

## day 1: 20 Feb 2017

### *morning: introduction radar theory*

start	end	topic	lecturer (co-lecturers)	topics covered
09:00	09:10	welcome venue host & sponsor	Terna	
09:10	09:45	welcome	Adriaan Dokter	house keeping, introduce instructors, goals of the course
09:45	10:30	L1.1 short history (weather) radar aeroecology	tbd	
10:30	11:00	coffee		
11:00	11:45	L1.2 Introduction radar theory	Robb Diehl	physics electromagnetics, radar on, RCS, aspect effects, Rayleigh vs Mie vs reflective scattering
11:45	12:30	L1.3 basic weather radar products & animal signatures in radar data	Alistair Drake, Jarmo Koistinen, Phil Stepanian	short intro Z,V products, introduction appearance birds / insects, wing-beat patterns, triangle of velocities
12:30	14:00	lunch		

### *afternoon: handling, visualising and inspecting radar sca*

14:00	15:30	P1.1 practical 1: basic radar data visualisation	Phil Stepanian (Adriaan Dokter, Vladislav Kosarev)	downloading radar data, concept of scans & volumes, plotting PPIs & RHIs
15:30	16:00	break		
16:00	17:30	P1.2 practical 2: interpreting PPIs, using collection of case studies	Jarmo Koistinen (Phil Stepanian, Jeff Buler, Robb Diehl)	Appearance of animals in radar data, basic interpretation & identification

### **evening joint dinner in Rome**

## day 2: 21 Feb 2017

### *morning: quantifying and identifying biological signatures*

start	end	topic	lecturer	topics covered
09:00	09:45	L2.1 weather radar products continued & short review previous day	Hidde Leijnse	difference Z, eta, dbZ, range folding, velocity aliasing, texture fields, X/C/S-band differences animal signatures, radar processor settings, clutter suppression, dual-PRF
09:45	10:30	L2.2 quantification algorithms of biological signatures	Adriaan Dokter	VPR, VAD, VPR algorithm, dealiasing algorithms, ground truthing / validation
10:30	11:00	coffee		

11:00	11:45	L2.3	intrduction to dual-polarimetry	Phil Stepanian	polarization, dual-pol moments, body orientation
11:45	12:30	L2.4	(weather) radar entomology	Alistair Drake (Hongqiang Feng)	large-scale alignments, diurnal insect bloom, bird/insect mixtures, layering, altitudinal patterns
12:30	14:00		lunch		
14:00	15:30	P2.1	practical 1: obtaining & processing raw radar data into vertical profiles of birds (VPBs)	Vladislav Kosarev (Adriaan Dokter)	
15:30	16:00		break		
16:00	17:30	P2.1	practical 2: visualizing and interpreting VPB output	Adriaan Dokter (Vladislav Kosarev, Hidde Leijnse)	

### day 3: 22 Feb 2017

#### *morning: advanced topics in radar aeroecology*

start	end		topic	lecturer	topics covered
09:00	09:45	L3.1	Migratory stopover	Jeff Buler	potential of radar to identify stopover, exodus timing, range & azimuth bias
09:45	10:30	L3.2	Group discussion or activity: how to design good radar research questions. What are the general strengths & limitations of radar techniques	all	
10:30	11:00		coffee		
11:00	12:30	P3.1	practical 1: dual-polarimetry	Phil Stepanian (Jarmo Koistinen, Hidde Leijnse)	
12:30	14:00		lunch		
14:00	15:30	P3.2	practical 2: spatial analyses within low-elevations scans / simple habitat associations	Jeff Buler, Robb Diehl	examining effects of range bias, making geo-referenced polar base grids and clutter maps, basic GIS operations, determining sampling times for mapping animal distributions
15:30	16:00		break		
16:00	17:00	L3.3	Radar in aeroecology: what have we learnt, what are the frontiers?	Thomas Alerstam	
17:00	17:30		closing		