# The new MST radar on Andøya/Norway

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## Radar experiments on Andøya island (69°N)





## The old ALWIN antenna array as seen in GoogleEarth





## The ALWIN2 idea

#### Constraints

- frequency allocation (53.5 MHz)
- existing infrastructure

#### Goals

- DBS observation with improved temporal and spatial (50m) resolution
- free beam steering capability
- multiple beam observation
- interferometric applications with 16 (64) receiving channels

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eiger 69°17'55.64" N 16°02'30.54" O

IAP

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## ALWIN2

#### The dimension and structure of the planned antenna array





### Prototypes of the ALWIN2 antenna





### ALWIN2 – array of 433 3-element Yagi antennas Radiation pattern for $\phi=0^{\circ}$ , $\theta=0^{\circ}$



Number of antennas	433
Directive gain of array	33.7 dBi
HPFW of main lobe	3.6°
Side lobe attenuation	-17.7 dB





### ALWIN – ALWIN2 Radiation patterns for $\phi$ =315°, $\theta$ =21°





#### allocation of antennas to 6 transceiver containers





#### Block diagram 1





#### transceiver block diagrams





- a state of the art VHF solid state pulsed transmitter and down converter
  - 53.5 MHz
  - 2kW peak power
- widely programmable operating parameters:
  - frequency,
  - phase
  - amplitude
  - pulse shapes
  - pulse lengths (≥ 0.33µs)
- vector RF detection circuitry for continuous monitoring on a pulse-to-pulse basis of
  - output power
  - phase
  - load impedance



### Block diagram 2





### Block diagram of multi function combiner





#### Allocation of 61 IF signals to 16 baseband receivers





permanent DBS configuration combined to reciever 1





#### example of a spaced antenna receiving





example of a spaced antenna receiving configuration





### ALWIN2 – Multibeam mode antenna radiation pattern for 7 beams





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## ALWIN64 – the interim solution

siteplan with 64-antenna array and separate Tx antennas





#### Block diagram of 16 channel receiving system





### ALWIN2 progress of construction





### ALWIN2

expansion stage scheduled for September 2009





## ALWIN2

### progress of construction & specifications

ALWIN webcam 2009-05-18 1 2:00:00		
	Specifications	
- Andrew Contraction of the second	Number of transmitter modules	433 (2 kW)
	Peak power	~800 kW
11/10	Number of antennas	433 3-element (crossed) Yagi antennas
States and the second second	Directive gain of antenna array	23.7 dBi
Laws is a correction	Aperture	~6300 m <sup>2</sup>
	HPFW of antenna beam	3.6°
	Beam directions	arbitrary zenith angles < 30°
	Number of receiving channels	16 (64)
		2
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