-15 Hrs	15-23 Hrs	23-07 Hrs	Experimento	Destino
Vi	1					
Sa	2					
Do	3					
Lu	4	CD	PZ	MS	R1412	BONN
Ma	5	EO				
Mi	6					
Ju	7	PZ	CD	MS	R4412	WASH
Vi	8	EO				
Sa	9					
Do	10					
Lu	11	EO	CD	PZ	R1413	BONN
Ma	12	EO				
Mi	13					
Ju	14	PZ	CD	EO	R4413	WASH
Vi	15	PZ				
Sa	16					
Do	17					
Lu	18					
Ma	19	PZ	CD	EO	R1414	BONN
Mi	20	PZ				
Ju	21	PZ	EO	CD	R4414	WASH
Vi	22	PZ				
Sa	23					
Do	24					
Lu	25	CH	CD	MS	R1415	BONN
Ma	26	CH				
Mi	27					
Ju	28	CH	MS	CD	R4415	WASH
Vi	29	CH				
Sa	30					
Do	31					

<b>CD</b>	Cristian	Duguet	08-7352310
<b>HH</b>	Hayo	Hase	2461273 (Casa) - 09-2995827
<b>CH</b>	Cristian	Herrera	09-1230702
<b>EO</b>	Eric	Oñate	2414962 (Casa) - 08-2944207
<b>SS</b>	Sergio	Sobarzo	2283627 (Casa) - 09-1299477
<b>MS</b>	Miguel	Soto	08-7671568
<b>PZ</b>	Pedro	Zaror	2225581 (Casa) - 09-9970747

# Shifts at TIGO

- 4 shifts per 24h session
- night-shift 23:00-07:00 is undesired by operators
- limited amount of staff available

How do we realize VLBI2010 continuous observation?

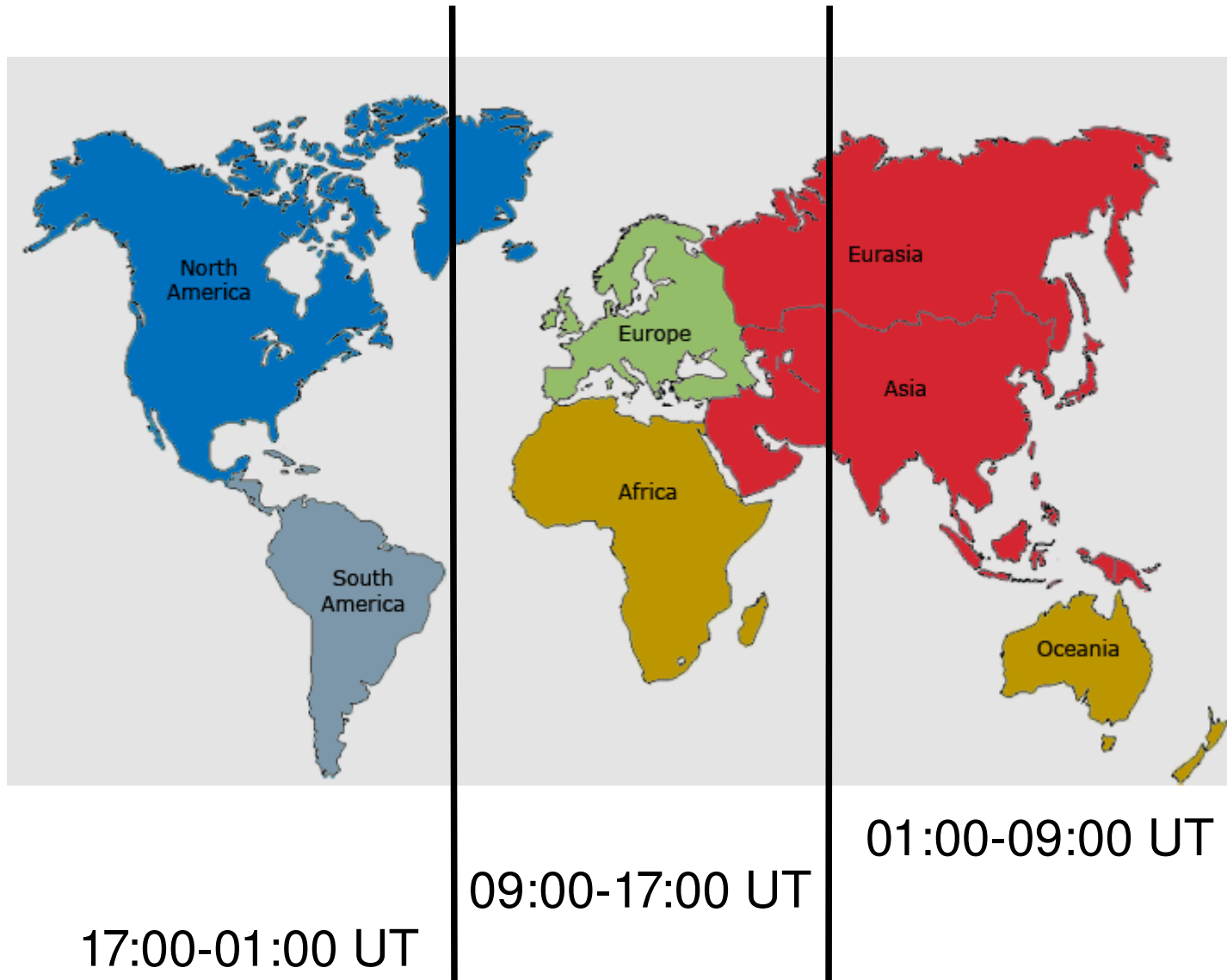
# Conditions for network control of VLBI operation

