ELEMENTS TO CONSIDER WHEN MODELLING FIRE BEHAVIOUR

ACT ESA WILDFIRE ANALYSIS TOOLS #7 July 2010.

ALGORITHM:
- McArthur FDI
- Red Book
- Vesta
- Rothermel
- Other overseas models

TIMING:
- Planning cycle
- Diurnal FDI cycle
- Field intel cycle
- Time taken for model run

TERRAIN:
- Dataset in use
- Scale of DEM vs fire scale
- Ruggedness class
- How are slope and wind vectors combined?
- Issues using LIDAR data for slope-aspect

WIND:
- Wind Regime
- Onset of eddies
- Wind - terrain interaction:
  Simple
  Look-up Table
  Mass Conservation
  CFD model
- Gridded Weather from ADFD

CHANNELLING:
- Pressure-driven channelling
- Forced channelling
- Lee-slope channelling
- Spotfire swarm

ORIGIN TIMING:
- Ignition
- Diurnal awakening
- Breakaway
- Spotover

ISOCHRONES (ONION RINGS):
- Error bars: earliest arrival vs most likely
- Handling of spotfires

CONTROL LINE OPTIONS:
- Dataset in use
- Time of arrival
- Fire behaviour on arrival

SPREAD VECTORS:
- Error bars for ROS
- Wind variation - use of Pasquill's Index & multiple vector sets

FUEL:
- Dataset in use
- Stylised from vegetation and fire age vs measured
- Surface fuel only vs elevated fuel
- FMC: reflects DF - use of SDI vs KBDI

SPOTFIRES:
- Independent vs drawn into main fire
- Acceleration phase

THEMATIC MAPS:
- Rate of Spread
- Intensity
- Flame Height
- Flame Angle
- spotting Distance

THREATENED ASSETS:
- Dataset in use
- Time of arrival
- Fire behaviour on arrival

MAIN AXIS (PATH OF MAXIMUM SPREAD):
- Maximum Rate of Spread
- Maximum Intensity
- Maximum Spotting distance
- Deep flaming & violent pyro-convection

EXTRINSIC ELEMENTS:
- Stability
- Non-diurnal weather events
- Abrupt surface drying events

WEATHER OBSERVATIONS:
- Fireground vs remote
- Interpolation method
- Diurnal cycle
- Limits to applicability

SCALE ISSUES:
- Chance of transitions
- Indications of watchouts or Red Flag Warnings

FIRE ENVELOPE:
- Handling of dense spotting
- Areas of likely spotting included

SPATIAL IMPLEMENTATION:
- Non-spatial (spreadsheet)
- Isochrone
- Vector
- 3D modelling environment
- MapInfo - ESRI - Proprietary

REPORTING:
- Summary statistics
- GIS product
- ICS stationery
- PDF report
- Printed vs on-line