

Name of radar station	Weather Operative Radar Center, Fossalon di Grado (GO) (Italy)	San Pietro Capofiume radar (Italy)	Monte Grande Weather radar (Italy)	Noventa di Piave Weather radar (Italy)
Location (Latitude, Longitude, Altitude)	45° 48' N; 13° 28' E, 25 m	44 39'17" N, 11 37'25" E 11 m MSL	45° 21' 46' 'N, 11° 40' 24" E 472 m a.s.l.	45°40'09" N, 12°35'20" E 1,5 m a.s.l
Institution (national, local)	ERSA Friuli Venezia-Giulia	Servizio Meteorologico Emilia-Romagna	ARPAV - SMR Via G. Marconi 55, I-35037 Teolo (Padova), Italy	ARPAV - SMR Via G. Marconi 55, I-35037 Teolo (Padova), Italy
Name, phone, Email of person answering	Dr Ettore Dietrich (dietrich@hail.ersa.fvg.it) +39 431 35177 - 88032 ; Dr Stefano Micheletti (smich@forecast.ersa.fvg.it) +39 431 34281 ; Roberto Fabbo (fabbo@radar.ersa.fvg.it) +39 431 88032	Sandro Nanni, +39 51 284559, E-mail: radar@meteo2.arpamet.regione.emilia-romagna.it	Dr. Marco Monai Phone: +39 49 9998111 Fax: +39 49 9925622 e-mail: meteo@csim.campiello.it	Dr. Marco Monai Phone: +39 49 9998111 Fax: +39 49 9925622 e-mail: meteo@csim.campiello.it
Manufacturer of radar	ALENIA - SMA	ALENIA - SMA	EEC - ERICSSON	EEC - ERICSSON
Responsible	Dr Ettore Dietrich	x	Dr. Marco Monai	Dr. Marco Monai
Date installed, updated	Sep. 1996	1989, fully operational 1992	Installed '88 Renewed end '98	Will be installed in spring '99
Operational or research	both	Operational	Operational	Operational
Time of operations	as necessary	x	24 hours	24 hours
Frequency	5.42 - 5.63 Ghz (8 channels)	5.43 GHz	5.30 - 5.70 GHz	5.30 - 5.70 GHz
Transmitted power	>700 kW (peak power)	500 kW	250 kW (peak power)	250 kW (peak power)
Antenna size	5 m dual-offset Cassegrain	5 m (diameter)	4.2 m (diameter)	4.2 m (diameter)
Beamwidth at 3 dB	0.9 deg	0.9 deg	1 deg	1 deg
Gain	> 46 dB	46 dB	45 dB	45 dB
Radome (Yes/No)	no	no	yes	yes

Sensitivity (dBm)	the receiver noise figure is 3.65 dB	-105,-108,-112 dBm	-109, -112 dBm	-109, -112 dBm
Pulse Repetition Frequency	1200 - 600 - 300 Hz	1200, 600, 300 Hz	250, 787, 885, 1180 Hz	250, 787, 885, 1180 Hz
Pulse width	0.5 - 1.5 - 3.0 μ s	0.5 - 1.5 - 3.0 μ s	0.4 - 0.8 - 2 μ s	0.4 - 0.8 - 2 μ s
Doppler capability, Nyquist velocity	yes 16 m/s - 48 m/s (dual PRF)	yes 16.5 m/s - 49 m/s (dual PRF)	yes 48 m/s	yes 48 m/s
Polarization capability, quantities measured	yes ZH, ZDR	yes ZH, ZDR	no	no
Minimum reflectivity at 10 km	x	-12 dBZ		
Range (maximum, used)	64, 125, 250, 480 km	400, 250 (125 Doppler) km.	(maximum/used) : 240/240 km in no-Doppler mode, 120/120 km in Doppler mode	(maximum/used) : 240/240 km in no-Doppler mode, 120/120 km in Doppler mode
Rotation per minute (maximum, used)	5 RPM max, as necessary	5 max, 4 used	2 - 6 RPM	2 - 6 RPM
Clutter suppression	yes	Dynamic clutter suppression	fix map in no-Doppler, Moving Target Indicator (MTI) in Doppler mode	fix map in no-Doppler, Moving Target Indicator (MTI) in Doppler mode
Type of calibration	daily internal, occasionally by sphere	x	bite	bite
Number of rain gauges for calibration, range	none	At least 20, between 10 and 110 km	54 across the region	54 across the region
Different modes operated	volume scan, sectorial (azimuth and elevation) scan	The following volumetric acquisitions are changed every 5 minutes: 1 : Z, V,sV with dynamic clutter suppression up to 125 km range; 2 : Z,Zdr,V,sV up to 125 km range; 3 : Z up to 250 km range	no-Doppler, Doppler,	no-Doppler, Doppler,