We need

- **reliable radio telescopes**
  - Does your radio telescope support unattended errorless operation during 24h?
- **reliable remote control software**
  - Does your remote control software address the important control parameters to fulfill safety issues and full Field System operation?
- **reliable communication** between the control center and the remote controlled stations
  - Is the intercontinental communication sufficient stable and software sufficient robust?

If 3x "yes",  
then you may try  
VLBI2010.

# 24h VLBI Network Control using daylight zones



## Turnos Enero 2010

		07-15 Hrs	15-23 Hrs	23-07 Hrs	Experimento	Destino
Vi	1					
Sa	2					
Do	3					
Lu	4	CD	PZ	MS	R1412	BONN
Ma	5	EO				
Mi	6					
Ju	7	PZ	CD	MS	R4412	WASH
Vi	8	EO				
Sa	9					
Do	10					
Lu	11	EO	CD	PZ	R1413	BONN
Ma	12	EO				
Mi	13					
Ju	14	PZ	CD	EO	R4413	WASH
Vi	15	PZ				
Sa	16					
Do	17					
Lu	18					
Ma	19	PZ	CD	EO	R1414	BONN
Mi	20	PZ				
Ju	21	PZ	EO	CD	R4414	WASH
Vi	22	PZ				
Sa	23					
Do	24					
Lu	25	CH	CD	MS	R1415	BONN
Ma	26	CH				
Mi	27					
Ju	28	CH	MS	CD	R4415	WASH
Vi	29	CH				
Sa	30					
Do	31					

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# Shifts at TIGO

## Proposal:

- **blue** shifts: TIGO to be controlled by Wettzell
- **green** shifts TIGO controls Wettzell
- both stations liberate each 8 night shifts =>

## Turnos Enero 2010

		07-15 Hrs	15-23 Hrs	23-07 Hrs	Experimento	Destino
Vi	1					
Sa	2					
Do	3					
Lu	4	CD	PZ	Wetzell	R1412	BONN
Ma	5	EO	MS	Wetzell	Extra	
Mi	6	MS				
Ju	7	PZ	CD	Wetzell	R4412	WASH
Vi	8	EO				
Sa	9					
Do	10					
Lu	11	EO	CD	Wetzell	R1413	BONN
Ma	12	EO	PZ	Wetzell	Extra	
Mi	13	EO	CD	Wetzell	Extra	
Ju	14	PZ	CD	Wetzell	R4413	WASH
Vi	15	PZ				
Sa	16					
Do	17					
Lu	18					
Ma	19	PZ	CD	Wetzell	R1414	BONN
Mi	20	PZ	EO	Wetzell	Extra	
Ju	21	PZ	EO	Wetzell	R4414	WASH
Vi	22	PZ				
Sa	23					
Do	24					
Lu	25	CH	CD	Wetzell	R1415	BONN
Ma	26	CH	MS	Wetzell	Extra	
Mi	27	CD				
Ju	28	CH	MS	Wetzell	R4415	WASH
Vi	29	CH				
Sa	30					
Do	31					

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# Shifts at TIGO

- redistributing liberated blue shifts
- TIGO's night shifts controlled by Wetzell and vice versa
- gain: **5 extra experiments** at both stations (e.g. new R2)

# 24h VLBI Network Control

## Human resources required

### Station Control

- 8 stations = 8 operators per 8h shift
- 24h = 4 shifts
- Total: 32 shifts
- Total: 24 staff
- 3 staff per station

### Network Control

- 8 stations = 1 operator per 8h shift
- 24h = 4 shifts
- Total: 18 shifts
- Total: 10 staff
- 2 staff per station



# 24h/7d VLBI Network Control

Human resources required (best case)

## Station Control

- 8 stations = 8 operators per 8h shift
- 24h/7d = 21 shifts
- Total: 168 shifts
- Total: 48 staff
- 6 staff per station

We don't have that!

## Network Control

- 8 stations = 1 operator per 8h shift
- 24h/7d = 21 shifts
- Total: 70 shifts
- Total: 24 staff
- 3 staff per station

Yes, we can do it!

# Network control

- should always **be shared** among station owners according to the spirit of the international collaboration
- should be **decentralized** and **time-shared** by the IVS components
- **needs engineers** locally at each site (not only in emergency cases)!
- could be **centralized** at correlators for **eVLBI** operation

# Conclusion

- **24h/7d** VLBI2010 operation is only possible with **network control** instead of station control.
- Remote control **tests** with ongoing S/X runs are on the agenda **now**.
- New reliable radio telescopes are being build.
- Remote control software is under development.  
(Attend presentation of Neidhardt, Ettl)
- Communication is stable to many places in the world.

# Network Control Hardware