Elevation(s) used	up to 20 elevations, to be decided	modes 1 and 3 : 4 elevations 0.5, 1.4, 2.3, 3.2 deg; mode 2 : 16 elevations 0.5, 1.4, 2.3, 3.2, 4.1, 5, 5.9, 6.9, 8, 9.5, 10.5, 14, 16, 18, 20 deg.	0.5°, 1°, 1.5°, 2.5°, 3.5°, 4.5°, 6°, 7.5°, 10°, 15°	0.5°, 1°, 1.5°, 2.5°, 3.5°, 4.5°, 6°, 7.5°, 10°, 15°
Range resolution of accessible, raw data	from 65 m, depending on range.	modes 1 and 2 : 250 and 125 m; mode 3 : 1000 and 250 m RESPECTIVELY	raw data not accessible	raw data not accessible
Azimuthal resolution of accessible, raw data	0.9 deg	1 deg	raw data not accessible	raw data not accessible
Possibility of modifications to adapt scanning	yes	limited	yes	yes
Scan(s) duration	as necessary	Mode 1 : 1' 04"; mode 2 : 4' 40"; mode 3 : 1' 12"	2-6 min.	2-6 min.
Time interval	as necessary	5 min maximum; the 3 modes are repeated every 15 min.	15 min	15 min
List of products	all COST 73 products and others	CAPPI Z at 500 m AGL, CAPPI Z at 3000 m AGL, CAPPI V at 500 m AGL, HVMI (Horizontal Vertical Maximum Intensity), SRI	Reflectivity and radial velocity, Rainfall intensity and Surface Rain Total, Spectral width (2nd trip and ground clutters), Velocity Azimuth Display wind profiles	Reflectivity and radial velocity, Rainfall intensity and Surface Rain Total, Spectral width (2nd trip and ground clutters), Velocity Azimuth Display wind profiles
Use of products	hail prevention research, operative radarmeteorology	Rainfall estimation, weather bulletins	Rainfall estimation, nowcasting	Rainfall estimation, nowcasting
Interval of products	to be decided	15 min	15 min	15 min
Area covered by products	within the radar range	Up to 110 km for CAPPI Z at 500 m, 250 km for HVMI	no-Doppler mode: 240 km range, Doppler mode: 120 km range	no-Doppler mode: 240 km range, Doppler mode: 120 km range
Transmission formats (national, european)	both, BUFR	x		
Pixel resolution of products	from 0.068 km ² at 60 km, from 0.136 km ² at 120 km	250 m for modes 1 and 2, 1000 m for mode 3	no-Doppler mode: 2 km ; Doppler mode: 1 km	no-Doppler mode: 2 km ; Doppler mode: 1 km
Projection algorithm	x	x	Conical Lambert Projection	Conical Lambert Projection

Ease for modifications	yes	x	No	No
Data archived: type, format,	to be decided	Volumetric for Z, Zdr, V, σV	standard Ericsson format	standard Ericsson format
Size of uncompressed, compressed products	to be decided	about 180 and 60 kByte	Polar volume: 510 kByte (uncompressed), 25-450 kByte (compressed) ; Rectangular volume (CAPPI) : 57 kByte (uncompr.), 10-40 kByte (compr.).	Polar volume: 510 kByte (uncompressed), 25-450 kByte (compressed) ; Rectangular volume (CAPPI) : 57 kByte (uncompr.), 10-40 kByte (compr.).
Device used for archiving	8mm tape (EXABYTE) and probably CD ROM	DAT tapes	TK 70 Compact Tape, DAT	TK 70 Compact Tape, DAT
Access to archived products and raw data	on demand, also by FTP	x		
Planned modifications	x	x		
	the radar will be fully operative in January 1997: thus a lot of operative modes are still to be decided.	x		

Montagnana (Firenze)	Bric della Croce (Italy)	Name of radar station	Monte Rasu (Italy)	Pisa (Italy)
43° 40' 02" N, 11° 06' 53" 220 m	45° 02' 04" 'N, 7° 43' 59" E 727 m	Location (Latitude, Longitude, Altitude)	40° 25' 15" 'N, 9° 00' 19" E 1258 m	43.683° N, 10.383° E 30 m
Istituto di Fisica dell'Atmosfera (CNR)	Regione Piemonte	Institution (national, local)	Servizio Agrometeorologico Regionale della Sardegna, Vialle Porto Torres, 119 - 07100 Sassari (Italy)	Italian Air Force Meteorological Service
Ing. Baldini Luca (PIN) +39 574 602535	M. Gabella +39 11 564 4067 perona@polito.it	Name, phone, Email of person answering	Gianluca Bandinelli Phone: +39 79 158601 e-mail: banda@sar.sardegna.it	Maj. Sivio Cau Phone: +39 6 599 6333
SMA (ricetrasmittitore), ENTERPRISE (Antenna)	ALENIA - GEMATRONIK	Manufacturer of radar	ERICSSON - ALENIA	ALENIA
IFA (CNR) e Dipartimento Ingegneria Elettronica (Firenze)	Ing. O. Ghigo Prof. G. Perona (Science)	Responsible	Giuseppe Bianco, Gianluca Bandinelli	Ltc Giuseppe Bacci
1991	September '99	Date installed, updated	1998 (estimated)	1996
Research	Operational	Operational or research	Operational	Operational
Field Experiments	24 hours	Time of operations	24 hours	24 hours
5.395 - 5.595 GHz	5.70 GHz	Frequency	5.60 - 5.65 GHz	5,45 - 5,65 GHz
500 kW	250 kW (peak power)	Transmitted power	250 kW (Peak Power)	540 kW
4.57 m (diameter)	4 m (diameter)	Antenna size	4.2 m (diameter)	non-centered optic with double Cassegrain-type reflector of 4.5 m diameter
1 deg	1 deg	Beamwidth at 3 dB	0.9°	1°
45.5 dB	45 dB	Gain	45 dB	45 dB
no	yes	Radome (Yes/No)	yes	no

- 110 dBm		Sensitivity (dBm)	S/N=0 dB (-10 dBZ target) at 79 km	0.2 dB
1200, 500, 250 Hz		Pulse Repetition Frequency	300 / 600 / 900 / 1200 Hz	300 / 600 / 900 / 1200 Hz
0.5, 1.5 , 3.0 μs		Pulse width	0.5, 1.5 , 3.0 μs	0.5, 1.5 , 3.0 μs
yes 16.5 m/s	yes	Doppler capability, Nyquist velocity	yes 16 m/s, 48 m/s (dual-PRF)	yes
yes ZH, ZDR	no	Polarization capability, quantities measured	no	yes ZH, ZDR
-20 dBZ		Minimum reflectivity at 10 km	x	x
400 km, 100 km (Doppler mode)	240 Km	Range (maximum, used)	max: 500 km Doppler: 125 km	max: 500 km Doppler and dual-polarization: 125 km
max 6 RPM, used 2 RPM		Rotation per minute (maximum, used)	6 RPM max	max 10 RPM
Yes No in doppler mode	Moving Target Indicator (MTI) in Doppler mode	Clutter suppression	>30 dB	>30 dB
Sphere, Multiparameter self-consistency principle		Type of calibration	x	x
no		Number of rain gauges for calibration, range	51 raingauge stations (10 min acquisition) across the region	x
1 : ZH ; 2 : ZH, ZDR; 3 ; ZH, ZDR, V, Doppler Width		Different modes operated	x	ZH, ZDR, Doppler

1.5, 2.5, 3.5, 4.5, 5.5, 7.5, 9.5, 14, 20, 36 deg		Elevation(s) used	x	-2°, +90°
125 m		Range resolution of accessible, raw data	x	64 to 2000 m
1 deg		Azimuthal resolution of accessible, raw data	x	1 deg
Yes		Possibility of modifications to adapt scanning	x	x
5 min.		Scan(s) duration	x	to be determined
10 min		Time interval	x	30 min
Zh, ZDR, V maps		List of products	x	SRI, SRT, ART, VMI, ETM, AVM, CMM, ASM
Research		Use of products	x	Flight assistance, agriculture, hydrology
x		Interval of products	x	30 min
90 km range		Area covered by products	x	x
x		Transmission formats (national, european)	x	BUFR X.25 protocol
1 km		Pixel resolution of products	x	512x512
x		Projection algorithm	x	x

x		Ease for modifications	x	x
Binary, IFA format		Data archived: type, format,	x	x
15 MByte (uncompressed)		Size of uncompressed, compressed products	x	x
Optical Disk		Device used for archiving	x	x
x		Access to archived products and raw data	x	x
Differential Phase Shift		Planned modifications	x	x
x			x	x

Istrana (Italy)	Stazione Sperimentale de Spino d'Adda
45.694° N, 12.107 E m 70	45° 24' N, 9° 30' E 80 m (TO BE CONFIRMED)
Italian Air Force Meteorological Service	CNR, Politecnico di Milano
Maj. Sivio Cau Phone: +39 6 599 6333	M. Eugenio Marzano +39 373 965 155
Plessey	SELENIA
Ltc Umberto Santoro	Prof. Carlo Capsoni
1996	Oct. 1979
Operational	Research (to become operational)
24 hours	Daytime
5,450 - 5,825 GHz	2.8 GHz
250 kW	475 kW
parabolic reflector of 2,44 m diameter	3.6 m (diameter)
1,5°	2°
40 dB	38.2 dB
no	no

1dB	– 104 dBM
300 Hz	500 / 1000 Hz
2 μs	0.5 μs
no	yes 25 m/s
no	no
x	4 dBZ (with 10 dB S/N)
200 km	150 km
0.1 - 6 RPM	5 RPM max, 3 rpm operational
Hardware	Off-line
x	signal injection, event basis
x	1
conventional	Volume scans, RHI, fixed path, zenith

volumetric scanning (-2°, +90°)	Volume scans: 1.5, 2.5, 4.5, 6.5, 8.5, 12.5, 15.6, 20.5, 24.5, 30.5, 38.5, 46.5 °
100 m	from 150 to 1200 m, range dependent
1.5 deg	2 deg.
x	yes
to be determined	24 sec /scan, 5 min/volume scan
30 min	10 min
SRI, SRT, ART, CAPPI, VMI, Max Precip, ETM, RHI, PPI	x
Flight assistance	x
30 min	x
x	x
BUFR X.25 protocol	x
0.5 km x 0.5 km	x
x	x

x	x
x	raw data
x	x
x	DAT tapes
x	to be defined
x	x
x	x